MCINTOSH COUNTY & CITY OF DARIEN JOINT HAZARD MITIGATION PLAN

December 2024

GMC

McIntosh County Emergency Management Agency

Ty Poppell, Director

Prepared by:
Goodwyn Mills Cawood

Contents

CHAPTER 1 – PLANNING PROCESS 1

SECTION 1 – PURPOSE, NEED, AUTHORITY, AND STATEMENT OF PROBLEM ... 2

SECTION II – PLANNING METHODOLOGY 5

SECTION III – REVIEW AND ANALYSIS OF ORIGINAL PLAN 13

SECTION IV – PLAN ORGANIZATION 14

SECTION V – SUMMARY OF LOCAL HAZARD, RISK, AND VULNERABILITY, AND LOCAL MITIGATION GOALS AND OBJECTIVES 15

SECTION VI – MULTI-JURISDICTIONAL CONSIDERATIONS 20

SECTION VII – ADOPTION, IMPLEMENTATION, MONITORING & EVALUATION 20

SECTION VIII – COMMUNITY DATA 22

SECTION IX – NATIONAL FLOOD INSURANCE PROGRAM 25

CHAPTER 2 – NATURAL HAZARD IDENTIFICATION AND RISK ASSESSMENT 28

SECTION I – COASTAL EROSION 33

SECTION II – COASTAL STORM / HURRICANE 44

SECTION III – DROUGHT 64

SECTION IV – EXTREME HEAT 72

SECTION V – FLOOD 80

SECTION VI – HAILSTORM 97

SECTION VII – TORNADO 103

SECTION VIII – WILDFIRE 112

SECTION IX – WINDSTORM 121

SECTION X – MOSQUITO CONTROL 130

SECTION XI – TECHNOLOGICAL (HAZARDOUS AND RADIOLOGICAL) 137

SECTION XII – PANDEMIC / EMERGENT INFECTIOUS DISEASE 142

CHAPTER 3 – NATURAL HAZARD MITIGATION STRATEGY 146
SECTION I – INTRODUCTION TO MITIGATION STRATEGY 147
SECTION II – NATURAL HAZARDS 163
Natural Hazard I – Coastal Erosion 163
Natural Hazard II – Coastal Storm/Hurricane 163
Natural Hazard III – Drought 163
Natural Hazard IV – Extreme Heat 164
Natural Hazard V – Flood 164
Natural Hazard VI – Hailstorm 164
Natural Hazard VII – Tornado 164
Natural Hazard VIII – Wildfire 165
Natural Hazard IX – Windstorm 165
Natural Hazard X – Mosquito Control 165
SECTION III – MITIGATION ACTION STEP LIST 166

CHAPTER 4 – EXECUTING THE PLAN 190
SECTION I – ACTION PLAN IMPLEMENTATION 190
SECTION II – MONITORING, EVALUATION, UPDATING 192

CHAPTER 5 – CONCLUSION 195
SECTION I – SUMMARY 195
SECTION II – REFERENCES 196

APPENDICES

Appendix A – Hazard Identification, Risk Assessment and Vulnerability (HRV)

1. Descriptions and GEMA Worksheet #3A

Section I – Coastal Erosion	a. Description b. GEMA Worksheet #3A
Section II – Coastal Storm/Hurricane	a. Description b. GEMA Worksheet #3A
Section III – Drought	a. Description b. GEMA Worksheet #3A
Section IV – Extreme Heat	a. Description b. GEMA Worksheet #3A
Section V – Flooding	a. Description b. GEMA Worksheet #3A c. GEMA Worksheet #3B
Section VI – Hailstorms	a. Description b. GEMA Worksheet #3A
Section VII – Tornado	a. Description b. GEMA Worksheet #3A
Section VIII – Wildfire	a. Description b. GEMA Worksheet #3A
Section IX – Windstorms	a. Description b. GEMA Worksheet #3A
Section X – Mosquito Control	a. Description b. GEMA Worksheet #3A
Section XI - Technological (Hazardous and Radiological)	a. Description b. GEMA Worksheet #3A
Section XII - Pandemic /Emergent Infectious Disease	a. Description b. GEMA Worksheet #3A

2. HAZUS Model Results – McIntosh County Hazard Risk Analyses 2017 (Supplement to the McIntosh County Joint Hazard Mitigation Plan)

Appendix B – Growth & Development Trends

1. McIntosh County Partial Comprehensive Plan Update 2008 – Summary
2. McIntosh County Short Term Work Plan Update 2013 – Summary
3. McIntosh County Comprehensive Plan 2018 - Summary
4. Darien Partial Comprehensive Plan Update 2008 – Summary
5. City of Darien Comprehensive Plan 2018 – Summary
6. McIntosh County and City of Darien 2023 Joint Comprehensive Plan - Summary
7. Georgia Coast 2030: Population Projections for the 10-County Coastal Region (2006)

Appendix C – Reports and Plans
1. Regional Plan of Coastal Georgia, 2022
2. Land Use Planning for Hazard Mitigation, Community Report for McIntosh County and City of Darien, 2013
3. McIntosh County Community Wildfire Protection Plan 2018
4. State of Georgia Hazard Mitigation Strategy, 2019
5. Darien Water Resources Ordinance
6. Darien Flood Prevention Ordinance
7. McIntosh County Flood Prevention Ordinance
8. Disaster Recovery and Redevelopment Plan, 2019
9. Language Access Plan, 2024

Appendix D – Documents Used in Planning Process
1. Hazard Frequency Table
2. GEMA Worksheet #1 – Identify the Hazard
3. Review of 2018 Action Steps / Updated 2024 Action Steps
4. Updated Goals and Objectives
5. GEMA Worksheet #4 - STAPLEE
6. Critical Facilities – Exposure to Hazards

Appendix E – Miscellaneous Planning Documentation
1. Public Meeting #1 Notices & HMPUC Invitation Materials
    a. HMPUC Invitee List
    b. HMPUC Letter & Email for Kickoff Invitation
    c. Paper Flyer
    d. Posting Locations for Paper Flyer
    e. Website & Social Media Postings

2. Executive Committee Meeting (Summaries, Attendance & Presentation Materials)
    a. March 25, 2024 Meeting Materials
    b. September 11, 2024 Meeting Materials
    c. October 7, 2024 Meeting Materials

3. HMPUC Committee Meeting (Summaries, Attendance & Presentation Materials
    a. April 30, 2024 Meeting Materials (Public Meeting #1)
    b. June 13, 2024 Meeting Materials
    c. October 22, 2024 Meeting Materials

Appendix F – Glossary of Terms

CHAPTER 1 – PLANNING PROCESS

Table 1.1 provides a brief description of each section in this chapter and a summary of the changes that have been made to the 2018 McIntosh County Joint Hazard Mitigation Plan Update.

TABLE 1.1: SUMMARY OF UPDATES TO CHAPTER 1

Chapter 1 Section	Updates to Section
I. Purpose, Need, Authority and Statement of Problem	Updated dates for previous Hazard Mitigation Plan Update
II. Planning Methodology	Section updated to include current/active list of participants, committee organization, brief summary of meetings, detailed summary of public involvement, establishment of HMPUC, and connection with neighboring communities. Section also updated to include a discussion of how representatives from organizations that work with underserved / disadvantaged communities, and individuals from these communities, were invited to join the HMPUC and attend meetings to provide input on the plan update process. A new subsection was created to list the documentation included in the plan appendix.
III. Review and Analysis of the Original Plan	Section updated with narrative on plan development process, additional or updated planning documents that were used, how plans were reviewed/updated, and a summary of major changes to the plan.
IV. Plan Organization	No major changes.
V. Summary of Local Hazard, Risk, and Vulnerability (HRV), and Local Mitigation Goals and Objectives	Two new "non-natural" hazards were added: 1) Technological (Hazardous and Radiological) and 2) Pandemic / Emergent Infectious Disease. Other updates included the addition of text regarding how the Executive Committee assisted the planning process and updates to the list of Critical Facilities and designation of "Essential Critical" and "Other Critical" Facilities subcategories. Updated Summary of Units and Associated Value by Source for Estimating Potential Losses and updated HAZUS modeling results were included for 2024 to estimate damage, displacement, and debris.
VI. Multi-Jurisdictional Considerations	No changes.
VII. Plan Implementation & Maintenance	Information about the plan adoption by the Darien City Council was added.
VIII. Community Data	Updated to include most recent information from U.S. Census.
IV. National Flood Insurance Program	This is a new section (not present in the 2018 Plan) created to outline the County and City's compliance with NFIP standards.

SECTION 1 – PURPOSE, NEED, AUTHORITY, AND STATEMENT OF PROBLEM

This document, referred to as the McIntosh County and City of Darien Joint Hazard Mitigation Plan (HMP), is the third official update to the plan submitted to and approved by the Federal Emergency Management Agency (FEMA) Region IV in April 2005. The first and second official updates were submitted to and approved by FEMA Region IV in 2013 and 2018, respectively. The contents of this document are intended to provide the framework for hazard mitigation strategies and actions undertaken by local governments within McIntosh County. The purpose of completing these proposed hazard mitigation actions is ultimately the reduction of the overall level of exposure and risk to the citizens of McIntosh County, Georgia. The Hazard Mitigation Plan Update will meet the requirements of the Disaster Mitigation Act of 2000 Public Law 106-390, October 30, 2000, as stipulated in the Interim Final Rule 44 CFR 201.4 Standard State Plan criteria, published on February 26, 2002. Meeting the regulations will allow McIntosh County to maintain eligibility and qualify to secure all federally-declared disaster assistance, including certain types of Public Assistance and hazard mitigation grants available through the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended).

The purpose of the McIntosh County Joint Hazard Mitigation Plan is to create a safer community for McIntosh County residents by reducing the potential for devastation to life and property posed by natural disasters. This purpose will be accomplished by creating a planning document that becomes the foundation for emergency management planning, training and preparedness, and by identifying those hazard mitigation projects that will reduce the impact of hazardous events.

Authority: The Disaster Mitigation Act of 2000 (DMA 2000)

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. DMA 2000 is the latest legislation to improve the planning aspect of that process. The Act reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. The Act establishes a pre-disaster hazard mitigation program and designates new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act identifies the new requirements for planning activities and increases the amount of HMGP funds available to states that have developed a comprehensive mitigation plan prior to disaster.

State and communities must have an approved mitigation plan in place prior to receiving post-disaster HMGP funds. Local mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities. To implement the new DMA 2000 requirements, the Federal Emergency Management Agency (FEMA) prepared an Interim Final Rule, published in the Federal Register on February 26, 2002 at 44 CFR Parts 201 and 206, which establishes planning and funding criteria for states and local communities. The

Rule identifies criteria for detailed Hazard, Risk, and Vulnerability (HRV) assessments.

Failure to meet the new criteria will make state and local governments ineligible for Stafford Assistance, and thus forfeit some types of emergency assistance. The following section describes the existing state planning initiatives and mitigation programs.

Georgia Planning Act

The Georgia General Assembly adopted the Georgia Planning Act in 1989 to encourage better management of growth in previously developed and developing areas of the State while encouraging smart development in less prosperous areas. Although supporting development, the legislature still strives for the conservation and protection of natural and historic resources, protection and promotion of quality of life through proper land use planning, and protection of community facilities. The cornerstone of the coordinated planning program is the preparation of a long-range comprehensive plan by each local government. This plan is intended to highlight community goals and objectives as well as determine how the government proposes to achieve those goals and objectives. With the passage of the Georgia Planning Act of 1989, all of Georgia's 159 counties and 529 cities were designated "Qualified Local Governments." Each of these local governments must maintain their status in order to remain eligible for a range of state and federal assistance programs. Continuing efforts strive for integrating the local hazard mitigation planning with the local comprehensive planning process.

Coastal Marshland Protection

OCGA 12-5-280

The Coastal Marshland Protection Act provides the Coastal Resources Division with the authority to protect tidal wetlands. The Coastal Marshland Protection Act limits certain activities and structures in marsh areas and requires permits for other activities and structures. Erecting structures, dredging, or filling marsh areas require a Marsh Permit administered through the Coastal Management Program.

Erosion and Sedimentation Control

OCGA 12-7-1

The Georgia Erosion and Sedimentation Act requires that each county or municipality adopt a comprehensive ordinance establishing procedures governing land-disturbing activities based on the minimum requirements established by the act. The Erosion and Sedimentation Act is administered by the EPD of the Georgia DNR and local governments. Permits are required for specified land-disturbing activities, including the construction or modification of manufacturing facilities, construction activities, some activities related to transportation facilities, activities on marsh hammocks, and others.

River Corridor Protection

OCGA 12-2-1

The statute informally known as the Mountain and Corridor Protection Act authorizes DNR to develop minimum standards for the protection of river corridors (and mountains,

watersheds, and wetlands) that can be adopted by local governments. The EPD administers the act. All rivers in Georgia with an average annual flow of 400 cubic feet per second are covered by the act, except those within the jurisdiction of the Coastal Marshlands Protection Act. Some of the major provisions of the act include: requirements for a 100-foot vegetative buffer on both sides of rivers, consistency with the Georgia Erosion and Sedimentation Act, and local governments' identification of river corridors in land-use plans developed under their respective comprehensive planning acts.

Shore Protection

OCGA 2-5-230

The Shore Protection Act is the primary legal authority for protection and management of Georgia's shoreline features including sand dunes, beaches, sandbars, and shoals, collectively known as the sand-sharing system. The value of the sand-sharing system is recognized as vitally important in protecting the coastal marshes and uplands from Atlantic storm activity, as well as providing valuable recreational opportunities. The Shore Protection Act limits activities in shore areas and requires a permit for certain activities and structures on the beach. Construction activity in sand dunes is limited to temporary structures on the beach. Construction activity in sand dunes is limited to temporary structures such as crosswalks, and then only by permit from the Georgia DNR, Coastal Resources Division. Structures such as boat basins, docks, marinas, and boat ramps are not allowed in the dunes.

The Watershed and Flood Prevention Act, PL 83-566, August 4, 1954 (16 U.S.C. 1001-1008)

This act authorized the establishment of programs to aid in protecting the lives and property threatened by natural disasters related to watersheds (such as flooding and erosion). Prior to fiscal year 1996, separate programs addressed small watershed planning activities and cooperative river basin surveys and investigations. After the 1996 appropriations act, the activities specified under the Watershed and Flood Prevention Act were combined into the single program known as the Emergency Watershed Protection (EWP) program. The purpose of the EWP program is to assist federal, state, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment as well as to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, water conservation, wetland protection and restoration, water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for wildlife and forest-based industries. Methods of planning and surveying addressed by the program include specific watershed plans, river basin surveys, flood hazard analyses, and floodplain management assistance. The purpose of the plans and surveys is to identify solutions that use land treatment and nonstructural measures to resolve resource problems.

Federal Hazard Mitigation Programs

Because GEMA administers federal hazard mitigation programs for Georgia, GEMA's planning process is inherently integrated into these federal programs, specifically the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), the National Flood Insurance Program (NFIP), the Community Rating System (CRS), Flood Mitigation Assistance Program (FMA), the Map Modernization Project, Repetitive Flood Claims Program (RFC) and Severe Repetitive Loss Program (SRL). The Hazard Mitigation Grant Program (HMGP), authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration in order to reduce the loss of life and property due to hazard events and to enable the implementation of mitigation measures during the immediate recovery period.

The Repetitive Flood Claims (RFC) Grant Program

This program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). The RFC program provides funds to assist States and communities in reducing flood damages to insured properties that have had one or more claims to the National Flood Insurance (NFIP) Fund. RFC grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. Georgia has utilized project grants in the first two years of this program's existence to permanently mitigate NFIP insured structures through property acquisition.

SECTION II – PLANNING METHODOLOGY

Development of the 2024 McIntosh County Joint Hazard Mitigation Plan Update was a concerted effort on the part of McIntosh County and the City of Darien. To meet federal requirements for the plan review and update process, the McIntosh County Board of Commissioners approved the scope of work for the development of the plan. McIntosh County was awarded a Building Resilient Infrastructure and Communities (BRIC) grant from FEMA to assist with preparation of an updated HMP, and McIntosh County selected Goodwyn Mills Cawood (GMC) to provide technical consultation, meeting facilitation, data collection and plan development services.

Two Committees were formed to assist with the 2024 HMP Update, including an Executive Planning Committee and the McIntosh County & City of Darien Joint Hazard Mitigation Plan Update Committee (HMPUC). A description of the how these Committees were formed, the roles of the Committees throughout the planning process, and information about meetings is provided further below and in Appendix E.

Vulnerable Populations

As required by FEMA and GEMA, this Plan update includes information about underserved and disadvantaged populations in McIntosh County and the City of Darien that may be adversely impacted by disasters. These are populations who are disproportionately at risk for loss during a disaster due to social structural factors. FEMA defines undeserved population as the following:

> *"Groups that have limited or no access to resources or that are otherwise disenfranchised. These groups may include people who are socioeconomically disadvantaged; people with limited English proficiency; geographically isolated or educationally disenfranchised people; people of color as well as those of ethnic and national origin minorities; women and children; individuals with disabilities and others with access and functional needs; and seniors."*

Throughout this plan, the terms "underserved" and "disadvantaged" are used interchangeably and the term "vulnerable" is used globally to refer to these populations. The most prevalent vulnerable populations that reside in McIntosh County and the City of Darien include senior citizens, minorities, and economically disadvantaged people. Housing insecure and non-English speaking citizens also reside within McIntosh County. This Plan also describes the planning methodology to ensure adequate representation for vulnerable community members throughout the planning process.

Executive Committee

The Executive Planning Committee consisted of County and City supervisory staff members and was facilitated by GMC. Table 1.2 lists the names and jurisdictions of the Executive Committee members. The purpose of the Executive Committee was to provide input on the composition of the HMPUC to ensure diverse representation, information about local procedures and policies relevant to hazard mitigation planning, and initiatives that were completed since the 2018 HMP plan update. The 2024 HMP Update process began with a meeting of the Executive Committee on March 25, 2024 to identify personnel changes at organizations that previously participated as part of the 2018 HMPUC; identify new Committee invitees to the HMPUC to ensure diverse and expanded representation (as discussed below); and discuss other tasks related to the plan update.

The Executive Committee elected to re-invite representative(s) from all organizations that were part of the 2018 HMPUC to rejoin the 2024 HMPUC Committee as well as private citizens that were previously part of the HMPUC. Representatives from organizations who remained the same were re-invited, or if an individual was no longer with the same organization, an equivalent staff member or volunteer was invited to attend on the organization's behalf. The Executive Committee also elected to invite representatives from seven *additional* organizations to be a part of the HMPUC to seek more diverse representation of disadvantaged and underserved communities (i.e., seven organizations that were not previously invited to join the 2018 HMPUC Committee). In addition, EMA Directors from neighboring counties, including Glynn, Liberty, Long and Wayne County,

were invited to join the HMPUC.

The Executive Committee met two additional times (three meetings total) to discuss the planning process; identify new and/or revise existing hazard mitigation strategies; discuss the location and function of critical facilities and essential critical facilities; complete "data gaps" for the HMP; provide input regarding the HMPUC meetings (i.e., information to discuss at meetings); and provide feedback regarding the draft HMP. Table 1.4 lists meeting dates and a brief summary of topics covered during Executive Committee meetings.

TABLE 1.2: EXECUTIVE COMMITTEE MEMBERS

Representative	Jurisdiction	Title
Patrick Zoucks	McIntosh County	County Manager
Shawn Jordan	McIntosh County	Shawn Jordan
Amy Hitt	McIntosh County	Finance Director
Ty Poppell	McIntosh County	EMA Director
Franklin Wallace	McIntosh County	EMS Chief
Richy Braun	City of Darien	City Manager / Attorney
Kieran McMullen	City of Darien	Director, Planning & Zoning and Code Enforcement

Stakeholder Committee & Public Involvement

As mentioned above, one of the primary initial goals of the planning process was to expand and re-establish the 2024 HMPUC to ensure diverse representation from public and private sectors and non—profit organizations, including community-based organizations in the housing, healthcare, and social service sectors that provide opportunities to vulnerable communities in the County and City. A description of how committee participation was sought to ensure adequate representation is provided above (see the Executive Committee section). The 2024 HMPUC meet three times during the planning process, and electronic correspondence was used to update Committee members as well.

Ty Poppell, McIntosh County EMA Director, sent electronic correspondence or mailed a letter to 64 members of the community inviting them to join or re-join the HMPUC and attend the first kick-off meeting held on April 30, 2024. This included all of the contacts that participated in the previous 2018 hazard mitigation update; additional contacts that were identified by the Executive Committee as described above; and EMA Directors from neighboring counties, including Glynn, Liberty, Long and Wayne County. A complete listing of all HMPUC invitees is included in Appendix E.

To engage the general public in the planning process and ensure the public had a chance to participate in the HMPUC, including citizens of disadvantaged and underserved communities, a Public Meeting Notice advertising the April 30th meeting was placed on the

McIntosh County Emergency Management Agency Facebook page and websites for McIntosh County and the City of Darien. A paper flyer was also posted at key locations in the community to advertise the April 30th meeting to citizens who might not have access to social media and websites, including the County Commissioner's office; courthouse & courtroom foyers; health department; two Coastal Community Health centers; senior citizen building; and at a local church that operates a food bank.

Public Meeting #2: Insert info re: County/City Presentations; note will also be posted on (new) EMA website @ http://www.mcintoshema.com/

HMPUC Meetings

Of the 64 community members invited to the 1st HMPUC meeting held on the morning of April 30th, 38 attended. The 2nd HMPUC Meeting was held on the morning of June 13, 2024; 79 members of the community were invited, and 27 invitees attended. (Everyone who attended the 1st HMPUC Meeting was invited to attend the 2nd meeting and join the HMPUC, and those who did not attend the first meeting were re-invited to join the Committee for the second HMPUC meeting. Fifteen additional community members / representatives of local organization were also invited to attend the 2nd HMPUC Meeting and join the HMPUC that were not initially invited. These additional invitees were identified by the Executive Committee after additional research and/or recommended by participants at the first meeting.) The third and final HMPUC meeting was held on October 22, 2024, and 14 of the 79 members invited attended the meeting. The final HMPUC Stakeholder Committee consisted of 46 members.

After the initial invitations were sent through mail and/or email, all communication to the HMPUC was through email. The HMPUC was chaired by Ty Poppell, McIntosh County Emergency Management Agency Director, and co-chaired by Frankie Wallace, McIntosh County Emergency Medical Services Chief. Table 1.3 lists the names and jurisdictions of the HMPUC members.

TABLE 1.3: HMPUC MEMBERS

Organization & Title	Name
GEMA, Coastal Planner	Michaela Schiesser
City of Darien, Mayor	Hugh "Bubba" Hodge
City of Darien, Council	Griffin Lotson
City of Darien, Council	Jeff Ragsdale
City of Darien, Council	Dr William Collins
City of Darien, City Manager City of Darien, City Attorney McIntosh County Board of Education Attorney	Richard Braun
City of Darien, Director of Planning and Zoning	Kieran McMullen
City of Darien, Public Works	Mike Davis
City of Darien, Utilities	Keith Wilson
City of Darien, Building Inspector	Chris Lynn
City of Darien, City Clerk	Priscilla Taylor
City of Darien, Assistant Sewer/Water Superintendent	Shawn Smith
City of Darien, Water/Sewer	Willie Bradley
City of Darien, Public Works	Arlene Young
City of Darien, Code Enforcement	Robert Shane Middleton
McIntosh County Commissioner, Commissioner-at-large	Davis Poole
McIntosh County Commissioner, District 1	Kate Karwacki
McIntosh County Commissioner, District 3	Roger Lotson
McIntosh County, County Manager	Patrick Zoucks
McIntosh County, Deputy County Manager	Shawn Jordan
McIntosh County, Finance Director	Amy Hitt
McIntosh County, Public Works Director	Steve Mellinger
McIntosh County Emergency Management Agency	Ty Poppell
McIntosh County Attorney Darien United Methodist Church (w/large scale food bank)	Adam Poppell
McIntosh County Water Department	Tim Cooke
McIntosh County Fire Chief	Mark Deverger
McIntosh County Volunteer Fire Department	Lynn Walter
McIntosh County Emergency Medical Services; Morgan's Chapel Methodist Church (includes food bank)	Frankie Wallace
McIntosh County Animal Services	Marianna Hagen
McIntosh County Board of Education	Kirk Loder
McIntosh County Board of Education, Superintendent (Head)	Melissa Williams
McIntosh County Board of Education, Maintenance Supervisor	Heath Mixon
McIntosh County Schools	Merwan Massa
Coastal Regional Commission, Planning Director	Aaron Carpenter
Georgia Dept. of Environmental Health	Corey Lightsey
Georgia Department of Health	Brooke Deverger

Organization & Title	Name
Georgia Department of Health	Sheila Smitham Armbruster
Georgia Forestry Commission	Jeffery Neesmith
Georgia Forestry Commission	Wesley Deverger
Wiregrass 911, Director	Vicki Naugle
Georgia Conservancy	Courtney Reich
Georgia Conservancy	Monet Murphy
McIntosh County Industrial Development Authority	Tom Draffin
Citizen	Loretta Scriven
Citizen	Linda Daniels
MCRP (McIntosh County Republican Party)	Lonnie Teague

The McIntosh County Emergency Management Agency (EMA) Director also solicited review and input on the draft HMP Update from EMA Directors in neighboring counties by inviting the Directors to attend the first and second HMPUC meetings and/or to join the HMPUC Committee, and emailing them a copy of the draft Plan for review. These included EMA directors for the following counties: Glynn County, Liberty County, Long County (, and Wayne County. They had no comments on the HMP Update.

The plan update process included three Executive Committee and three facilitated HMPUC committee meetings to review Hazard, Risk and Vulnerability (HRV) assessment data and Hazard Frequencies; critical facilities that could be impacted in the event of a natural disaster; formulate mitigation actions based on collected assessments and local capabilities; and discuss the draft plan. In addition, Executive Committee members provided information about the HMP process at both a McIntosh County Board of Commissioner meeting and a Darien City Council meeting. The general public was invited to attend both of these presentations. The general public was also invited to the first HMPUC meeting and to join the HMPUC, and invited to attend the McIntosh County Board of Commissioner meeting and a Darien City Council meeting. An invitation about the meeting was shared via a paper flier that was posted at key locations throughout the County and on the City and County websites as well as the EMA website.

Agendas and meeting minutes were created for each committee meeting and meeting attendees were asked to complete a sign-in sheet at each meeting (see Table 1.4). Presentation materials (including PowerPoint slides, maps, and other relevant information) were also used to share information with meeting attendees and provide additional information about the planning process and identified hazard mitigation strategies.

TABLE 1.4: HMP PLANNING MEETINGS

Executive Committee Meetings		
Executive Committee Meeting #1	3/25/24	Reviewed personnel changes at organizations that previously participated as part of the 2018 HMPUC Committee and identified potential new invitees (including organizations that work with underserved communities and socially vulnerable populations in the County and City). Also discussed a timeline for future meetings; key changes required by GEMA that need to be addressed for the 2024 Plan Update; and reviewed the status of mitigation actions from the 2018 Plan.
Executive Committee Meeting #2	9/11/24	Discussed how to address two new hazards within the HMP 1) Technological (Hazardous and Radiological) and 2) Pandemic / Emergent Infectious Disease; mitigation strategies for the hazards; potential census discrepancies re: growth, population trends, and populations for educational structures. Focused on the geographic locations of underserved / disadvantaged communities and how these communities (or their representatives) were invited to join the HMPUC. Reviewed the revised hazard mitigation strategies and some specifics to complete the table and outlined future meeting schedules and the next steps to finish the HMP, present it to the Committees for review, and submit to GEMA and FEMA for review and approval.
Executive Committee Meeting #3	10/07/24	Reviewed status of clean-up related to Hurricane Helene; outstanding data gaps and information needed for the draft HMP; and the schedule and purpose of the final HMPUC meeting and presentations to the McIntosh County Board of Commissioner meeting and Darien City Council meeting. Also discussed the next steps needed to review, edit, and finalize the HMP & final submittal to GEMA and FEMA for approval.
HMPUC Committee Meetings		
MPUC Meeting #1: Kickoff Meeting (general public invited[A])	4/30/24	Discussed the HMP update process and role of HMPUC. GMC provided a PowerPoint presentation to review the Hazard Frequency Table from the 2018 HMP and evaluate new hazards for inclusion. Group activity was held to review and update maps/database of current critical facilities.
HMPUC Meeting #2	6/13/24	Reviewed the potential new hazards discussed at the April 30th meeting and decided on which would be added. Also discussed updates to the Hazard Frequency Table; inventory of assets and potential loss estimates; new HMP Goals (as a result of new hazards added); and mitigation action steps that were achieved from the 2018 list. GMC provided a PowerPoint presentation to review this information for the 2018 Plan and updated information to be included in the 2024 Plan.
3rd HMPUC Meeting	10/22/24	Reviewed the roles and responsibility of the HMPUC; the results of the previous two HMPUC meetings and the new Plan Changes. GMC provided a PowerPoint Presentation to summarize the HMP Plan updates. A copy of the draft HMP was provided to the Committee prior to the meeting for Committee input and comments and feedback will be accepted for several more weeks after the meeting.

County Commission / City Council Public Meetings		
County Commission Meeting (general public invited[A])		
City Council Meeting (general public invited[A])		

A/ Public Meeting Notices advertising the April 30th meeting and the County Commission / City Council meetings were placed on the McIntosh County EMA Facebook page and websites for McIntosh County and the City of Darien. Notices about the County Commission / City Council meeting was also posted to the new EMA website. A paper flyer was also posted at key locations in the community to advertise the April 30th meeting and XXX meetings to citizens who might not have access to social media and websites, including the County Commissioner's office; courthouse & courtroom foyers; health department; two Coastal Community Health centers; senior citizen building; and at a local church that operates a food bank.

The initial draft was edited based on comments received from the 3rd HMPUC Meeting. The updated draft was posted on the McIntosh County EMA website as well as the County and City websites on XXX concurrently with submission to GEMA for their review and while it was under review with GEMA. This step allowed anyone from the Public (who had not been participating in the planning process) an additional opportunity to review and comment on this plan while it was being edited. From the period of XXX to December XXX. XXX comments were received from the Pubic about the draft HMP Update that was available online.

Because the plan was available on the City/County websites and the McIntosh County EMA website, anyone with internet access at home, work, or local library could have seen this and had the opportunity to review and comment on the HMP Update. This includes people living and working in McIntosh County as well as those in neighboring counties. The HMPUC had participation from people that work in and serve neighboring counties. Several individuals on the HMPUC work outside of McIntosh County and serve neighboring counties and/or represent wider regional geographical areas, including representatives for the Georgia Conservancy; Coastal Regional Commission; Georgia Department of Health; Georgia Forestry Commission; and GEMA. As mentioned earlier, the McIntosh County EMA Director also reached out to EMA Directors in neighboring counties to allow for their input to be included in this Plan Update. The EMA Directors at Glynn County, Liberty County, Long County and Wayne County had no comments on the HMP Update.

Documentation

Copies of the following documentation generated throughout the planning process is provided in Appendix E:

1. HMPUC Invitee List
2. HMPUC Committee List
3. HMPUC Meeting Kickoff Invitation Letter
4. Meeting Announcement Flyer & Posting Locations
5. Public Meeting Notices
6. Committee Meeting Agendas & Meeting Summaries
7. Presentation Materials (copies of slides and other documentation
8. Attendance Records

SECTION III – REVIEW AND ANALYSIS OF ORIGINAL PLAN

For the 2024 HMP update process, several additional or revised planning documents were reviewed and successfully incorporated, including:

- 2024 Georgia Governor's Office of Planning and Budget (OPB) County Population Projections to 2060 (https://opb.georgia.gov/population-projections)
- 2024 HAZUS Modeling
- 2024 Language Access Plan
- 2023 McIntosh County and City of Darien Joint Comprehensive Plan
- 2023 Consolidated Tax Digest
- 2022 Regional Plan of Coastal Georgia
- 2018 McIntosh County Community Wildfire Protection Plan
- 2019 State of Georgia Hazard Mitigation Strategy
- 2019 Disaster Recovery and Redevelopment Plan
- 2013 Local Emergency Operations Plan

The following planning documents used in the previous 2018 HMP Update continued to be utilized:

- Earlier iterations of Comprehensive Plans and Short Term Work Plan Updates for McIntosh County and City of Darien (2018; 2013, and 2008)
- 2013 Georgia Governor's Office of Planning and Budget County Population Projections to 2050, FEMA Flood Insurance Study, and available sections of the Local Emergency Operation Plan.
- 2006 Georgia Coast 2030: Population Projections for the 10-County Coastal Region

The County does not have a specific Flood Mitigation Assistance Plan. The plans described

above are the most up-to-date and approved versions of these plans. The plans and studies listed above were reviewed by the HMPUC to identify new hazard mitigation action steps and shifts in prioritization since the HMP was last updated as well as to determine recent accomplishments and activities related to pre-disaster hazard mitigation. The review was also conducted to determine if there were any changes to land development trends, hazard mitigation planning, or future land use planning. Information from the 2024 HMP Update will be incorporated into the plans above during their respective future updates.

The contracted planner had primary responsibility for collecting updated information and presenting data to the committee. The approved 2018 HMP Update was available to each committee member and for public review upon request. It was also available at the Darien Library. Each chapter was reviewed chronologically with updated hazard, risk, and vulnerability data, as well as previous accomplishments of mitigation strategy efforts. Formal meetings of the HMPUC were held throughout the planning process. Irregularly attending participants were kept informed with emails containing minutes from the previous meeting and plans for future meetings and tasks to be completed

Each section of the 2018 HMP was revised in some manner, primarily through text updates from recent data, and the first section of each chapter identified the major changes made. These included the following (1) adding two new manmade hazards – Technological and Pandemic/Emergent Infectious Disease; (2) Updating the information for the Hazards in Chapter 2; (3) Adding information about the impacts of each hazard on vulnerable populations at risk and the impact of climate change in Chapter 2; (4) expanding information about NFIP compliance; (5) updating the list of Critical Facilities and creating subcategories for "Essential Critical" and "Other Critical" Facilities; and (6) Updating all relevant documents in the appendices. The HMP Update also included information from a recent HAZUS modeling study that was performed for the County by the Coastal Regional Commission at the direction of GEMA and updated census information.

Copies of the afore-mentioned planning documents are available in Appendix C.

SECTION IV – PLAN ORGANIZATION

The Hazard Mitigation Plan Update is organized to incorporate the requirements listed in the Interim Final Rule 44 CFR 201.4 Standard State Plan criteria in several chapters. This chapter, "Chapter 1: Introduction to the Planning Process", includes an overview of the document, assurances of compliance, an overview of the various state and federal authorizing authorities, the overall goals of the plan, and details of the planning process, as stipulated by Interim Final Rule 44 CFR 201.4(c)(1).

Chapter 2 outlines the natural hazard history in terms of events and losses, identifies current hazard exposures, assesses the jurisdiction's risks and vulnerabilities, and

analyzes potential losses, as stipulated by Interim Final Rule 44 CFR 201.4(c)(2). Impacts based on future climate change, and impacts to vulnerable populations, are also discussed.

Chapter 3 outlines the City's and County's hazard mitigation priorities and goals, related policies, programs, and capabilities at the local level, mitigation actions and activities and specific contributions, and sources of mitigation project funding from all levels, as stipulated by Interim Final Rule 44 CFR 201.4(c)(3).

Chapter 4 outlines the process of plan maintenance, including the methods and schedule of updates, monitoring the implementation of mitigation efforts, and reviewing progress of achieving the goals outlines in Chapter Four, as stipulated by Interim Final Rule 44 CFR 201.4(c) (4).
Finally, Chapter 5 summarizes the planning effort and provides reference material used for the update process.

The summary of changes is included in the overview section of every chapter as a table that details each section and the changes that have occurred within the section since the last approval (2018).

SECTION V – SUMMARY OF LOCAL HAZARD, RISK, AND VULNERABILITY, AND LOCAL MITIGATION GOALS AND OBJECTIVES

A local risk assessment was accomplished by compiling data on the hazards that could affect McIntosh County and its residents, profiling the previous hazard events, and then assessing the community's vulnerability to these hazards. The HMPUC accomplished the risk assessment by conducting the following steps:

(1) Hazard Identification
(2) Hazard Event Profiling
(3) Vulnerability Assessment
(4) Potential Loss Estimates

(1) Hazard Identification: Maps and historical data sources were studied and reviewed in order to identify the geographic extent, intensity, and probability of occurrence for various hazard events. GEMA Worksheet #1, "Identify the Hazard," was used in this process, and a copy of this worksheet is provided in Appendix D.

The HMPUC reviewed the list of hazards from the previous HMP update and decided to keep the current list of natural hazards that post a threat to the residents, property, and economy of McIntosh County as part of this HMP Update. The HMPUC also elected to add two new manmade disasters: Technological and Pandemic / Infectious Diseases. The final list of hazards include:

I. Coastal Erosion
II. Coastal Storm/Hurricane
III. Drought
IV. Extreme Heat
V. Flood (including Sea Level Rise)
VI. Hailstorm
VII. Tornado
VIII. Wildfire
IX. Windstorm
X. Mosquito Control
XI. Technological (Hazardous and Radiological)
XII. Pandemic / Emergent Infectious Disease

A comprehensive hazard history for McIntosh County is provided in Appendix D, in the Hazard Frequency Table that was collected with data on historical storm events.

(2) Hazard Event Profiling: Past hazard event data were collected through an extensive process that utilized input from the HMPUC members, research on past disaster declarations in the County, information provided from the National Climatic Data Center and the National Weather Service (National Centers for Environmental Information – Storm Events Database), NOAA database of historical hurricane tracks, GA Forestry Community Fire Report database, a review of current Flood Insurance Rate Maps (FIRM), internet and newspaper data searches. These data sources were used to complete a Hazard Frequency Table for committee analysis purposes. A copy of the Hazard Frequency Table is provided in Appendix D.

The committee analyzed the causes and characteristics of each hazard, how the hazard had affected McIntosh County in the past, and what part of McIntosh County's population and infrastructure had historically been vulnerable to each specific hazard. The Hazard Frequency Table was used to complete this process. A profile of each hazard and associated maps are provided in Chapter 2.

(3) Vulnerability Assessment: The asset inventory component of the HRV assessment data included the development of a database that provides county infrastructure and critical facilities data as well as estimated structure dollar values for loss estimates. This critical facilities database was developed by the Emergency Management Agency office, local planners and the tax assessor's office and input and feedback was also solicited from the HMPUC. Information collected includes structure location, value, contact information and facility type.

Maps and accompanying database of critical facilities were printed and discussed at the first HMPUC meeting in order to update and verify locations of critical facilities, add new facilities that were recently constructed, and/or delete any inactive/closed facilities. The total number of critical facilities was decreased from 75 to 68.

A critical facility, for the purposes of this plan, is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response and/or disaster recovery functions. For the 2024 HMP, critical facilities were grouped into two sub-categories: 1) "Critical Essential Facility" as defined by GEMA (which includes emergency response and public safety facilities; healthcare facilities; academic institutions; and other facilities that the Committee deems are critical to daily functions and 2) "Other Critical Facility" for facilities that are not considered a Critical Essential Facility but that the Committee felt should be designated as a critical facility (water and wastewater treatment plants, governmental services facilities, etc.)

A community's vulnerability can be described in terms of the assets located within the extent of a hazard event and the potential losses if such an event occurs. Therefore, the vulnerability assessment was accomplished by comparing each previously identified hazard with the inventory of affected critical facilities and population exposed to each hazard. GEMA Worksheet #3A, provided in Appendix A, outlines this step of the HRV assessment. Maps of each hazard with critical facilities presented are included after each section in Chapter 2. The number and value of structures by occupancy class were based on the 2023 Consolidated Tax Digest (Georgia Department of Revenue).

Assessing vulnerability, for the purposes of this plan, also included a review of the McIntosh County and City of Darien 2023 Joint Comprehensive Plan (as well as earlier iterations from 2013 and 2008); the 2020 Decennial Census; and the 2024 population projections from the Georgia Governor's Office of Planning and Budget to assess general land use patterns and development trends.

(4) Potential Loss Estimates: Using the best available data and mathematical modeling, estimated damages and financial losses likely to be sustained in a geographic area during a hazard event were calculated. Describing vulnerability in terms of dollar losses provides the county with a common framework in which to measure the effects of hazards on critical facilities. Another tool used was HAZUS modeling, which was conducted for McIntosh County by the Coastal Regional Commission (facilitated by GEMA). Their 2024 report, "Hazard Risk Analyses: Supplement to the McIntosh County Joint Hazard Mitigation Plan," is included in Appendix A. The modeling exercises simulated a Category 2 hurricane, EF-3 tornado, and 1% chance annual flood – riverine and coastal. Each simulation estimated the number of buildings damaged, building damage value, essential facilities impacted, displaced households, and debris generated.

The number and type of structures in the County have been determined for potential loss estimations. The source of the information was from the parcel-based County Tax Assessor's Office, and the Georgia Department of Revenue's 2023 Consolidated Tax Digest

Summary. Additional information can be found in Appendix A. For the parcel-based County Tax Assessor's data, a parcel or improved-building and associated value was categorized as exposed to the hazard if any part of the hazard was within the parcel limits. This procedure is a more conservative approach for estimating exposure to a hazard.

A summary of the total numbers of structures, parcels, "improved buildings," general building stock, housing units, and occupied housing units based on the various data sources used is provided in the table below for all of McIntosh County and for the City of Darien. The numbers of units vary based on definition of units and how they are defined (e.g., parcel-based, housing unit, structure). The maximum number of persons that could be affected by hazards impacting 100% of the area totaled 17,849 in McIntosh County and 3,336 in City of Darien. These numbers represent the resident population and the workforce population. Further clarification of population categories is included on Worksheet #3A located in Appendix A.

In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien.

The Executive Committee and HMPUC reviewed and discussed this data at several meetings during the planning process. Both Committees concurred that the 2020 Census data may not have accurately recorded the actual population of the County and City and that their populations are actually higher than reported with an upwards growth trend. For example, the 2020 Census listed the County's population at 10,975; there are currently 9,800 registered voters in the County. The Committee discussed these statistics and determined that this may support the Committee's conclusion that the Census population numbers may be lower than the actual populations of the County and City, as typically there is a greater gap between the population count and number of registered voters due to a portion of the population being underage and/or otherwise not registered as a voter.

TABLE 1.5: HMP PLANNING MEETINGS SUMMARY OF UNITS AND ASSOCIATED VALUE BY SOURCE FOR ESTIMATING POTENTIAL LOSSES

Source	City/ County	Units	Value	Notes
GA Dept. of Revenue 2023 Consolidated Tax Digest Summary	Entire County	41,367 Structures	$ 2,201,629,413	Used in Worksheet #3A, provides breakdown by Occupancy Class
	City	4,675 Structures	$ 257,559,803	
McIntosh County Tax Assessor Data, 2023 (parcel-based)	Entire County	13,213 Parcels 7,481 "Improved Buildings"	$1,255,697,149 ("Improved Bldg. Value")	Used in Chapter 2 and for estimating exposure by % of buildings and % of value in hazard for Worksheet #3A
	City	1,493Parcels 1,054 "Improved Buildings"	$169,240,736 ("Improved Bldg. Value")	
Hazard Risk Analyses Report (HAZUS model run by CRC)	County Only	9,219 General Building Stock	$1,394,271,000	Report included in Appendix A
U.S. Census, 2022 Estimate, Housing	Entire County	6,814 Housing Units 4,786 Occupied Units		5-year American Community (U.S. Census) Estimate
	City	737 Housing Units 549 Occupied Units		

The Executive Committee and the HMPUC used the results of the Hazard, Risk and Vulnerability assessment, as well as the Report of Accomplishments to identify and prioritize appropriate further mitigation goals, objectives and related actions. The committees identified and discussed mitigation strategies over the course of three Executive Committee meetings and three HMPUC meetings. Input into strategy development was increased as members also discussed meetings with staff from their respective agencies and departments for ideas about additional mitigation actions and comments about the list of mitigation actions being developed.

After ensuring that the HMPUC had ample opportunity to contribute to strategy development, mitigation action steps were next given priority status. To evaluate priorities, a planning tool, prepared by FEMA known as STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria, was used. Each mitigation strategy step was evaluated using STAPLEE criteria as the guiding principle to identify those steps best for McIntosh County. Steps were ranked as high priority, medium priority, or low

priority. Past occurrences of disasters and historical trend data aided in assigning priorities.

The public was given the opportunity to comment on the mitigation strategies, including prioritization, through review of the draft 2024 HMP Update that was posted on the County and City website, as well as the McIntosh EMA website, while it was under review with GEMA. No comments were received from XXX to XXX when the Plan was adopted by McIntosh County. The public was also invited to participate in the initial HMPUC kickoff meeting and join the HMPUC through (1) public notices placed on the McIntosh County EMA Facebook page and City/County websites and 2) posting of a paper flier in key locations throughout the public (including locations accessible to underserved / socially vulnerable community members who may not have access to social media or online resources. The public also had a final opportunity to comment on the 2024 HMP Update at the (insert date) County Commission meeting and (insert date) Darien City Council meeting when the plan was presented for adoption by the County and the City. No comments or edits were received. The (insert date) County Commission Meeting was advertised the on the County's website; the (insert date) Darien City Council Meeting was advertised on the City's website. A copy of the public meeting notices, paper flier, and log of locations where the fliers were posted is included in Appendix E.

SECTION VI – MULTI-JURISDICTIONAL CONSIDERATIONS

The City of Darien and unincorporated McIntosh County were active participants in the planning process. A few mitigation goals, objectives and action items identified in this plan update applied to one or the other, but in general, most were applicable to both the County and City. The EMA Director will coordinate with the appropriate city agency personnel in order to execute multi-jurisdictional steps. The EMA Director does not have authority to implement items in the jurisdictions; however, the committee has chosen to coordinate communication efforts to implement and document progress towards goals with the EMA agency.

SECTION VII – ADOPTION, IMPLEMENTATION, MONITORING & EVALUATION

Upon final approval by GEMA, the McIntosh County Board of Commissioners and the Darien City Council formally and unanimously adopted the McIntosh County Joint Hazard Mitigation Plan on (insert dates), respectively. The adopted plan will then be submitted to FEMA Region IV. Following approval by FEMA, the governing body for the City of Darien will formally adopt the plan.

After formal adoption of the McIntosh County Joint Hazard Mitigation Plan, the County Commission and City Council will keep in consideration the Priority Task List and oversee the implementation of these tasks using branches of city and county government when appropriate.

Unincorporated McIntosh County and the City of Darien currently utilize comprehensive land use planning, capital improvements planning and building codes to guide and control development in the county. The McIntosh County Joint Hazard Mitigation Plan will be presented to the Committees and persons responsible for updating Comprehensive Plans and Capital Improvement Plans, for their use in incorporating the Hazard Mitigation goals and strategies. In addition, the Commission and City Council will require that the local authorities responsible for the previous plans listed, along with the Local Emergency Operations Plan (LEOP) and other multi-jurisdictional plans, utilize guidance from this Hazard Mitigation Plan.

The McIntosh County Joint HMPUC has developed a method to ensure that regular review and update of the Plan occurs. At the direction of the MEMA Director, the McIntosh County HMPUC members will be invited at least once during the midpoint of the planning period (2025-2030) to convene in order to discuss the progress and whether any action or edits are required to the mitigation action steps or the plan itself. This would likely occur during year 2027. The public will also be notified of this meeting and have an opportunity to participate.

The method of evaluation will consist of utilizing a checklist to determine what mitigation actions were undertaken, the completion date of these actions, the cost associated with each completed action, and whether actions were deemed to be successful. This method was successful in the past; therefore, scheduling a midpoint progress meeting will again provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of this hazard mitigation plan. The parties responsible for the various implementation actions, as assigned by the County Commission and City Council, will provide a project status report and will include which implementation processes worked well, any difficulties encountered, how coordination efforts were proceeding, and which strategies should be revised. The committee will also review each goal and objective to determine relevance to changing situations in the County, as well as changes in state and federal policy and to ensure that goals are addressing current and expected conditions. The committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified.

The County Commission and City Council will review recommendations of the committee at the midpoint evaluation. County Commissioners and City Council members will evaluate and update the Plan to ensure mitigation action steps are being established and that existing programs are utilizing the guidance provided by the Hazard Mitigation

Plan. The MEMA Director will then forward any changes to GEMA's Hazard Mitigation Planning Specialist.

Unincorporated McIntosh County and the City of Darien are dedicated to involving the public directly in the continual reshaping and updating of the Hazard Mitigation Plan. The MEMA Director and HMPUC are responsible for the midpoint review and 5-year update of the Plan. Although they will represent the public to some extent, the public will be able to directly comment on and provide feedback about the Plan.

Copies of the plan will be available on the McIntosh County and Darien local government websites, at the McIntosh County Emergency Operations Center, and at the Ida Hilton Public Library (Darien, GA) and Hog Hammock Public Library (Sapelo Island, GA) . All comments and questions will be directed to the Emergency Management Agency Director for follow-up. The publicly declared County Commission meeting to adopt the Plan and associated public hearing also provided the public an additional forum for which they could express concerns, opinions, or ideas about the Plan. No comments were received at the public hearing. Announcements to invite the public were made ahead of this meeting through the County's website and local newspaper.

SECTION VIII – COMMUNITY DATA

Sources for the following community data are The *New Georgia Encyclopedia* (www.georgiaencyclopedia.com), the authoritative source on the people, places, events, and institutions of Georgia, the McIntosh County Comprehensive Plan Update, the McIntosh County Chamber of Commerce website (www.mcintoshcounty.com), and the City of Darien website (www.cityofdarienga.com). McIntosh is one of Georgia's six ocean-facing counties. The county has a total area of 575 square miles; 433 square miles is upland and 142 square miles (24.56%) is water. McIntosh County was created from Liberty County by an act of the state legislature in 1793. The county was named for the McIntosh family, who were among the earliest Scottish Highlanders to settle the area three years after the founding of the Georgia colony. The most prominent member of this family was General Lachlan McIntosh, commander of Georgia forces in the Revolutionary War (1775-83) and a primary force in the colony's movement toward independence.

The earliest settlers in the lands that became McIntosh County were Guale Indians, followed by Spanish missionaries from about 1595 to 1686, both on the mainland and on nearby Sapelo Island. The first English presence was established by South Carolina Rangers, who built Fort King George in 1721. The first permanent settlement was a group of Highland Scots from Inverness, who, under the auspices of James Edward Oglethorpe, founded the town Darien in January 1736.

Darien was incorporated and made the seat of McIntosh County in 1816, during a period when the area began to prosper as a primary outlet for the shipment of upland-grown cotton conveyed to the port down the Altamaha River. During the antebellum period rice and Sea Island cotton plantations made McIntosh County one of the wealthiest sections of the south Atlantic coast. Rice shipments from the local Altamaha delta exceeded 6 million pounds in 1859, the peak year for exports. The leaders in the production of this valuable commodity were Pierce Butler, Jacob Barrett, and Robert B. Rhett. Meanwhile, the county's most prominent citizen of the time, Thomas Spalding of Sapelo Island, established one of the leading plantations of the antebellum South.

McIntosh County was devastated by Union military and naval action during the Civil War (1861-65). Darien, deserted and undefended, was sacked and burned by Union colonel Robert Gould Shaw and his 54th Massachusetts regiment in June 1863, and most of the county's river plantations were destroyed in a series of raids in 1862-64.

During Reconstruction, Tunis G. Campbell, an agent of the Freedmen's Bureau, became McIntosh County's first African American elected official, serving in the Georgia General Assembly as well as in various local positions. During his period of public service, Campbell did much to enhance educational and economic opportunities for McIntosh County's freed slaves.

McIntosh County was an international timber market for four decades after the Civil War. The volume of rafts of virgin yellow-pine timber floating down the Altamaha River from the interior of Georgia established Darien as the primary outlet for lumber and timber on the Atlantic coast. Sawmills and loading docks in the county provided employment for hundreds of local black citizens displaced by the war.

Sailing vessels and steamships from Europe, South America, and the Far East loaded cargoes of lumber processed at mills in and around Darien. Later, investments of northern capital further energized the county and led to the construction of a railroad into Darien in 1895. In 1900, a record of more than 112 million board feet of lumber was processed and shipped overseas from McIntosh County.

By 1915, the Altamaha River timber supply was exhausted because of overcutting upriver from Darien, and the local timber trade was all but over by 1925. The demise of timber as an economic resource led numerous county citizens to seek their livelihoods from other sources—primarily the nearby Atlantic Ocean. In the first half of the twentieth century McIntosh County became a leading producer of seafood, especially oysters, shrimp, and crabs. By 1960 McIntosh had one of the largest shrimp-boat fleets on the south Atlantic coast, although the county's population was then only 6,364 residents. About 1975, however, the seafood industry entered a period of steady decline, brought about by rising operating costs and the increasing importation of cheaper foreign shrimp.

During World War II (1941-45) the U.S. Army operated an air training facility with concrete runways, barracks, and support facilities at Harris Neck in a remote section of McIntosh County, for the training of P-40 fighter pilots. The Coast Guard had submarine watch stations on Sapelo and Blackbeard islands. In 1953, the University of Georgia established its Marine Institute on Sapelo Island.

In 1991 Georgia writer Melissa Fay Greene published *Praying for Sheetrock*, an award-winning book that chronicles the coming of the civil rights movement to McIntosh County in the 1970s.

From the 2010 to the 2020 Decennial Census, McIntosh County's population decreased by 23% from 14,333 to 10,975, and City of Darien's population decreased by 26% from 1,975 to 1,460. Based on the most recent population estimate by the U.S. Census in 2022, McIntosh County's population has increased 2% since 2020 to 11,183, and Darien's population has decreased by 14% to 1,253. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) from 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. The projected population is 12,083 in 2030, 12,349 in 2040, 12,218 in 2050, and 12,168 in 2060. Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people).

In 2022, McIntosh County had fewer children (15.2%) and more retiree-aged adults (28.9%) than the state average of 23.4% under age 18 and 14.4% age 65 and over. Darien was similar to McIntosh County compared with the state average with 13.2% under age 18 and 26.7% age 65 and over. The racial demographic in 2022 in McIntosh County was 63.2% white, 31.7% black or African American, and 2.6% Hispanic, and in the City of Darien, it was 48.2% white, 40.8% black or African American, and 8.0% Hispanic.

While forestry and commercial fishing have been dominant industries, the area has become increasingly dependent on tourism. In 2022, the top three industries for residents in McIntosh County were:

1. Professional, scientific, and management, and administrative and waste management services (17.8%)
2. Educational services, and health care and social assistance (17.4%)
3. Retail trade (12.2%)

Darien's top three industries included:

1. Educational services, and health care and social assistance (33.7%)
2. Arts, entertainment, and recreation, and accommodation and food services (15.9%)
3. Retail (10.3%)

A strong desire exists among McIntosh citizens to preserve the unique features of McIntosh County. The rich natural habitats and coastal character, the live oak canopied vistas, and abundant wild life areas contribute to a lifestyle that is enviable to a large portion of the population. One unique characteristic of McIntosh County is a popular feeling that their sense of place determines their lifestyle. Residents relate in terms of their natural habitat. In McIntosh County, for instance, farming and agriculture often relate to harvesting crops from the sea, such as shrimp, fish, and crabs. Preservation of farmland in McIntosh County may well refer to protecting clam, oyster, and mussel beds and growing habitat. Transportation alternatives may imply the need for better boat ramps to access waterways; bike trails to better access the wildlife viewing areas and walking paths to better access the Coastal Birding Trails. The barrier islands of McIntosh County immediately identify the region and bring to mind the peace, tranquility, diverse wildlife, and beautiful vistas that are so important to the wellbeing of the population.

The City of Darien is known for beautiful views by the water with ancient live oaks and Spanish moss, historic, landscaped parks, cozy bed and breakfasts, birding, biking, boating, authentic colonial forts, coastal marshlands with five rivers, and opportunities to explore and discover barrier islands, fresh seafood, Gullah-Geechee culture, salt and fresh water fishing, sea kayaks, river tours, Scottish heritage, and shrimp boats returning to waterfront docks at sunset.

SECTION IX – NATIONAL FLOOD INSURANCE PROGRAM

McIntosh County and the City of Darien each participate in the National Flood Insurance Program (NFIP) and follow the Program guidelines to ensure future development is carried out in compliance with regulatory requirements to reduce flood hazards. Consistent with NFIP guidelines, both jurisdictions have adopted and executed a Flood Damage Prevention Ordinance. Compliance with NFIP standards and enforcement of the Flood Damage Prevention Ordinance is overseen for McIntosh County by the County's Building and Zoning Department and for Darien by the City's Director of Planning & Zoning / Code Enforcement Officer.

McIntosh County's Flood Damage Prevention Ordinance is located in Chapter 10, Article IV, of the County's Code and was last updated on September 12, 2023 to include additional provisions for flood hazard reduction (Section 10.54 of the Ordinance). The City of Darien's

Flood Damage Prevention Ordinance is located in Appendix I of the City's Code and was last updated on September 19, 2023. Copies of the Ordinances are provided in Appendix C and can also be accessed online at the Municode Ordinance Library at https://library.municode.com/.

The NFIP Community Rating System (CRS) was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed minimum NFIP standards. Any community fully compliant with NFIP floodplain management requirements may apply to join the CRS. McIntosh County is an active participant in the NFIP's CRS program and has implemented additional flood mitigation strategies; the County is currently rated as a CRS Class 7 community. The City of Darien submitted an application to participate in the CRS program in 2024 and the City is currently waiting to hear if the CRS application has been approved.

McIntosh County maintains a webpage providing FEMA and flood-related information to the public, including City of Darien residents, at https://mcintoshcountyga.com/163/Flood-Safety-Preparedness. Flood Insurance Rate Maps (FIRMS) were mostly recently updated in August 2018 for McIntosh County using enhanced LIDAR technology and a refined model to yield more valuable elevation data for many of the proposed measures, including the flood hazard analysis. The new flood maps were adopted by McIntosh County on August 2, 2018, which contributes to McIntosh County's continued compliance with the NFIP requirements to participate in the FEMA's map modernization initiative. Adoption of updated FIRMS has also enabled the County and the City to better identify floodplains and to regulate new construction in Special Flood Hazard Areas (SFHAs).

The City and County require that all construction, additions, conversions, and or development located in areas of special flood hazard comply with certain minimum standards intended to minimize damage from floods. For example, houses and certain other structures are required to be built one foot above the 100-year base flood elevation. The County and City also track and regulate development in the SFHA through the permitting process and enforcement of their respective Flood Damage Prevention Ordinances.

Any substantially improved or substantially damaged home must be brought up to comply with NFIP standards and the requirements of the Flood Damage Prevention Ordinances (i.e., the 50% Rule). The "50% Rule" states that if the lowest finished floor of an existing house is below the base flood elevation (BFE) and the cost of repairs or renovations will increase the structures original Fair Market Value by more than 50%, then the lowest finish floor elevation must be raised or elevated to at least the BFE. In the AE and/or VE zones within McIntosh County and Darien, the bottom of the lowest horizontal member must be brought up to one foot above the BFE.

The County and City plan to maintain their adherence to NFIP regulations through enforcement of their building codes, performing inspections, requiring elevation certificates, following the land development codes, and implementing and enforcing their respective “Flood Damage Prevention” ordinances.

CHAPTER 2 – NATURAL HAZARD IDENTIFICATION AND RISK ASSESSMENT

The Hazard, Risk, and Vulnerability assessment of the McIntosh County Joint Hazard Mitigation Plan Update provides the scientifically sound foundation for the goals, objectives, tasks, and actions steps that are proposed in the plan.

- The McIntosh County Joint Hazard Mitigation Plan Update Committee reviewed those hazards initially identified as most likely to impact the county. The GEMA Worksheet #1, "*Identify the Hazard*," in Appendix D, and Worksheet #2, "*Profile Hazard Events*," were reviewed along with the updated hazard event data. Previous hazard event data were recorded in the Hazard Frequency Table in Appendix D and reviewed alongside the table from the approved plan. Using this review method, the planning committee determined that the ten natural hazards studied for the 2018 HMP Update would remain and that two new hazards 1) Technological (Hazardous and Radiological Threats) and 2) Pandemic / Emergent Infectious Disease would be added. The 2024 HMP Update will focus on the following hazards:
    I. Coastal erosion;
    II. Coastal storm/hurricane (Note: This hazard also includes beach-related hazards such as rip tides, undertows, and rip currents.)
    III. Drought;
    IV. Extreme heat;
    V. Flood (Note: Committee members chose to keep sea level rise as a subtopic under this hazard.)
    VI. Hailstorm;
    VII. Tornado;
    VIII. Wildfire;
    IX. Windstorm;
    X. Mosquito control;
    XI. Technological (hazardous and radiological threats); and
    XII. Pandemic / emergent infectious disease.

SUMMARY OF UPDATES TO CHAPTER 2

Chapter 2 Section	Updates to Section
I. Coastal Erosion	Added new sections for Climate Change and Vulnerable Populations. All relevant datasets were updated. This included updates for historical frequencies of coastal storms; events that were likely to cause coastal erosion; and the GCHP historical shoreline change dataset. The Land Use and Development Trend section was also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
II. Coastal Storm/ Hurricane	Added new sections for Climate Change and Vulnerable Populations. All relevant datasets were updated. This included the addition of updated data and narratives for storm events that occurred since the last HMP update in 2018; information from the NOAA NCEI Storm Event Database; new data from the USGS site regarding stage records for flood events; information about essential critical facilities; SPLOSH data; and HAZUS modeling. Category updated to reflect beach-related hazards such as rip tides, undertows, and rip currents are also included as part of this hazard. The Land Use and Development Trend section was also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
III. Drought	Added new sections for Climate Change and Vulnerable Populations. Updated data, including the addition of one severe drought event since 2018. The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
IV. Extreme Heat	Added new sections for Climate Change and Vulnerable Populations. Extreme heat event data was updated and information from a new data set (a long-term weather station on Sapelo Island) was added. The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
V. Flood	Added new sections for Climate Change and Vulnerable Populations. Updated data; including Tax Assessor data, HAZUS modeling, and text changes to reference the flood hazard maps were based on the 2018 DFIRMS which were finalized after the last HMP update. The Land Use

Chapter 2 Section		Updates to Section
		and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
VI.	Hailstorm	Added new sections for Climate Change and Vulnerable Populations. Hailstorm event data was updated and included data for 20 years (previously it was 10 years). The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
VII.	Tornado	Added new sections for Climate Change and Vulnerable Populations. Data was updated to reflect the addition of one new tornado event and HAZUS model results presented for hypothetical EF-3 tornado. The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
VIII.	Wildfire	Added new sections for Climate Change and Vulnerable Populations. Updated data; added revised Community Wildfire Protection Plan results and information; reduced the frequency of events to County and City. The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
IX.	Windstorm	Added new sections for Climate Change and Vulnerable Populations. Storm event data was updated and Consolidated Tax Digest Summary was revised to reflect information from 2023. The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
X.	Mosquito Control	Added new sections for Climate Change and Vulnerable Populations. Added data, including revisions to the method used by the County to ground spray. The Land Use and Development Trend section as also updated to reflect information from the 2023 Joint Comprehensive Plan update, and general text edits.
XI.	Technological (Hazardous and Radiological)	Added as a new hazard due to the HMPUC's concern of incidents along I-95 and transport of hazardous and radiological materials along this corridor.

Chapter 2 Section	Updates to Section
XII. Pandemic / Emergent Infectious Disease	Added as a new hazard due to the recent experience with COVID-19.

The Georgia Emergency Management Agency defines hazard, risk, vulnerability, and mitigation as presented in the *Georgia Hazard Mitigation Plan Standard and Enhanced,* published March 31, 2008, as follows:

> "A hazard is a potential threat or actual event that impacts a population, infrastructure, or environment. Hazards are spatially and temporally definable but vary in terms of range. For example, compare the examples of a flood and a tornado. Floods are more easily spatially defined than tornadoes due the historical record (and other sources) showing a distinct pattern of flooding events (within flood plain) and a less distinct pattern of tornado events (narrow down to regions of occurrence). For another example, compare earthquake events to drought events in terms of temporality. Earthquake events have a shorter temporal impact (usually a matter of seconds) while drought events by definition can have a longer temporal impact (more than a decade). A wide range of hazards exist and are sometimes categorized as either natural or anthropogenic. However, modern-day hazards are more complex and intertwined, with anthropogenic hazards further complicating natural hazards. For example, a hurricane causes a levee to fail, which floods a town and causes the deposition of toxic chemicals in the water supply. Attempting to categorize this event is fruitless. This type of complexity gives validity to the recent all-hazard approaches to emergency management that also account for the fact that hazards are either wholly or partly a social product and, therefore, must be analyzed in context (social, political, historical, and environmental).
>
> Risk is a quantifiable probability of a specific hazard event actually occurring. This probability is typically based on hazard history profile-driven statistical modeling. Risk is as temporally and spatially variable as hazard events. For example, the risk (probability of occurrence) of a severe winter storm in Georgia is highly seasonal while the risk of an earthquake has no seasonality. In terms of spatiality, the risk of a flood is defined in terms of types of floodplains (100-year, 500-year) while the risk of drought spans the entire State of Georgia. Calculating the risk of a hazard proves difficult at times because of the absolute dependency on data availability and accuracy as well as reliable statistical modeling.
>
> Vulnerability is essentially the potential for loss. Vulnerability describes the ability and capacity not only to survive the event but also to recover from the event's impacts in both the short and long-term phases. Various types of vulnerability exist including independent, social, and biophysical. Independent vulnerability

refers to an individual person or structure's susceptibility to harm from the hazard event. The individual's unique characteristics determine this susceptibility (such a person's physical disability or a building's low structural integrity). Social vulnerability refers to a particular population's general susceptibility to harm from a hazard event. Typically, socioeconomic variables are utilized to determine this type of vulnerability. Along the same scale as social vulnerability is the idea of the vulnerability of the built environment. In other words, the general susceptibility of the infrastructures in an area versus the individual building creates a broader view of vulnerability. Finally, geophysical vulnerability is essentially synonymous with hazard exposure and includes variables like magnitude, duration, frequency, impact, rapidity of onset, and proximity. Like hazards and risk, vulnerability is subject to temporal and spatial variability. For example, the characteristics of the infrastructure and population of an area obviously change through time. However, given the same time period, the characteristics depend on the scale of analysis, whether the analysis occurs at a state, county, or smaller scale.

Mitigation refers to the activities undertaken to reduce or eliminate the threat, occurrence, or the effects of natural hazard events. Mitigation activities serve to protect public health and property and to break the damage-repair cycle in hazardous areas. Mitigation activities often fall into one of two categories: structural and non-structural. Structural mitigation approaches include constructing levees as a form of flood control while non-structural mitigation approaches include using insurance to compensate for flood damage."

The asset inventory component of the assessment data included the development of a database that provides county infrastructure and critical facilities data as well as estimated structure dollar values for loss estimates. The committee utilized GEMA Worksheet #3A (Inventory of Assets) and the 2023 Tax Digest Consolidated Summary from Georgia Department of Revenue to determine the potential dollar losses to vulnerable structures in the region. The figures on the worksheets and included in this text were derived using formulas provided by FEMA and GEMA and represent structure potential loss estimations based on use, square footage, and replacement value. Each of the potential loss estimates is addressed for the individual hazards in the following text. For more specific details, refer to Worksheets #3A located in Appendix A as well as the Critical Facility exposure provided in Appendix D. In addition to this approach, when a hazard had GIS-based mapping, potential loss estimates were calculated using the County Tax Assessor's parcel-based dataset. Based on the parcels in the hazard area, the ones with "improved buildings" and their respective values were summed.

SECTION I – COASTAL EROSION

A. Hazard Identification

Coastal erosion is the wearing away of coastal land. The term is commonly used to describe the horizontal retreat of the shoreline along the ocean. Erosion is considered a function of larger processes of shoreline change, which includes erosion and accretion. Erosion results when more sediment is lost along a particular shoreline than is re-deposited by the water body. Accretion results when more sediment is deposited along a particular shoreline than is lost. When these two processes are balanced, the shoreline is said to be stable.

When evaluating coastal erosion, the focus is on the long-term impacts. However, storms can erode a shoreline that is, over the long-term, classified as accreting, and vice-versa.

Erosion can be caused by a number of events including coastal storms and floods; changes in the geometry of tidal inlets, river outlets, and bay entrances; man-made structures and human activities such as shore protection structures and dredging; long-term erosion; sea level rise; and local scour around buildings and other structures.

Coastal erosion hazard maps (historical shoreline change) for McIntosh County and the City of Darien are presented at the end of Section I. These rates are based on historical records of shoreline change from 1930s to 2000, and the data is presented in units of meters per year. A negative value indicates erosion and a positive value indicates accretion.

B. Hazard Profile

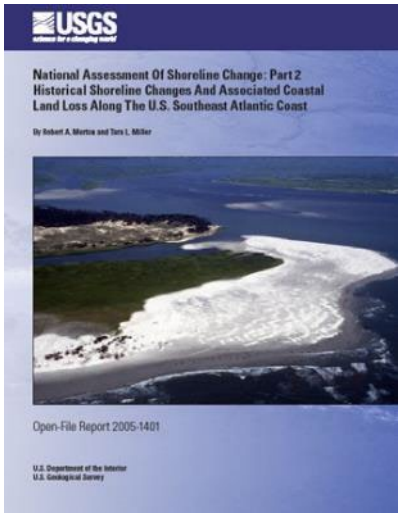
Scientific data to support coastal erosion issues for the previous HMP Update had been scarce. Previous shoreline change data was only available for outer barrier islands, and these are either not inhabited or mostly uninhabited. Since the 2013 update, a new resource available through Skidaway Institute of Oceanography, University of Georgia, that presents historical shoreline change from the 1930s to 2000 for all inner barrier islands is the "Georgia Coastal Hazards Portal" (GCHP). Data from this GIS-based tool was used to analyze the number of parcels and associated "improved building" values that have a history of erosion. County and City maps with historical shoreline change rates during the period from the 1930s to 2000 are presented at the end of Section I. Shoreline rate of change is grouped into 5 categories in these maps: (1) less than –1.00 m/yr [red], (2) –1.00 to –0.21 m/yr [orange], (3) –0.20 to +0.20 m/yr [green], (4) +0.21 to +1.00 m/yr [light blue], and (5) greater than +1.00 m/yr [dark blue]. Categories #1 and #2 indicate erosion, with red (#1) being most severe, and categories #4 and #5 indicate accretion, with dark blue (#5) being most severe. Category #3 indicates little change in either direction. These maps represent the historical extent of the coastal erosion hazard from the 1930s to 2000.

From these maps, most of the red (highest rate of erosion) and dark blue (highest rate of accretion) are located along the ocean side of the outer barrier islands. These islands are

either not inhabited or mostly uninhabited. From south to north, these islands include: Egg Island (erosion on southern end and accretion on northern end), Wolf Island (erosion on all of ocean facing land), Sapelo Island (accretion on southern end and erosion on northern end), Blackbeard Island (accretion on southern end and middle and erosion on northern end and middle). Out of these islands, only Sapelo Island is inhabited, but it is sparsely populated. As a note, there are no beach-front structures built on the ocean facing portion of the island, like Tybee Island or St. Simons Island. Despite a section being identified with shoreline rate of change less than –1.00 m/yr (red), the nearest structure is about 0.5 miles inland, through mostly marshlands.

Green is the dominant color for these maps of the interior islands and tidal channels. This represents shoreline change in Category #3, which had the least change in either direction (between –0.20 and +0.20 m/yr). Most of the shoreline in McIntosh County has a large marshland buffer. Similar to the outer barrier islands, many of the interior islands are also not inhabited or mostly uninhabited. The waterfront section of the City of Darien was also identified in this category with the smallest rate of shoreline change.

Coastal erosion issues, from anecdotal data, also include a loss to the economy when the fishing industry became impacted due to silting of the river channels and when damage to waterfront businesses occurred. Three barrier islands afford McIntosh County some protection from erosion issues: Blackbeard, a national wildlife refuge; Sapelo, a wildlife refuge and research reserve; and Wolf, a national wildlife refuge that is predominately tidal marsh. Blackbeard can be accessed by charter or private boat. Sapelo is reached by a ferry that carries tourists two to three times a day to the island. Wolf Island National Wildlife Refuge can be viewed from the water by private boat or charter, but the beach and all upland areas are closed to the public.



The 2013 HMP Update studied the *National Assessment of Shoreline Change: Part 2 Historical Shoreline Changes and Associated Coastal Land Loss along the U.S. Southeast Atlantic Coast.* Open File Report 2005-1401. This report indicates that in Georgia, coastal land loss is caused primarily by erosion of the Atlantic Ocean beaches. Open lagoons are not present landward of the barrier islands and estuaries are small, so erosion of back barrier shores and interior marshes is not a significant component of coastal land loss in Georgia as it is in other states. Analysis of long-term historical shoreline change indicates that 65% of the Georgia shore was stable or accreting, with an overall average shoreline change rate of 1.0± 2.7 m/yr. This report also describes that the highest long-term erosion rates for Georgia occurred along Wolf Island, which is in McIntosh County. The shoreline change was at a rate of -9.4 ± 4.0 m/yr (the negative shoreline change indicates erosion). This unpopulated island is part of the Wolf

Island National Wildlife Refuge. The uncertainties (± term) presented above are based on a 90% confidence interval.

As coastal erosion is caused by storm surge, high water levels, and strong currents that occur during coastal storms (hurricanes, tropical storms, and tropical depressions) and other flooding events (flash flood and coastal flood), the coastal erosion hazard profile was explored by analyzing the frequency of these events. These events are likely the major causes of significant coastal erosion since the 1930s that are presented in the maps at the end of this section. For the County and City of Darien, the historical frequency of a coastal storm (hurricanes, tropical storms, and tropical depressions) is 65.4% chance per year (182 years of records) and a flood event (flash flood or coastal flood) is 17.3% chance per year (75 years of records). Please see Section II and Section V for hazard frequency details for Coastal Storm/Hurricane and Flood, respectively. These two hazards (Coastal Storm/Hurricane and Flood) were combined in the hazard frequency data table in Appendix D for the 75-year history when both have available records, as these events are likely the major causes of significant coastal erosion. The hazard events were summed for those with unique dates (e.g., a named tropical storm with reported flash flood on the same date counts as one event and not two). Based on this methodology, there were a total of 68 unique events over the 75-year history. The frequency of events appears to be increasing, with 1.10 events per year over the previous 50 years and 1.50 events per year over the previous 20 years. It should be noted that data collection, reporting, and accuracy are much better in the past 10 to 20 years. Based on the previous 10 years, there will be, on average, 1.60 events per year. The frequency would be the same for both the County and the City because both have areas of exposure to sounds, marshes, and tidally-influenced rivers.

Since the 2018 HMP Update, McIntosh County has been exposed to the following events likely to cause coastal erosion: one Category 1 hurricane; five tropical storms; three tropical depressions; and one coastal flood. Please see Section II and Section V for hazard history details for Coastal Storm/Hurricane and Flood, respectively.

C. Assets Exposed to Hazard and Estimate of Potential Losses

Using the "Georgia Coastal Hazards Portal" dataset of historical shoreline erosion, it was identified that in McIntosh County, 3% of parcels, 3% of "improved buildings," and 7% of value of "Improved Buildings" were immediately adjacent to waterways with historical shoreline erosion. In City of Darien, the exposure was 1% of parcels, 0.3% of "improved buildings," and 5% of value of "improved buildings." These totals are presented in the table below. This was a significant improvement from the 2013 HMP Update, where general percentages were assigned by occupancy class.

EXPOSURE TO COASTAL EROSION HAZARD

Location	Parcels Impacted (% of Total)	"Improved Buildings" Impacted (% of Total)	Value of "Improved Buildings" (% of Total)
McIntosh County (ALL)	415 (3%)	212 (3%)	$82,545,588 (7%)
City of Darien	16 (1%)	3 (0.3%)	$7,948,315 (5%)

Data Source: Parcel information and value are from the 2023 McIntosh County Tax Assessor Data.

The percentages identified in the table above were assigned to the GEMA Worksheet #3A to estimate structures, value of structures, and number of people exposed to this hazard by structure occupancy class. There were two exceptions, industrial remained at the previously identified 0% because the McIntosh County Industrial Park (94 acres) is located away from water sources near the intersection of King Swamp Road and State Route 251, and education remained at 0% due to location of schools. These results are presented in Appendix A, Section I.

Overall, none of the 68 critical facilities are located in this hazard area. Based on the parcel-based, County Tax Assessor database, 212 "improved buildings," valued at $82,545,588 are located within the Coastal Erosion hazard area in the County. The number of people in this hazard area, from Worksheet #3A, was estimated at 440 in the County and 5 in the City. The exposure, as a percentage, was smaller for the City compared with the County as a whole.

D. Land Use and Development Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to coastal erosion hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh

County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors, out of the natural hazard area.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.

- Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
- Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
- Promote the community's water, sewer, and subsequent infrastructure capacity to support development.

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

The coastal areas of the county, including the City of Darien, as well as the barrier islands are especially vulnerable to the effects of coastal erosion while the interior of the county is less vulnerable. The exposure, as a percentage, was smaller for the City compared with the County as a whole (1% versus 3% of parcels and 0.3% versus 3% of "improved buildings").

McIntosh County has a wealth of natural resources such as wetlands, coastal marshes, protected rivers, and floodplains, which are located throughout the County. The importance of these areas cannot be understated for their marshes, mudflats, tidal creeks, and an abundant mix of coastal wildlife enhance the rural feel of McIntosh County, act as a draw for tourism and play a significant role in resident's quality of life.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of coastal erosion. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for

storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of erosion-producing storms that affect McIntosh County and the City of Darien. Climate change is associated with warmer sea surface temperatures, and warmer ocean temperatures may lead to more powerful storms by increasing rainfall and causing more severe flooding, which may lead to coastal erosion. Climate change is also driving sea levels higher, which increases the potential for more dangerous storm surges and therefore more erosion.

According to NOAA's May 2023 State of the Science Fact Sheet titled "Atlantic Hurricanes and Climate Change," based on a survey of existing studies with regards to future North Atlantic, Caribbean Sea, and Gulf of Mexico tropical storm and hurricane activity, global warming is generally projected by most models to result in the following conditions which may increase the potential for more coastal erosion:

- Sea level rise, which leads to more storm inundation levels during hurricane surge events;
- A 15% increase in rainfall rates associated with tropical storms and hurricanes;
- An increase in hurricanes that reach Category 4 or 5 intensity (although this has a large area of uncertainty and some studies project a decrease);
- Increased wind strength of storms and hurricanes.

However, it's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like coastal erosion also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

F. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by coastal erosion.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.

- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations, particularly those located on Sapelo Island, may be disproportionately impacted by coastal erosion due to food and housing shortages and other physical and economic hardships posted by erosion-producing storm events.

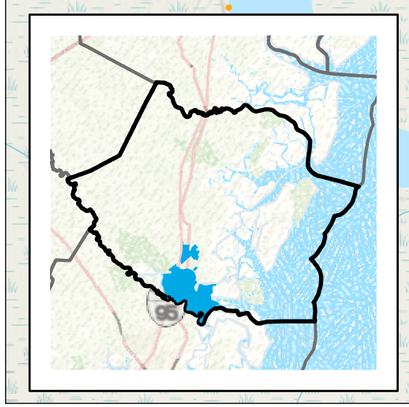
G. Overall HRV Summary

The committee is concerned that coastal erosion is an economic issue for McIntosh County. They feel the issue is exacerbated by the frequency of coastal storm events and the geographic location of the county. Failure to plan for and protect these assets may detract from McIntosh County's rich biodiversity, and the quality of life, and the draw these assets have for potential residents, tourists, and businesses. Its greatest impact is on waterfront and marsh front development and the seafood industry.

Coastal Erosion: Historical Shoreline Change

City of Darien

Horse Creek
Cathead Creek
US Highway 17
New River Rd
Miller Ln SW
Redfish Dr SE
Meadow Ln SE
Canal St SE
Franklin St SE
Black Rd SE
Ashantilly Dr
GA Highway 99
Ashantilly Rd SE
Gray St
Dakota St
Old River Rd
New River Rd SW
Bond Rd SE
Pine St
Houston St
Elbert St
6th St W
5th St W
3rd St W
2nd St W
1st St W
Screven St
Darien
Wilson St
Pine St
Ridge Rd
Crystal Springs Rd SE
Kell Ave
W Black Island Rd SE
Adams St
Greene St
7th St E
6th St E
Wayne St
Congress St



Legend

- City of Darien
- McIntosh County
- Parcels

0 0.17 0.35 0.7 Miles

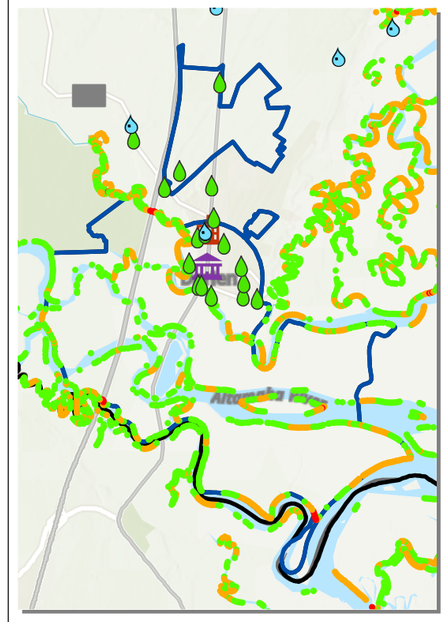
1930s to 2000s

Shoreline Change Rate (m/yr)

- < -1
- -1 - -0.21
- -0.20 - 0.20
- 0.21 - 1
- > 1

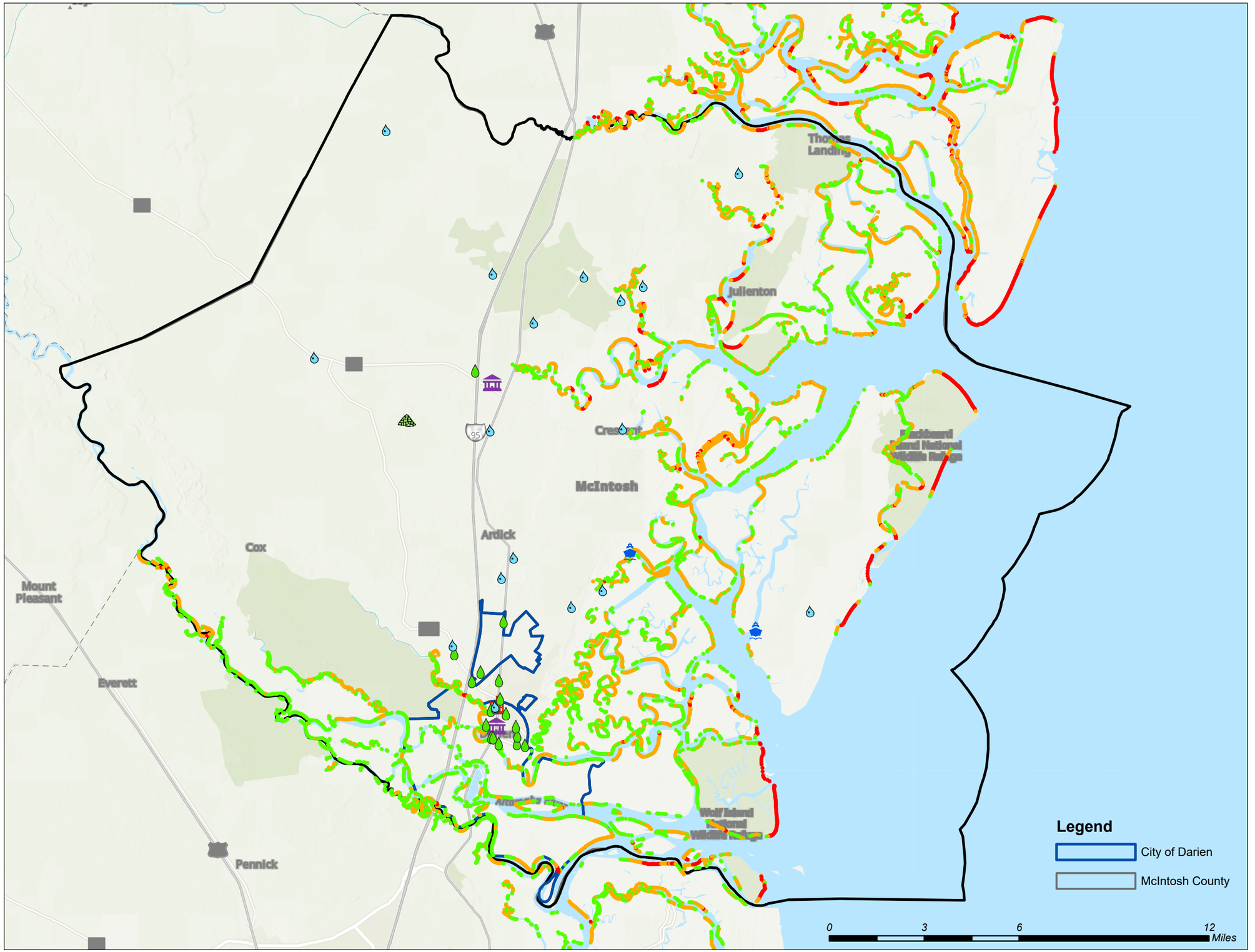
Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



GMC

Coastal Erosion: Historical Shoreline Change

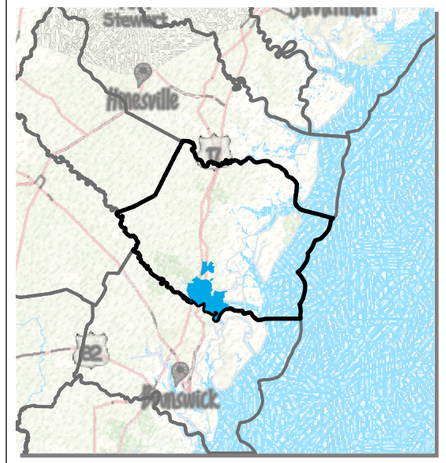


Shoreline Change

- < -1
- -1 - -0.21
- -0.20 - 0.20
- 0.21 - 1
- > 1

Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



GMC

SECTION II – COASTAL STORM / HURRICANE

A. Hazard Identification

Coastal storm systems are characterized by heavy rains and gale force winds. The worst effect of these storms comes from the sea. As the storms move coastward and across the continental shelf, strong winds drive massive amounts of sea water onto land, sometimes increasing mean water level by more than 18 feet. This storm surge is often coupled with normal astronomical tides and wind waves. This coastal flooding has potential to cause severe flooding that not only dampens but destroys exposed structures. The storms can last for several days and can be very large – 1,000-mile-wide storms are not uncommon.

A hurricane is a coastal storm that has wind speeds greater than 74 miles per hour. Hurricanes develop over warm waters and are caused by the atmospheric instability created by the collision of warm air with cooler air. Hurricane winds blow in a large spiral around a calm center called the eye, which can be 20-30 miles wide. When a hurricane nears land, it may bring torrential rains, high winds, storm surges, coastal flooding, inland flooding, and sometimes, tornadoes. A single hurricane can last for more than two weeks over water and can extend outward 400 miles. The hurricane season for the Atlantic coast is June 1 to November 30. On average, five hurricanes strike the United States every year. In a two-year period, an average of three significant (category 3 or higher) hurricanes will strike the United States. Some hurricanes are characterized primarily by water – a rainy or wet hurricane – while others are primarily characterized by wind – a windy or dry hurricane. Wet hurricanes can flood both coastal and inland areas, even as the storm dissipates in wind strength; while windy hurricanes primarily affect coastal areas with their high winds and storm surge. Because hurricanes are large moving storm systems, they can affect entire states or entire coastlines.

For purposes of this Plan, this category also includes related natural beach-related hazards such as rip tides, rip currents, and undertows that may be caused by, or associated with, coastal storms and hurricanes. Rip currents are powerful, narrow channels of fast-moving water. These are strong offshore flows and often occur when breaking waves push water up the beach. Rip tides are a specific type of current associated with the swift movement of tidal water through inlets and the mouths of estuaries, embayments, and harbors. Undertows are strong current that moves water back out to sea after waves break on the shore.

Coastal Storm and Hurricane-associated hazard maps for McIntosh County and the City of Darien are presented at the end of Section II. These hazards include (1) Wind and (2) SLOSH

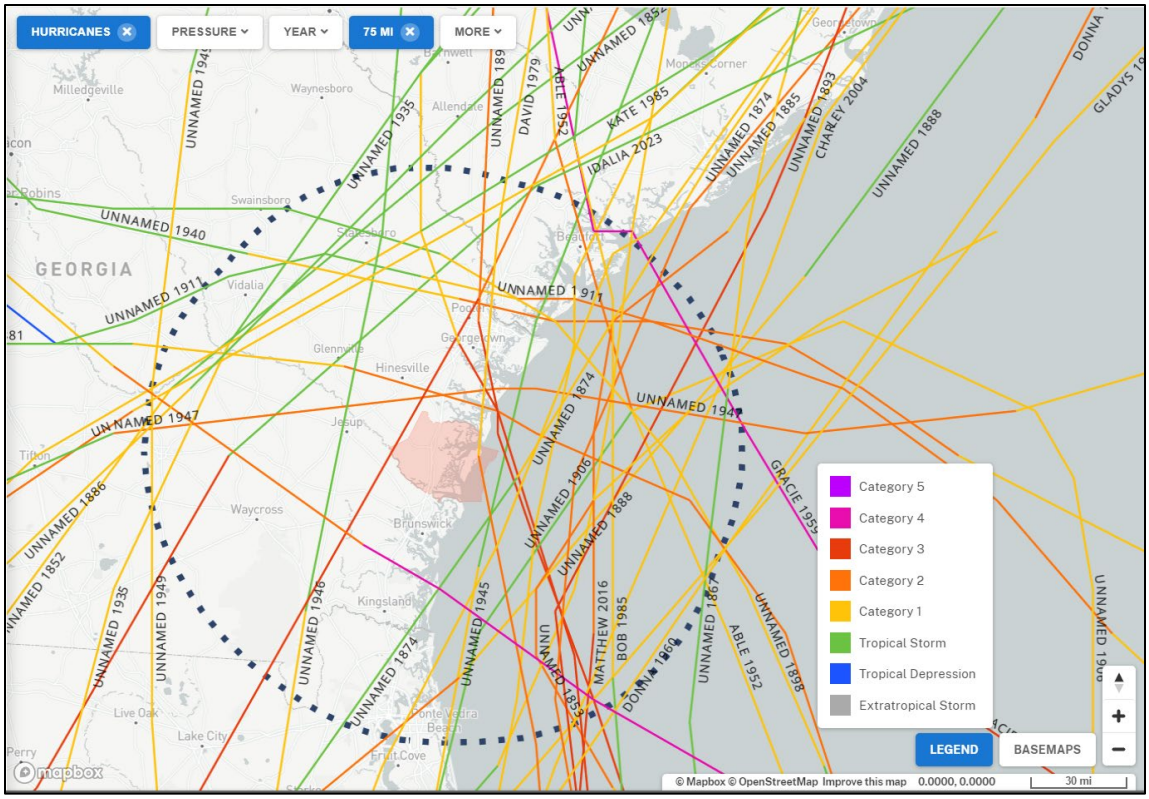
(Sea, Lake, Overland Surge from Hurricanes).

B. Hazard Profile

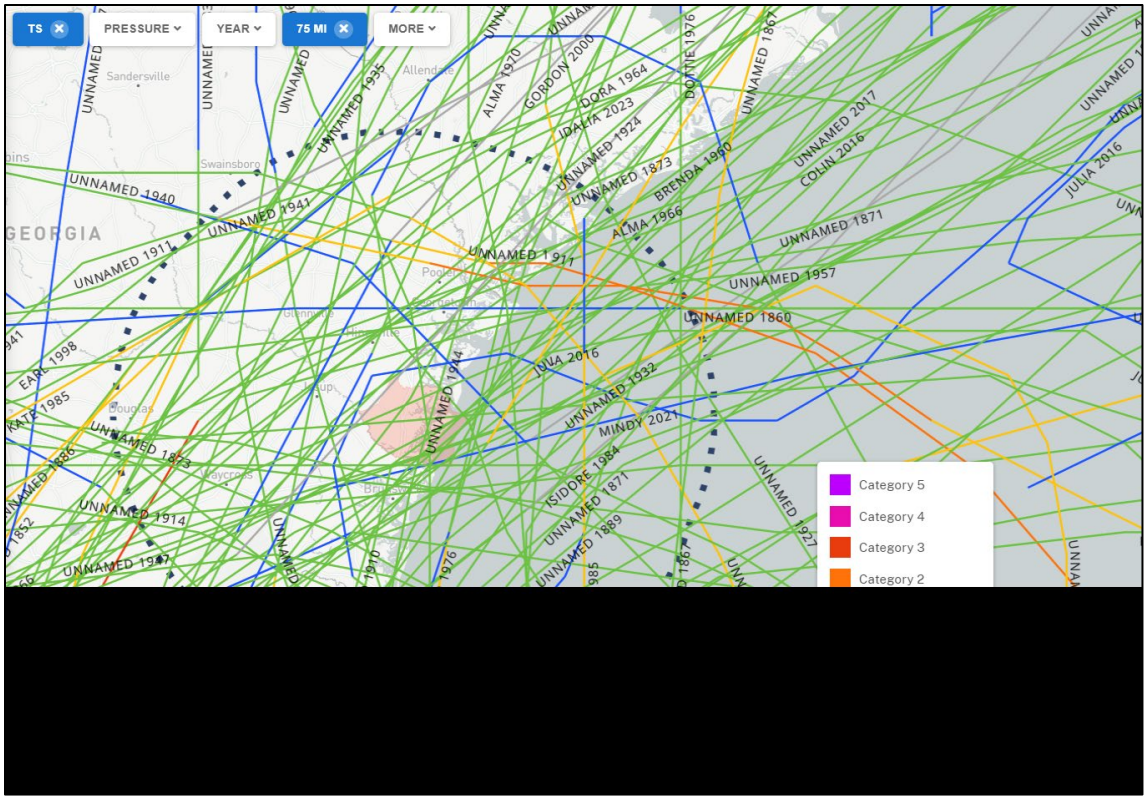
McIntosh County has suffered heavy property damage from coastal storms in the past two hundred years, but most of these instances occurred over 100 years ago. Details of the storms that impacted McIntosh County in years 1804, 1898, and 1964 can be found in the book *Early Days on the Georgia Tidewater* written by local historian, Buddy Sullivan. The storm that hit Georgia on September 7, 1804 is described as the worst to hit the Georgia coast since 1752, as the eye of the storm passed directly over St. Simons Island and Darien (p.69).

Details included in the history book describe the storm on October 2, 1898, as particularly severe along the coast from Sapelo to Fernandina, Florida (p. 421). The storm blew in off the Atlantic Ocean and its center crossed over Sapelo Island at high tide, which created widespread flooding. Reports told of two-story homes completely under water.

The NOAA National Hurricane Center presents historical tracks of hurricanes and tropical storms for 182 years, since 1842. This database was used to find the hurricanes, tropical storms and tropical depressions in which the track of the storm was within 75 miles of the center of McIntosh County. Hurricanes and tropical storms are wide systems that impact large areas, so a 75-mile radius was selected to explore storms that were close to McIntosh County and could have impacted the County. This data source provided excellent historical information, as the NOAA NCEI Storm Event Database only included events that were reported in the past 28 years (since 1996). Graphics of historical hurricanes and tropical storms from 1842-2024 that were within 75 miles of McIntosh County are presented below.



Historical Hurricane Tracks within 75 Miles of McIntosh County [1842-2024] (NOAA NHC)



Historical Tropical Storms within 75 Miles of McIntosh County [1842-2024] (NOAA NHC)

From 1842 to 2024, there were 23 hurricanes, 72 tropical storms, and 24 tropical depressions that had tracks within 75 miles of McIntosh County. Most of these storms occurred in the 1800s. The most severe hurricanes were one Category 4 and three Category 3, and these all occurred in the 1800s (1854-1898). During the previous 50 years (January 1, 1974 to October 15, 2024) only had four hurricanes (one Category 2 [Matthew, 2016] and three Category 1 [David, 1979; Bob, 1985; Helene, 2024]), one hurricane that downgraded to a tropical storm [Kate, 1985], 25 tropical storms, and 15 tropical depressions with tracks within 75 miles of McIntosh County or that impacted the County.

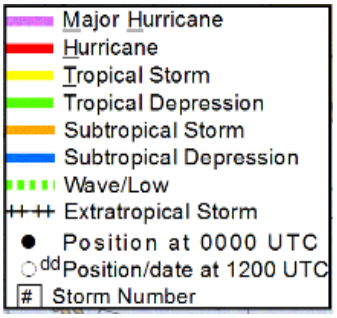
The NOAA NCEI Storm Event Database lists 35 reports from 14 named storms, dating back to 1996, and 8 of the 14 are included in the summary above for coastal storms within 75-miles of McIntosh County. There were an additional 4 tropical storms and 2 hurricanes reported that had impacts of wind, rain, and evacuations in McIntosh County and coastal Georgia, but the centerline of their tracks extended beyond the 75-mile criteria. The two hurricanes occurred in 1996 (Bertha; Category 1 when passing McIntosh County) and 1999 (Floyd; Category 2 when passing McIntosh County), and the 4 tropical storms occurred between 2004 and 2008 (Jeanne, 2004; Alberto, 2006; Ernesto, 2006; and Fay, 2008). All 6 of these storms were counted as Tropical Storms in the Hazard Frequency Table because none of these systems had hurricane-force winds per reports in the Storm Event Database.

Since the 2018 HMP Update, the following coastal storms were within 75 miles of the County and/or had impacts:

- 2019 – Tropical Depression Dorian (9/4/2019)
    - NOAA NCEI Database: "McIntosh County Emergency Management reported 4 trees down across the county due to strong winds associated with Hurricane Dorian. The NERRS site on Sapelo Island measured a peak sustained winds of 38 mph and a peak wind gust of 55 mph during the event."
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded 2.83 inches of rain over a 4-day period, and at Darien 4.2 NNE (Station ID "US1GAMI0003"; Lat/Long: 31.424722, -81.395833), recorded 4.47 inches over a 5-day period.
- 2020 – Tropical Storm Eta (Oct. 31 – Nov. 14) [*track within 75 miles*]
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded less than 1.0 inch of rain.
- 2021 – Tropical Storm Danny (June 27-29) [*track within 75 miles*]
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded less than 1.0 inch of rain.
- 2021 – Tropical Storm Elsa (June 30 – July 10)
    - NOAA NCEI Database: "McIntosh County dispatch reported a tree down in Eulonia. The primary impacts to southeast Georgia and southeast South

Carolina included heavy rainfall, a few tornadoes, and gusty winds."
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded 5.00 inches of rain over a 1-day period.
- 2021 – Tropical Depression Mindy (Sept 8-10) [*track within 75 miles*]
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded less than 1.0 inch of rain.
- 2022 – Tropical Depression Colin (July 1-2) [*track within 75 miles*]
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded less than 1.0 inch of rain.
- 2023 – Tropical Storm Idalia (8/30/2023)
    - NOAA NCEI Database: "The media reported numerous trees down and damage to a couple structures around Darien, Georgia due to tropical storm force wind gusts between 40 to 50 mph as Hurricane Idalia transitioned to Tropical Storm Idalia."
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded 1.60 inches of rain over a 1-day period.
- 2024 – Tropical Storm Debby (8/6/2024)
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), recorded 5.20 inches of rain over a 4-day period.
- 2024 – Hurricane Helene (Category 1) (9/27/2024)
    - Cleanup still underway
    - NOAA rain gauge on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077), was not operational for the storm, but USGS site Hudson Creek at Meridian Landing (USGS site number 022035975) recorded 0.62 inches of rain.

During the 2018 HMP Update, 2016 and 2017 were busy and impactful tropical seasons in Coastal Georgia, and there was one Category 2 hurricane (Matthew, 13) and three tropical storms (Colin, 3; Hermine, 8; and Julia, 10) in 2016 and one major tropical storm in 2017 (Irma). The tracks for those in 2016 are presented in the table below (noted by number of storm). The County Manager estimated that Hurricane Matthew caused about $2 million in damage, and most of this cost was debris cleanup.



2016 Hurricane and Tropical Storms Impacting McIntosh County

Details of Hurricane Matthew from the NOAA NCEI Storm Event Database include:

> "Matthew became a hurricane about 190 miles northeast of Curacao on September 29th before reaching Category 5 strength the following day. Matthew tracked parallel to the northern half of the Southeast Georgia coast as a Category 2 hurricane (110 mph), before continuing to weaken to a Category 1 hurricane (85 mph) while passing much of the lower Southeast South Carolina coast. Minimum surface pressures of 983.1 mb at Savannah International Airport (KSAV), 980.6 mb at Beaufort Airport (KNBC) and 981.7 mb at Charleston International Airport (KCHS) where recorded as Matthew passed just offshore.
>
> Across southeast Georgia and southeast South Carolina, the main impacts from Matthew included heavy rain, wind damage in the form of scattered to widespread trees and power lines blown down and storm surge, specifically along coastal locations from Tybee Island, GA north to Edisto Beach, SC. Storm total rainfall amounts generally ranged from 4.5 to 7 inches across western areas of Southeast Georgia and extreme western locations of Southeast South Carolina to 8 to 17 inches closer to the coast, highest in coastal counties of Southeast Georgia and the lower

Southeast South Carolina coast. A peak storm total rainfall of 17.49 inches was recorded at Hunter Army Airfield in Georgia while a peak storm total rainfall of 16.90 inches was recorded near Edisto Island, SC. Daily record rainfall totals were also set on October 7th and October 8th at the Savannah International Airport (KSAV), 4.36 inches and 3.84 inches, at the Charleston International Airport (KCHS), 4.7 inches and 5.77 inches and in downtown Charleston (KCXM), 4.36 inches and 3.84 inches respectively. Heavy rains also led to several instances of flash flooding with damage to roads and homes and helped produce long duration flooding along the Edisto River, Ashley River and Santee River. Wind damage produced numerous to widespread power outages and damage to homes and other structures throughout the area, most significantly at locations near the coast where 60 mph to 100 mph wind gusts occurred with rain bands surrounding the passing eye wall. On October 8th, a maximum sustained wind of 75 mph and peak wind gust of 96 mph was recorded at the Tybee Island South sensor (XTYE) in Georgia while a maximum sustained wind of 67 mph was recorded at the Beaufort (XBUF) sensor in South Carolina and peak wind gust of 87 mph was recorded at the Hilton Head Airport (KHXD) sensor in South Carolina. Three deaths and 1 injury occurred from trees falling on homes or cars in Southeast Georgia (but none in McIntosh County). The most extensive damage came with storm surge during Matthew. The entire Southeast Georgia and Southeast South Carolina coast was impacted by storm surge generally ranging between 2 to 5 ft with some locations as high as 6 to 8 ft. A peak surge of 7.69 ft occurred at the Fort Pulaski tide gauge at 2:48 AM October 8th while a peak surge of 6.20 ft occurred at the Charleston Harbor tide gauge at 5 AM October 8th. Damage from surge was most notable on the northern ends of Tybee Island in Georgia, Fripp Island in South Carolina and Edisto Island in South Carolina.

Specifically, on Sapelo Island, the DNR Sapelo Island manager reported that there were thousands of trees that fell during Hurricane Matthew. No trees landed on homes. There was only limited structural damage with just one residence requiring significant repair. An estimated 60 and 80 percent of the island's power lines came down."

In 2017, Irma was another coastal storm/hurricane had major impacts on McIntosh County and coastal Georgia as a Tropical Storm in terms of wind intensity. Details of this extreme event from NOAA NCEI Storm Event Database are described below:

"Irma strengthened into a major hurricane and made landfall on the southwest Florida coast on September 10th. During an extended period as a major hurricane, Irma set numerous intensity records for a hurricane in the Atlantic basin. Maximum sustained winds reached 185 mph, making Irma the strongest storm on record to exist in the Atlantic Ocean outside of the Caribbean and Gulf of Mexico. The minimum central pressure reached during Irma's life cycle was 914 mb which is the lowest pressure on record by an Atlantic hurricane outside of the western Caribbean and Gulf of Mexico.

Furthermore, Irma maintained Category 5 status for 3 consecutive days which is the longest on record for an Atlantic hurricane. Irma officially made landfall at Marco Island, FL at 3:35 pm September 10 as a Category 3 hurricane. Following landfall, Irma tracked to the north-northwest and eventually the northwest as it progressed up the western side of the Florida peninsula. Irma steadily weakened during this time and was downgraded to a tropical storm near the big bend of Florida at 8:00 am on September 11th. Through the rest of September 11th, Irma tracked to the northwest into southern Georgia and widespread impacts occurred across the Southeast.

Despite the fact that the center of Irma tracked well to the west of the southeast Georgia and southeast South Carolina region, it still caused significant impacts due to heavy rainfall, strong winds, tornadoes, and storm surge. Feeder bands around Irma continuously moved onshore on September 11th and produced very heavy rainfall rates with rainfall totals generally ranging from 3 to 9 inches. The widespread heavy rain resulted in several reports of flash flooding with water entering homes and businesses. Wind damage produced numerous power outages across the region with some damage to structures and numerous downed trees. The strongest winds were confined to coastal locations, but frequent gusts into the 40-50 mph range occurred well inland. The entire southeast Georgia and southeast South Carolina coast was impacted by storm surge generally ranging from 3 to 6 feet. This storm surge produced numerous reports of 4 to 6 feet of inundation above ground level, mainly along the southeast South Carolina coast. A peak surge of 4.87 feet occurred at the Charleston Harbor tide gauge at 2:00 pm while a peak surge of 5.63 feet occurred at the Fort Pulaski tide gauge at 5:42 am. Significant beach erosion occurred at area beaches with widespread damage to docks and piers all along the coast, as well as numerous reports of inundated roadways.

According to data received from the Georgia Emergency Management Agency, total damages from Irma in southeast Georgia were $29,150,000. This includes $2,900,000 in McIntosh County.

McIntosh Emergency Management reported extensive storm surge flooding and inundation across coastal portions of the county, including islands. County dispatch reported 2 feet of water on the road on Butler Island at Highway 17 as well as 2 feet of water on Blue N Hall Road due to storm surge. USGS high water mark analysis revealed inundation above ground level ranging from 1.37-3.87 feet in coastal portions of the county. The peak inundation measured occurred on Graystone Road where a high-water mark showed 3.87 feet above ground level. Also, the USGS site Hudson Creek at Meridian Landing (USGS site number 022035975) reached a record level of 7.78 feet during the event. This USGS site dates back to October 2007. McIntosh County Emergency Management also reported numerous trees down across the county due to strong winds associated with Hurricane Irma. The NERRS site (National Estuarine Research Reserve) on Sapelo Island measured a peak wind gust of 60 mph during the

event. Total rainfall measured at this USGS site was 6.00 inches."

Based on a 17-year history of available data from the USGS site (ID: USGS 022035975) Hudson Creek at Meridian Landing (since October 2007), the following information regarding stage records is available about the flood events since the 2013 HMP Update. This station also includes a rain gauge, but it was only operational prior to 10/24/2017 and after 6/16/2024.

- The highest stage on record was Tropical Storm Irma on September 11, 2017 – 7.78 feet. Total rainfall from this event was 6.00 inches.
- From the recent coastal storms since 2018, the only events to exceed a stage of 5.50 feet were: Tropical Depression Dorian (9/4/2019 – 5.92 feet; rainfall data not available), Tropical Storm Idalia (8/30/2023 – 5.94 feet; rainfall data not available), Tropical Storm Debby (8/6/2024 – 5.65 feet; rainfall data not available), and Hurricane Helene (9/27/2024 – 5.57 feet; 0.62 inches of rain). The other coastal storms were less than 5.50 feet – T.S. Eta in 2020, T.S. Danny, T.S. Elsa, and T.D. Mindy in 2021, and T.D. Colin in 2022.
- The coastal flood event on 11/23/2018, had a stage of 6.67 feet, which was the third largest event from 2018 to 2024. This event was not influenced by rainfall but rather a combination of persistent and strong east/northeast winds, the Perigean spring tide and a full moon. The other two events with a higher stage were 11/7/2021 (6.83 feet) and 11/10/2022 (7.18 feet). Neither exceeded the largest record from Tropical Storm Irma in 2017.

The magnitude of impact is illustrated in the table below. The wind scale for hurricanes is based on the Saffir-Simpson Scale.

SAFFIR-SIMPSON SCALE AND MAGNITUDE OF IMPACT FOR HURRICANES

Storm Magnitude	Winds (MPH)	Damage	Storm Surge	# Impacting McIntosh County (1842-2016)
Tropical Storms	Less than 74	Minimal/Some		60
Category 1	74-95	Minimal/Some	4-5 feet	10
Category 2	96-110	Extensive	6-8 feet	8
Category 3	111-130	Devastating	9-12 feet	3
Category 4	131-155	Catastrophic	13-18 feet	1
Category 5	More than 155	Catastrophic	› 18 feet	0

Hurricane Floyd, September 16, 1999, like the recent Hurricane Matthew, caused one of the larger peacetime evacuations in history. Approximately 350,000 coastal residents joined more than 2 million people from Florida, South Carolina and North Carolina. Floyd was a Category 5 storm while at sea but was downgraded to a Category 2 when it made landfall

near Cape Fear, North Carolina. The coastal Georgia counties were spared hurricane damage. Hurricane Matthew stayed just far enough off of the coast and avoided a direct hit. It made direct landfall in Charleston, SC, and caused tremendous flooding in southeastern North Carolina.

The rate of onset of a storm surge has a smaller range than the storm itself. While the storm may show signs of approach up to days before the storm peaks, the storm surge will often appear somewhat suddenly. This rapid rate of onset is the major contributor to the many deaths associated with storm surge. The duration of the surge event depends on the depth of the surge and other environmental factors such as drainage capability. The waters from the surge may remain for days in certain areas. Although Georgia has not sustained a direct hit from a tropical cyclonic system in the recent record, Georgia's coastal counties have experienced some coastal flooding. Georgia's coastal counties, including McIntosh County, have great potential for a massive tropical cyclone to hit directly, causing an overwhelming storm surge.

Due to McIntosh County's location in relation to the coast and its flood area size, all assets are at great risk for hurricane damage from rain and winds. The frequency of an event would be the same for both the County and the City of Darien. Based on historical records, the annual probability of a Category 1 hurricane is 6.0% and a Category 4 hurricane is 0.5%. In terms of extent, McIntosh County has suffered from predominantly Tropical Storm and Category 1 storm effects but storms up to Category 5 cannot be ruled out. The hazard frequency data table and critical facility inventory is located in Appendix D.

C. Assets Exposed to Hazard and Estimate of Potential Losses

All structures and facilities within McIntosh County could be damaged by a coastal storm or hurricane, including all public safety facilities, government buildings, water and wastewater treatment facilities, public utilities, education centers, the public library and commercial and residential areas. Based on the 2023 Consolidated Tax Digest Summary, existing structures in the coastal storm and hurricane hazard area may number 40,789 residential, commercial, industrial, agricultural, and nonprofit structures, 35 infrastructure structures, as well as 543 government and education structures. The value of these structures is $2,201,629,413. The entire population, 17,849 people, would also be at risk. This exposure is detailed in Appendix A, Section II, for McIntosh County and the City of Darien (GEMA Worksheet #3A).

All 68 critical facilities are exposed to this hazard. Exposure of these facilities was also explored for storm surge and wind. There are a total of 26 essential critical facilities located in the County. In total, 3 critical facilities would be exposed to storm surge for a Category 1 hurricane and 16 for a Category 4 hurricane. All 3 facilities vulnerable to a Category 1 hurricane are located on Sapelo Island. For the Wind hazard, 23 are located in the Category 5 zone (most extreme) and 3 are located in the Category 4 zone.

The impact of storm surge in McIntosh County and City of Darien were explored based on the SLOSH (Sea, Lake, and Overland Surge from Hurricanes) model using GIS. Storm surge from a Category 1 and a Category 4 hurricane were explored because these represented the most common storm, and the largest on record since 1842. It was identified that in McIntosh County 29% of parcels, 25% of "improved buildings," and 41% of value of "Improved Buildings" were in the storm surge zone for a Category 1 hurricane. The City of Darien was in general on higher ground than most of the County, so only 5% of parcels, 3% of "improved buildings," and 10% of value of "improved buildings" were in this storm surge zone. If a Category 4 hurricane impacts the area, the percentages of exposure jump greatly. In McIntosh County, exposure increased to 89% of parcels, 87% of "improved buildings," and 88% of value of "Improved Buildings," and in Darien, exposure increased to 76% of parcels, 75% of "improved buildings," and 78% of value of "Improved Buildings." These totals are presented in the table below.

EXPOSURE TO COASTAL STORM/HURRICANE HAZARD

Location	Parcels Impacted (% of Total)	"Improved Buildings" Impacted (% of Total)	Value of "Improved Buildings" (% of Total)
Category 1 Storm Surge			
McIntosh County (ALL)	3,744 (29%)	1,890 (25%)	$508,914,476 (41%)
City of Darien	75 (5%)	27 (3%)	$16,582,471 (10%)
Category 4 Storm Surge			
McIntosh County (ALL)	11,781 (89%)	6,529 (87%)	$1,104,801,376 (88%)
City of Darien	1,129 (76%)	787 (75%)	$131,214,120 (78%)

Data Source: Parcel information and value are from the 2023 McIntosh County Tax Assessor Data.

It should be noted that in addition to storm surge, wind hazard is also of concern. All of City of Darien, and about two-thirds of McIntosh County are located in Category 5 Wind Hazard (highest rating). The remainder of McIntosh County, mostly west of I-95, is in Category 4. Maps of storm surge and wind hazard are presented at the end of this section for McIntosh County and City of Darien. According to the Georgia Office of Insurance and Safety Fire Commissioner, McIntosh County is in Zone 2 of the Georgia Manufactured Housing Wind Zones. This zone is rated for 100 to 109 MPH and is the highest in the state of Georgia. Unincorporated County's code states that all structures must meet wind loading requirements of Federal Emergency Management Administrator and the Southern Building Code Congress International (SBCCI) Codes. The local continuous design wind speed in the unincorporated area is 120 MPH.

HAZUS modeling was conducted for McIntosh County, and it is reported in the 2024 Report,

"Hazard Risk Analyses: Supplement to the McIntosh County Joint Hazard Mitigation Plan," by Coastal Regional Commission. This report is included in Appendix A. Damage was calculated for a hypothetical Category 2 hurricane.

HAZUS modeling predicted the following for Wind Damage from a Category 2 Hurricane:

- Impacted 829 buildings, with damage of $11,998,070 and total economic loss of $16,462,500 for a loss ratio of 0.93%.
- None of the 27 essential facilities suffered damage greater than 50%, and 16 facilities had expected loss less than 1 day.
- Total wind-related debris was 198,970 tons.

D. Land Use and Development Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to coastal storm/hurricane hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their

proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
    - Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation

preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

The greatest concerns during a coastal storm and hurricane event are the impacts of flooding caused by heavy rainfall and storm surge combined with the impact of high winds. Unincorporated McIntosh County and the City of Darien participate in the National Flood Insurance Program (NFIP), as well as adhere to the Georgia State Minimum Standard Codes (Uniform Codes Act) and the International Building Code. The minimum standards established by these codes provide reasonable protection to persons and property within structures that comply with the regulations for most natural hazards.

Due to the county and city's location in relation to the coast, the entire area is at great risk for coastal storms. With respect to storm surge, City of Darien is at less risk than McIntosh County; however, a Category 4 hurricane or greater would impact most of both areas. When factoring in wind and localized flooding from heavy rainfall, the entire area is at risk. There are no hurricane shelters located within the entire county, so evacuation and reentry processes are very important to consider and plan for to ensure public safety.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of coastal storms and hurricanes. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of storms and hurricanes that affect McIntosh County and the City of Darien. Climate change is associated with warmer sea surface temperatures, and warmer ocean temperatures may lead to more powerful storms by increasing rainfall and causing more severe flooding. Climate change is also driving sea levels higher, which increases the potential for more dangerous storm surges.

According to NOAA's May 2023 State of the Science Fact Sheet titled "Atlantic Hurricanes and Climate Change," based on a survey of existing studies with regards to future North Atlantic, Caribbean Sea, and Gulf of Mexico tropical storm and hurricane activity, global warming is generally projected by most models to result in the following:

- Sea level rise, which leads to more storm inundation levels during hurricane surge events;
- A 15% increase in rainfall rates associated with tropical storms and hurricanes;

- An increase in hurricanes that reach Category 4 or 5 intensity (although this has a large area of uncertainty and some studies project a decrease);
- A 15% projected decrease in the total numbers of Atlantic tropical storms and hurricanes combined; however, this has a large uncertainty and a minority of studies project an increase; and
- Increased wind strength of storms and hurricanes.

NOAA's Fact Sheet notes that other aspects such as storm formation location, tracks and size may also be impacted by climate change, but there is little agreement on the projections. It's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like coastal storms and hurricanes can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by coastal storms and hurricanes.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.
- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by storms and hurricanes due to food and housing shortages and other physical and economic hardships posted by storm events.

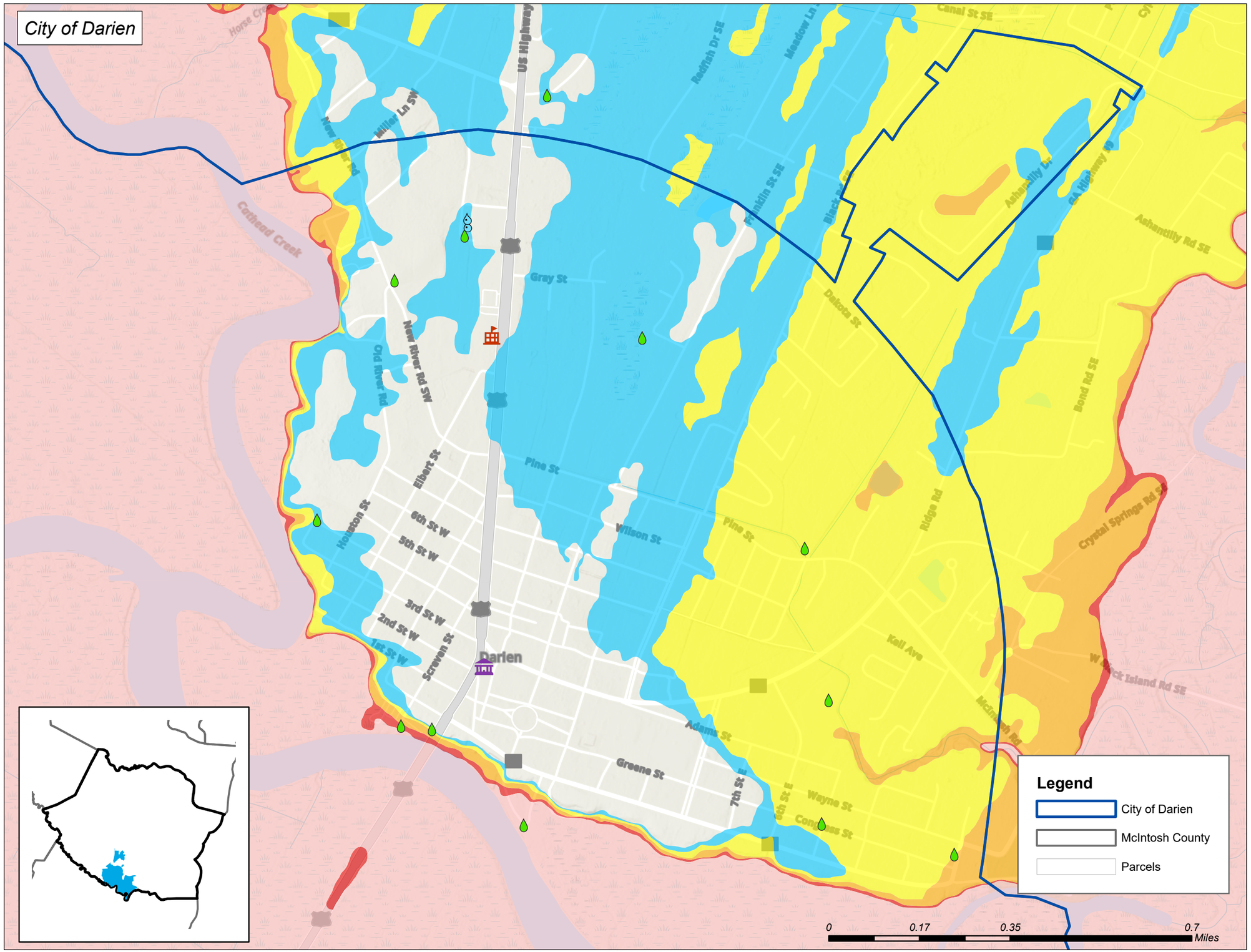
H. Overall HRV Summary

McIntosh County has a high probability for exposure to potential damages caused by coastal storms and hurricanes. The storms would impact all facilities and structures within the county. Due to jurisdiction's location in relation to the coast, considerable damage would be caused, particularly from heavy rainfall, high winds, and storm surge. The storm surge has potential to cause severe flooding that not only dampens but destroys exposed

structures. Based on the magnitude of these events, this type of hazard would have the largest impact on property and people per an individual event. The entire exposure area could be impacted from one event.

Storm Surge

City of Darien



Legend

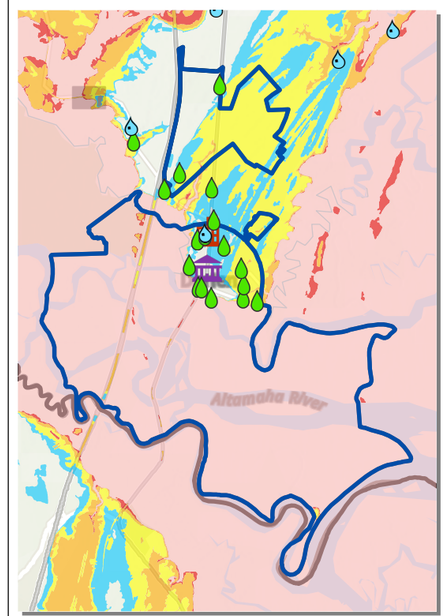
- City of Darien
- McIntosh County
- Parcels

Storm Surge

- Tropical Storm
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5

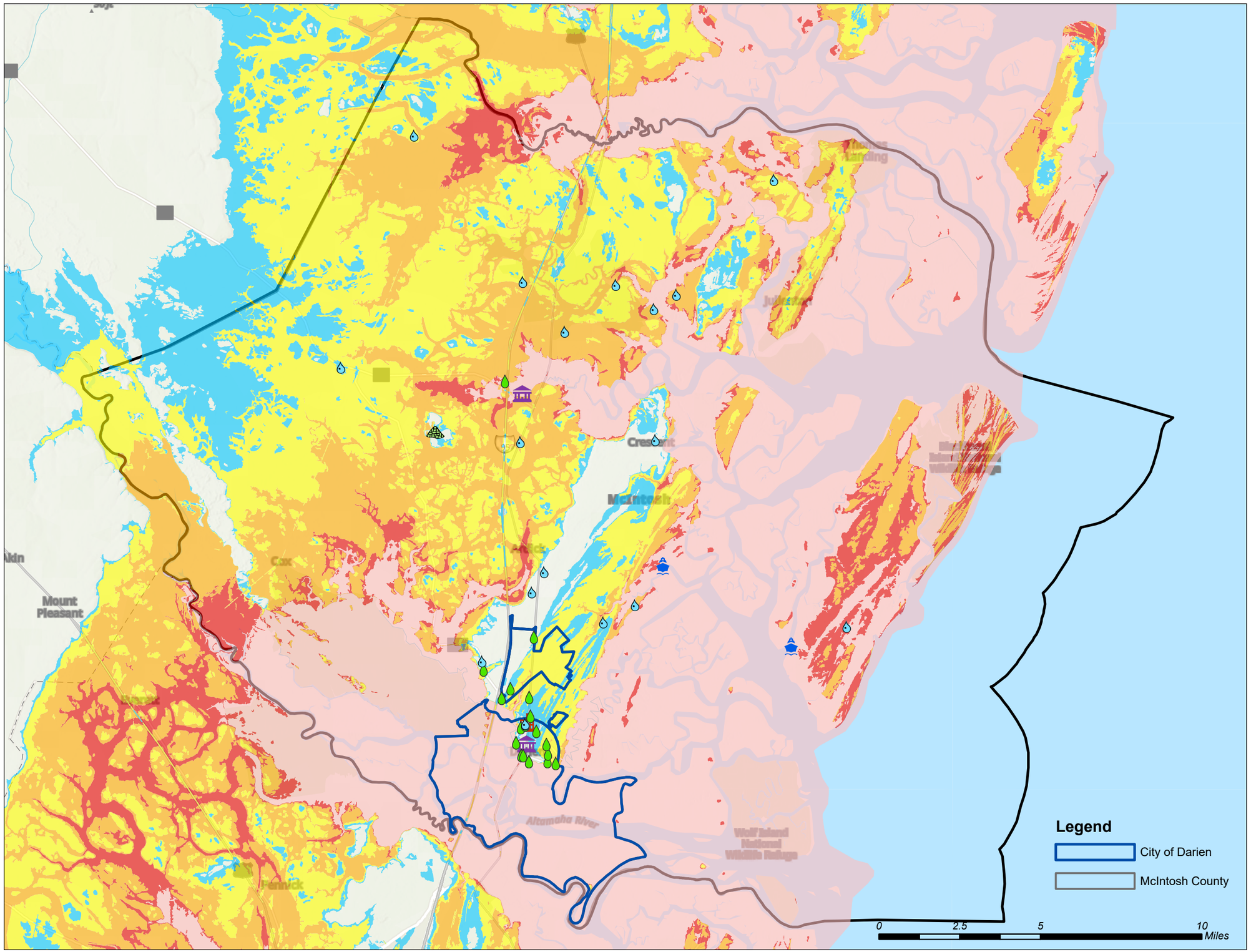
Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



GMC

Storm Surge

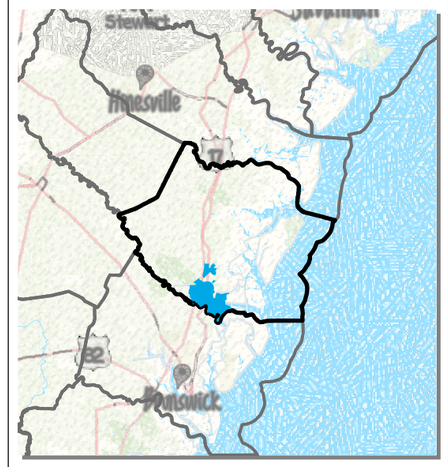


Storm Surge

- Tropical Storm
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5

Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



GMC

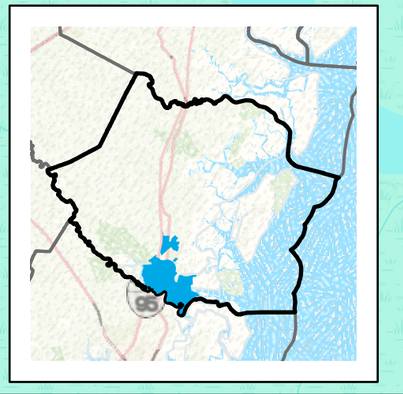
Wind Zones

City of Darien

Horse Creek
Cathead Creek
US Highway 17
New River Rd
Miller Ln SW
Redfish Dr SE
Meadow Ln SE
Canal St SE
Bay
Palmetto
Cypress
Franklin St SE
Black Island Rd SE
Ashantilly Dr
GA Highway 99
Ashantilly Rd SE
Gray St
Dakota St
Old River Rd
New River Rd SW
Bond Rd SE
Elbert St
Houston St
6th St W
5th St W
3rd St W
2nd St W
1st St W
Screven St
Pine St
Wilson St
Darien
Ridge Rd
Crystal Springs Rd SE
Kell Ave
W Black Island Rd SE
McIntosh
Adams St
Greene St
7th St
8th St
Wayne St
Congress St
Altamaha River

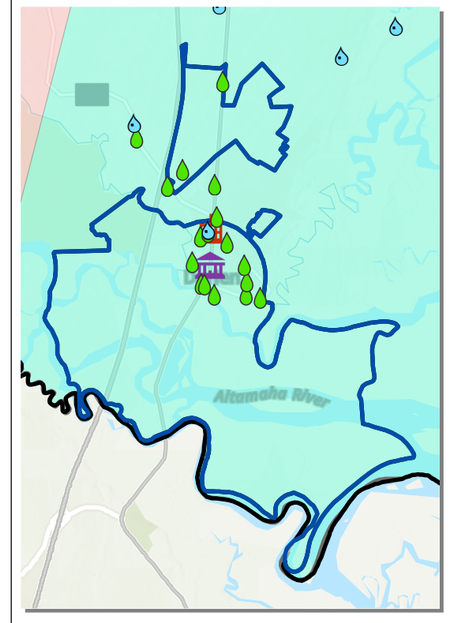
Wind Zones
- Zone 4
- Zone 5

Critical Facilities
- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



Legend
- City of Darien
- McIntosh County
- Parcels

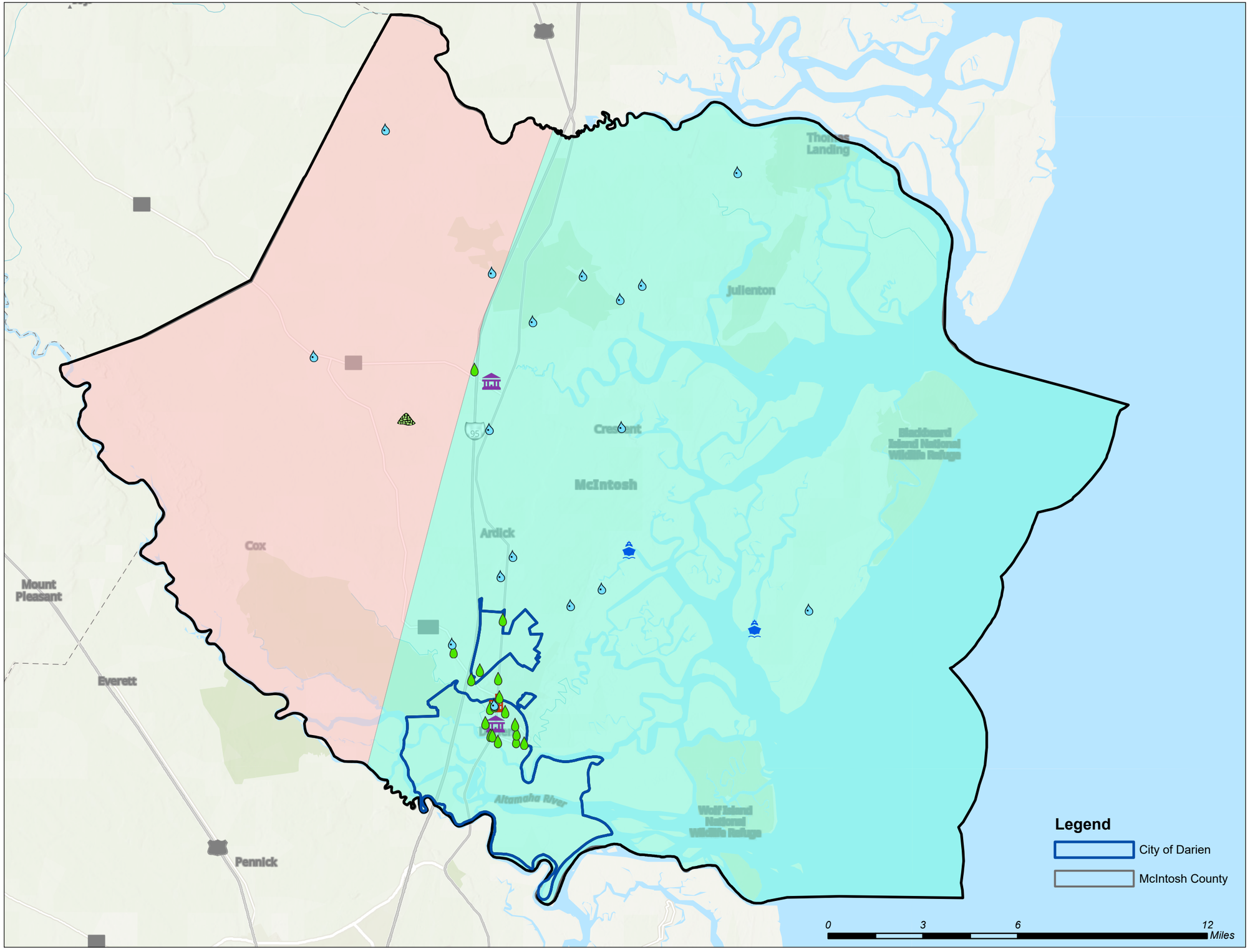
0 0.17 0.35 0.7 Miles



McIntosh County

GMC

Wind



Wind Zones

- Zone 4
- Zone 5

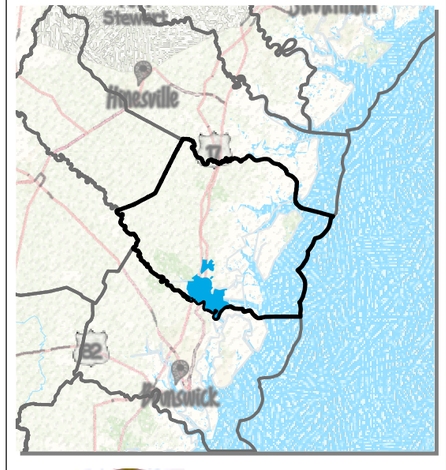
Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical

Critical Facilities

CriticalFacilities_GMIS_122016.SimpleType

- Education



GMC

SECTION III – DROUGHT

A. Hazard Identification

The 2008 *Georgia Hazard Mitigation Plan Standard and Enhanced* defines drought as a normal, recurrent feature of climate consisting of a deficiency of precipitation over an extended period of time (usually a season or more). Therefore, a drought is a period of abnormally dry weather sufficiently prolonged for the lack of water to cause a serious hydrologic imbalance in the affected area. Drought conditions affect the cultivation of crops as well as a water availability and water quality. Drought is also a key factor in wildfire development. Drought conditions make natural fuels (grass, brush, trees, and dead vegetation) more flammable. According to the 2023 Consolidated Tax Digest Summary, more than 47% of McIntosh County is considered Agricultural and Forest Land. There are very few agricultural crops grown in McIntosh County, so one of the biggest concerns for droughts is fuel for wildfires.

Drought conditions may endure from months to decades, which implicate droughts as having high potential to cause devastation on a given area. The duration characteristic of droughts is so important that droughts are classified in terms of length of impact. Droughts lasting 1 to 3 months are considered short term, while droughts lasting 4 to 6 months are considered intermediate and droughts lasting longer than 6 months are long term.

Data from the U.S. Drought Monitor was used to classify the presence and duration of droughts (University of Nebraska-Lincoln). Based on this classification system, there are 5 categories, ranging from D0 (abnormally dry) to D4 (exceptional drought). These are described in the table below along with comparisons to other indicators and indices.

Drought Severity Classification

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Short-term drought indicator blends focus on 1-3 month precipitation. Long-term blends focus on 6-60 months. Additional indices used, mainly during the growing season, include the USDA/NASS Topsoil Moisture, Keetch-Byram Drought Index (KBDI), and NOAA/NESDIS satellite Vegetation Health Indices. Indices used primarily during the snow season and in the West include snow water content, river basin precipitation, and the Surface Water Supply Index (SWSI). Other indicators include groundwater levels, reservoir storage, and pasture/range conditions.

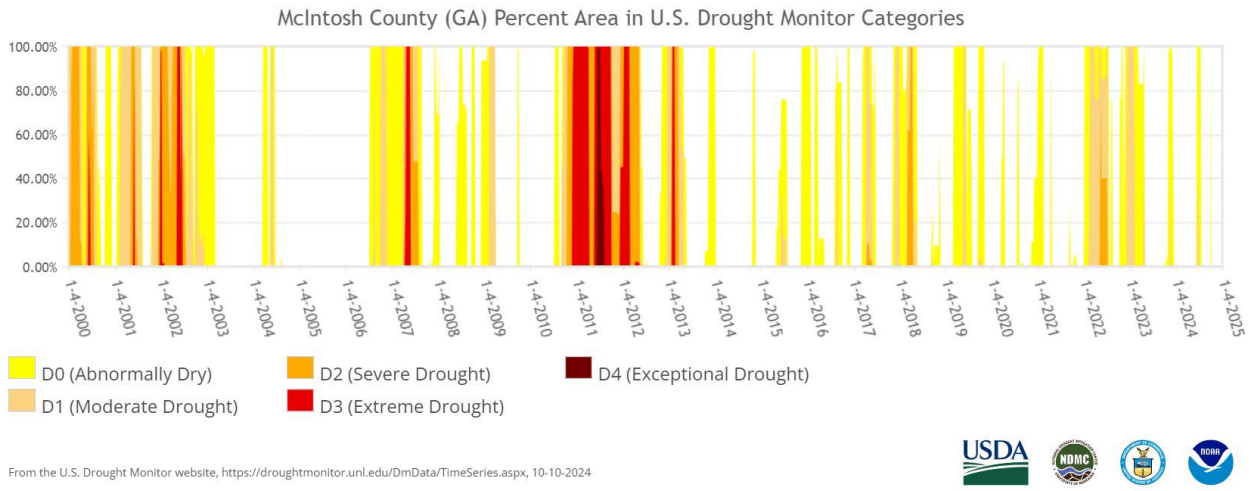
Drought Classification System from U.S. Drought Monitor (University of Nebraska-Lincoln)

B. Hazard Profile

Historical frequency data for this hazard was researched on the NOAA NCEI Storm Event Database. The Storm Event Database lists 46 occurrences of drought. An occurrence is listed in this database on the 1st of each month if the rainfall and weather conditions indicate a drought, so the reporting does not account for continuous drought conditions. Within the database, two locations are listed for each month with a drought – "Inland McIntosh" Zone and "Coastal McIntosh" Zone. Therefore, there were 23 months with a drought reported. The HMPUC defined a drought event as a continuous event, so overall, there were 5 recorded drought events in the 75-year recorded storm history. There were no new drought events identified in this database since 2002, and all 5 events occurred from 1996 to 2002. These drought events occurred during the following periods: (1) May 1996, (2) August–September 1999, (3) May–September 2000, (4) April–June 2001, and (5) October 2001–September 2002. No crop damage or losses were reported in this database for these events.

Since the most recent drought recorded on the NOAA NCEI Storm Event Database was in 2002 and droughts have been observed in the area within the last decade, drought conditions were also explored using the U.S. Drought Monitor (http://droughtmonitor.unl.edu/). Drought information was downloaded for the period since data was last updated for the 2013 HMP Update, which was July 2009. The longest consecutive period with at least a D2 (severe drought) was 51 weeks from 10/26/2010 to 10/17/2011, including two periods of 19 consecutive weeks with at least a D3 (extreme

drought). The other periods with a severe drought (D2) or worse were: (1) a 22-week period from December 2011 to May 2012, (2) an 8-week period from February to March 2013, and a 6-week period from March to April 2018. Since the 2018 HMP Update, there has been one additional severe drought (D2) or worse for 1-week in May 2022. Based on the results from the U.S. Drought Monitor, at least a severe drought was recorded 5 times over a 16-year period since 2009, with one drought lasting for 12 months.



U.S. Drought Monitor for McIntosh County from 2000 to 2024

The drought hazard frequency is not entirely representative since some droughts can last a couple months and others over a year. Based on the 5 events in the NOAA NCEI Storm Event Database, the drought from 2007-2008 that was based on county records and reported in the 2013 HMP Update (and seen in the graph above from U.S. Drought Monitor), and the 5 periods identified since July 2009 from the U.S. Drought Monitor, a total of 11 events have occurred over the past 74 years for a 14.9% chance to occur per year. All of these events have been recorded in the most recent 29 years. Because the data collection, reporting, and accuracy are much better in the past 20 years, the frequency of a drought is 0.30 events per year for the most recent 20 years only. The frequency is the same for both the County and the City. The hazard frequency data table is located in Appendix D.

Previous instances of droughts and responses are described below. Coastal Georgia has experienced a prolonged drought period since 1999. In response to this situation, the United States Department of Agriculture issued an Emergency Disaster Declaration on October 18, 2002. The declaration was in response to continuous drought conditions since January 2002. This declaration allowed agricultural businesses in the indicated counties to become eligible for emergency farm loans. On February 22, 2001, then Governor Roy Barnes secured Economic Disaster Relief from the Small Business Administration for Georgia's seafood industry in response to the impact of drought. McIntosh County was named in the declaration.

Drought conditions have increased in frequency, magnitude and intensity in recent years. The Georgia governor declared a State of Emergency in Drought Executive Order 011808 on October 20, 2007 that was extended on November 20, 2007 and again on December 19, 2007. Because the condition was declared a Level 4 drought for most of the state, increased levels of drought response are necessary. Thus, the executive order called for establishment of the Drought Response Unified Command and the Drought Response Working Group to be consistent with the Georgia Emergency Operations Plan. The order also called for the implementation of the State of Georgia Drought Response Strategy. More information regarding the drought response can be found on the Drought Response Unified Command's website (https://www.piersystem.com/go/site/1619/) as well as the Conserve Water Georgia's website (http://www.conservewatergeorgia.net/Documents/georgia_drought.html). Also, the most up to date drought monitoring information can be found at the National Drought Mitigation Center's website (http://www.drought.unl.edu/index.htm).

Because of the slow rate of onset and long duration of droughts in Georgia, long-term management and mitigation measures are appropriate. The Environmental Protection Division (EPD) of Georgia's Department of Natural Resources (DNR) publishes the Georgia Drought Management Plan, which addresses both pre-drought mitigation strategies and drought response strategies. On June 10, 2009, Georgia EPD issued a non-drought schedule for outdoor water use for the first time since June 2006, a 3-year period because significant rainfall and improved water supplies.

C. Assets Exposed to Hazard and Estimate of Potential Losses

Drought conditions typically pose little or no threat to structures; however, fires can occur from the dry weather. The McIntosh County HMPUC concluded that a drought itself presents no credible threat to critical facilities. Droughts could impact some private wells, which are not as deep as the City and County wells. Wildfire, as a result of drought, was considered, and the Committee determined that this hazard does bear a significant threat to the community. The hazard, Wildfire, and associated actions and descriptions are described in Section VIII.

The HMPUC decided to keep the exposure for drought at 100% for agricultural category and 15% for government category. In McIntosh County, the number of structures in the hazard area is 1,587 valued at $135,405,448, and in Darien, the number of structures in the hazard area is 32 structures valued at $2,773,687. These results are presented in Appendix A, Section III.

Potential drought losses are calculated on the value of agriculture in the County. According to data maintained by Georgia Department of Natural Resources, Coastal Resources Division, the market value of production in seafood harvesting represents more than $5 million annually.

D. Land Use & Development Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to drought hazards. Some guidance comes from the State and Coastal Regional Water Plans for local governments to implement. Current and recent economic conditions have made it difficult to predict future growth. Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to coastal storm/hurricane hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
    - Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock

(the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County could potentially be affected by drought conditions, particularly as concerns the seafood industry and the threat of wildfire. Most of the wildfire danger is in the county because structures are in the Wildland-Urban Interface. Any mitigation steps taken related to wildfire should be undertaken on a countywide basis and include the City of Darien.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of droughts. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of extreme weather events that affect McIntosh County and the City of Darien.

Currently, it is unclear how climate change could impact droughts in the future. According to GEMA's 2019-2024 Georgia Hazard Mitigation Strategy and Enhanced Plan, droughts could become more frequent and more severe, although significant changes in the frequency and severity of droughts are not projected. Increased temperatures associated with global warming could lead to increased evaporation rates for crops and wetland areas and therefore hotter summers under drier climatic conditions, which could have ecological and economic impacts for McIntosh County and the City of Darien. It's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like drought can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by droughts, if they were to occur.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.

- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by storms and hurricanes due to food and housing shortages and other physical and economic hardships posted by storm events.

H. Overall HRV Summary

Drought can cause severe economic stress to the agricultural and forestry interests in McIntosh County. The potential negative effects of sustained drought are numerous. In addition to an increased threat of wildfires, drought can affect municipal and industrial water supplies, stream water quality, water recreation facilities, as well as agricultural and forest resources. Shallow private wells are more likely to be impacted from prolonged droughts than municipal water supplies.

SECTION IV – EXTREME HEAT

A. Hazard Identification

Extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for a particular region and last for an extended period of time. Humid or muggy conditions can exacerbate the effects of high heat and occur when a dome of high atmospheric pressure traps hazy, damp air near the ground.

Heat kills by pushing the human body beyond its limits. Under normal conditions an internal thermostat produces perspiration that evaporates and cools the body. The human body dissipates heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and as a last resort by panting, when blood is heated above 98.6°F. Sweating cools the body through evaporation. However, high relative humidity retards evaporation, robbing the body of its ability to cool itself. When heat gain exceeds the level the body can remove, body temperature begins to rise, and heat-related illnesses and disorders, such as heat exhaustion, may develop. In extreme cases, heat stroke and even death can occur. Older adults, young children, and those who are sick, overweight, or living in poverty are more susceptible to the effects of extreme heat.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. The Heat Index (HI) is the temperature the body feels when heat and humidity are combined. The chart below shows the HI that corresponds to the actual air temperature and relative humidity. This chart is based upon shady, light wind conditions. Exposure to direct sunlight can increase the heat index by up to 15°F. Due to the nature of the heat index calculation, the values in the tables below have an error +/- 1.3°F.

Temperature (F) versus Relative Humidity (%)

°F	90%	80%	70%	60%	50%	40%
80	85	84	82	81	80	79
85	101	96	92	90	86	84
90	121	113	105	99	94	90
95		133	122	113	105	98
100			142	129	118	109
105				148	133	121
110						135

HI	Possible Heat Disorder:
80°F - 90°F	Fatigue possible with prolonged exposure and physical activity.
90°F - 105°F	Sunstroke, heat cramps and heat exhaustion possible.
105°F - 130°F	Sunstroke, heat cramps, and heat exhaustion likely, and heat stroke possible.
130°F or greater	**Heat stroke highly likely with continued exposure.**

Heat Index Calculations Based on Temperature and Relative Humidity

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."

B. Hazard Profile

The McIntosh County Joint HMPUC reviewed updated information on extreme heat conditions. Based on the NOAA NCEI Storm Event Database, there were no extreme heat events in McIntosh County for the 75 years of available data. The 2013 HMP Update noted five extreme heat events on record; however, the data source of these events and whether it actually was recorded in McIntosh County could not be confirmed. It is suspected that Chatham County data was used. Since this is not a neighboring county, its data should not have been applied.

With new data of zero events, the frequency of an occurrence per year is 0.00. It is likely that this type of hazard is not adequately reported and available from the NOAA NCEI Storm Event Database for McIntosh County. The hazard frequency data table is located in Appendix D.

However, extreme heat is known to be a concern and hazard that impacts the population of coastal Georgia. Data from the neighboring counties of Liberty County and Long County

were used to highlight the potential threat of this hazard for McIntosh County. Both Liberty and Long counties recorded two events each – July 26, 2010 and July 30, 2010. Details of these events showed heat indices reaching 115°F to 125°F. The event narrative for one of these events on the NOAA NCEI Storm Event Database stated the "unseasonably hot and humid airmass resulted in heat index values of 115 degrees or higher across much of coastal South Carolina and coastal Georgia." Extreme heat is an event affecting large, multi-county or multi-state areas and not an isolated event such as a tornado; therefore, this use of data from neighboring counties is to document potential risk for McIntosh County. Based on the data from Long and Liberty counties, the probability of an extreme heat event for the previous 20 years would be 0.10 events per year or a 10% chance of occurrence per year. With documented heat index values greater than 115°F in neighboring counties, the impact to McIntosh County with a similar heat index is the potential for residents and visitors to suffer from heat exhaustion, heat stroke, or even death if they work outdoors or if they do not have access to places of relief with air conditioning. Since extreme heat events are regional weather patterns, the impacts from an individual event will be felt countywide.

The present economic conditions have resulted in more people leaving air conditioners off. Therefore, HMPUC members chose to study possible actions steps to reduce this impact. This vulnerability of the low-income and elderly population segment is a concern for emergency medical and law enforcement personnel.

As another approach to identify the local threat and exposure of this hazard, a long-term weather station on Sapelo Island (Station ID "USC00097808"; Lat/Long: 31.39806, -81.28077) was used to explore the frequency of consecutive days over 90 °F over the past 50 years (1974-2023). The average frequency of instances with three or more days over 90 °F has increased from 6.2 times per year for the 50-year dataset, to 6.9 times for the 20-year dataset, and 7.1 times for the 10-year dataset. The longest consecutive number of days over 90 °F has averaged 13.6 days per year for the 50-year dataset, to 17.0 days for the 20-year dataset, and 18.7 days for the 10-year dataset. These data show a higher frequency of periods with at least three consecutive days over 90 °F, plus longer durations of consecutive days over 90 °F per year in the most recent decade (2014-2023) compared with 50-year dataset.

C. Assets Exposed to Hazard and Estimate of Potential Losses

The economic impacts of this hazard cannot be evaluated geographically. The impacts are more concerning for personal health of residents than property damage. However, excessive heat can cause utility outages due to an increased demand for electricity. Utility outages could severely hamper the County's ability to provide services as facilities become inoperable and must be closed due to a lack of power or water. Overall, critical infrastructure is unlikely to be affected by this hazard.

The most vulnerable individuals to this hazard are the lower-income population because they are less likely to have access to air conditioning, but it also affects the very old and young, and individuals who live alone, suffer from illness, lack transportation, or are overweight. Since the impact is most strongly tied to income-level, the most recent, Census-reported, poverty status of the population was investigated. Census data for 2022 showed the percentage of the population with an income below the poverty level was 20.3% for McIntosh County and 16.8% for City of Darien. The HMPUC decided to set the residential population exposed to this hazard at these levels. There was no change in exposure for the County at 20%, but the City decreased greatly from 37% to 17%. The previous HMP Update also identified 10% of the agricultural assets in both the County and City exposed to this hazard. The HMPUC decided to keep this exposure the same.

Overall, an extreme heat event could potentially impact 2,287 people in McIntosh County, including 246 people in City of Darien. More details on the inventory of exposed assets are reported in Appendix A, Section IV (GEMA Worksheet #3A).

D. Land Use & Developmental Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to extreme heat hazards. As poverty is one factor that can affect a population's ability to respond to extreme heat events, because of the access to air conditioning, there was no change for McIntosh County's population as a whole from 2016 to 2022. However, the City of Darien had a decrease in poverty rate from 37% to 17% during this same time period. Due to the perceived issues and errors with the U.S. Census data by the HMPUC, the updated poverty rate for City of Darien is suspect and likely low.

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to coastal storm/hurricane hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh

County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.

- Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
- Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
- Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

The City of Darien has the greater potential for negative impact for this hazard because it has a higher percentage of the population with an income below the poverty level. However, residents in the unincorporated sections of the county have less access to transportation and are farther from emergency services, if they experience heat-related symptoms.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of extreme heat events. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of extreme weather events, including extreme heat, that affect McIntosh County and the City of Darien.

According to NOAA's March 2021 State of the Science Fact Sheet titled "How Changing Climate Affects Extreme Events," it is well-documented that the frequency and intensity of some types of extreme events are changing due to human-induced changes in Earth's climate system. In the last century, cold extremes have become less common; there have been many more record high temperatures than record low temperatures in the United States. Globally, both heatwaves and extreme high temperatures have increased (both over land and in the form of marine heatwaves). NOAA projects that the frequency and intensity of daily heat extremes is "virtually certain (99-100% chance)" to increase in the future due to climate change and cold extremes will decrease. However, it's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like extreme heat can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by extreme heat.

- As noted above, the most vulnerable individuals to this hazard are the lower-income population because they are less likely to have access to air conditioning. Based on 2022 U.S. Census data, approximately 20% of the County's population (2,240 individuals) live below the poverty level and are therefore most likely to be impacted by extreme heat. This includes a small number of housing and food insecure residents.
- Extreme heat may also affect the very old and young, and individuals who live alone, suffer from illness, lack transportation, or are overweight due to loss of air conditioning and other physical and economic hardships posted by extreme heat events.
    - According to the 2022 U.S. Census, 29% of the County's population (3,236

individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.

- Minorities, particularly non-English speakers, may also be disproportionately impacted.
    - Approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County.
    - According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.

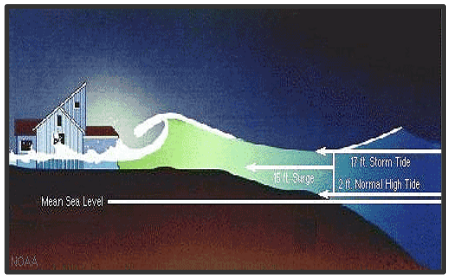
H. Overall HRV Summary

Although the risk of deaths during extreme heat events is low for McIntosh County, the HMPUC feel this is a relevant issue to include in the Hazard Mitigation Plan. Many of the issues that pose a danger to resident health exist in portions of McIntosh County. High levels of poverty, increased rates of obesity and chronic illness, and lack of access to transportation exacerbate the problems.

SECTION V – FLOOD

A. Hazard Identification

A flood is a natural event for rivers and streams. Excess water from rainfall or storm surge accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers and oceans that are subject to recurring floods. Adverse impacts may include structural damages, temporary backwater effects in sewers and drainage systems, and unsanitary conditions by deposition of materials during recession. McIntosh County is subject to flooding from coastal storm surge tides, in addition to rainfall induced by hurricanes, tropical storms, and other storms. Hurricanes and tropical storms normally occur in the summer and early fall. Other significant flooding sources within McIntosh County include rivers and streams. The South Newport River, which delineates the county boundary with Liberty County, has a drainage area of approximately 160 square miles and flows generally southeasterly. The Altamaha River also flows generally southeasterly and delimits the county boundary with Glynn County. Other flooding sources include the Darien River/ Cathead Creek system with a drainage area of 98.3 square miles, and the Sapelo River with a drainage area of 34.6 square miles. The McIntosh County Joint Hazard Mitigation Plan Update Committee examined historical data from the National Climatic Data Center to update research on the effects of flooding in McIntosh County.



Flood hazard maps for McIntosh County and the City of Darien are presented at the end of Section V. The flood hazard maps are based on the Effective Georgia DFIRM (digital flood insurance rate map), last revised August 2018. As with the previous HMP Update, there were no repetitive loss properties identified in the County (see Page 17, Appendix A). Base Flood Elevation (BFE) is 12 Feet NAVD. During rainy periods, the water table rises sharply, and water remains near the surface, with flooding occurring at 1-3 feet above BFE.

Another hazard map associated with flooding that is presented at the end of Section V is for sea level rise. Although there is no historical evidence on which to base future estimates of damage from sea level rise in McIntosh County, the County is at risk for sea level rise. It was discussed in the HMPUC meetings to explore sea level rise impacts for a 1-m (3-ft) rise in sea level because this is a typical depth used by other coastal counties.

B. Hazard Profile

Within McIntosh County, flooding has caused significant damage on several occasions. Most flooding issues occur in the western portion and northeastern portion of the county. Flooding issues in the western portion of the county are attributable to the Altamaha River rising over the banks from the heavy rainfall that occurs in the central portion of Georgia. Problems occur in the unincorporated area along the Townsend Cox Road. The 2013 HMP Update estimated that flooding along Townsend Cox Road occurs,

on average, every three years. Problems include road erosion and property damage. According to the 2013 HMP Update, there were 5 "flood" events prior to approval of the 2005 HMP that caused $850,000 in damage, and all of these events were not captured in the NOAA NCEI Storm Event Database as a flood event, so they have been included in the hazard frequency table as based on County records. These pre-2005 flood events included: (1) & (2) coastal storms in 1993 and 1994, resulting in excess of $350,000 in flood damage; (3) flooding from Hurricane Bertha in 1996, resulting in excess of $300,000 in flood damage; and (4) & (5) severe storms in 1994 and 1998, resulting in excess of $200,000 in flood damage. Hurricane Bertha (1996), while not listed as a "flood" event, it was listed as a "Hurricane (typhoon)" in the NOAA NCEI Storm Event Database.

According to the NOAA NCEI Storm Event Database, there were 6 instances of "Flash Flood" and 9 instances of "Coastal Flood" in the 75-year history. Several of these instances were associated to the same weather system, so they were counted as a collective weather event. In total, there were 4 "Coastal Storm" events and 4 "Flash Flood" events, in which one was associated with Tropical Storm Tammy in 2005 and another with Tropical Storm Irma in 2017. Many of the coastal storms (hurricane, tropical storm, and tropical depression) have flooding associated with them but they are not always reported as a specific flooding event in the NOAA NCEI Storm Event Database. In the years since the HMP was last updated in 2018, only 1 "flood" events were reported on the NOAA NCEI Storm Event Database. The "Flash Flood" and "Coastal Flood" event details from the NCEI Storm Event Database, including those since the 2013 HMP Update, are described below:

- Pre-2005
    1. A "Flash Flood" event occurred on August 18, 2003, due to heavy rainfall. It was reported by law enforcement that streets in Darien flooded and at least 1 car was inundated by water.
- 2005-2010
    1. Details of flooding during Tropical Storm Tammy (October 5-7, 2005) include: flooded numerous roads throughout the County, including Murray Townsend Road; 5 homes were damaged by flood waters; 15-20 roads washed out; and 2 pond dams burst. Tropical Storm force wind gusts as high as 50 mph affected the County for many hours.
    2. A "Coastal Flood" event occurred on September 30, 2007. Strong Northeast winds and High Astronomical Tides combined to produce significant beach erosion. Roads were flooded or damaged on the south end of Sapelo Island, and all docks along North Back River near Ridgeville were submerged. Catastrophic beach erosion was reported on Sapelo Island, with approximately 20-30 feet of beach being washed away.
    3. A "Flash Flood" event occurred on April 2, 2009 due to several waves of low pressure along a quasi-stationary front. This system promoted showers and thunderstorms over the area, including a few storms with heavy rain. The emergency manager reported that several dirt roads were closed due to

flooding near Darien.

4. Another "Coastal Flood" event occurred on June 22-23, 2009. Anomalously high Perigean Spring Tides resulted in significant coastal flooding. Landing Road flooded around high tide in Meridian, Georgia. The employee at the NOAA National Estuarine Research Reserve stated that this road had never flooded at high tide before, and some culverts washed out. The 2013 HMP Update also described that this event had $700,000 in reported damages as roads flooded on Sapelo Island and washed out culverts.

- 2010-Present (Since 2013 HMP Update)
    1. A "Coastal Flood" event occurred on October 27-28, 2015. A combination of persistent and strong east/northeast winds, the Perigean spring tide and a full moon produced 2 days of elevated high tide cycles. Major coastal flood stage levels were recorded at the Fort Pulaski, GA (FPKG1) tide gauge on Oct 27, 2015, which claimed 3rd place on the all-time historic crest list. Moderate coastal flood stage levels were also recorded at the Fort Pulaski, GA (FPKG1) tide gauge on Oct 28, 2015, which claimed 9th place on the all-time historic crest list. In McIntosh County, a ferry dock was flooded on Sapelo Island and severe erosion was reported at the beach. Many shrimp docks were flooded around Darien. In addition, flooding was reported at many parts of the Fort King George historical site, including nature trails, parking lots, docks and some exhibitions.
    2. A "Flash Flood" event was reported on September 11, 2017, in Darien, during Tropical Storm Irma. Local broadcast media reported flash flooding from heavy rainfall associated with Tropical Storm Irma. Pictures showed several structures submerged due to flood waters on Highway 17 south of Darien. Water was nearly up to the windows on one structure. Feeder bands around Irma produced very heavy rainfall rates with rainfall totals generally ranging from 3 to 9 inches. The strongest winds were confined to coastal locations, but frequent gusts into the 40-50 mph range occurred well inland. McIntosh Emergency Management reported extensive storm surge flooding and inundation across coastal portions of the county, including islands. County dispatch reported 2 feet of water on the road on Butler Island at Highway 17 as well as 2 feet of water on Blue N Hall Road due to storm surge. USGS high water mark analysis revealed inundation above ground level ranging from 1.37-3.87 feet in coastal portions of the county. The peak inundation measured occurred on Graystone Road where a high-water mark showed 3.87 feet above ground level. Also, the USGS site Hudson Creek at Meridian Landing (USGS site number 022035975) reached a record level of 7.78 feet during the event. This USGS site dates back to October 2007. The total precipitation at this USGS site was 6.0 inches, over a 24-hour period.

Based on a 12.5-year history of available data from the USGS site Hudson Creek at Meridian Landing (since October 2007), the following information regarding stage records is available

about the flood events since the 2013 HMP Update. This station also includes rain gauge records.

- Tropical Storm Irma had the highest stage on record of 7.78 feet on September 11, 2017. Total rainfall from this event was 6.00 inches.
- Hurricane Matthew had the second highest stage of 5.99 feet on October 7, 2016. Total rainfall from this event was 4.16 inches.
- The coastal flood event on October 27, 2015, had the third highest stage event at 5.64 feet. This event was not influenced by rainfall but rather a combination of persistent and strong east/northeast winds, the Perigean spring tide and a full moon.

Additional rainfall records within the County were explored through NOAA NCEI Climate Data Online (https://www.ncdc.noaa.gov/cdo-web/datatools/findstation). Station "Darien 4.2 NNE, GA," (ID: GHCND:US1GAMI0003) measured 10.99 inches for Hurricane Matthew in October 2016 and 7.70 inches for Tropical Storm Irma on September 11, 2017.

The hazard frequency history included 8 total "Flash Flood" and "Coastal Flood" events from the NOAA NCEI Storm Event Database, as well as the 5 events prior to the 2005 HMP that were described in the 2013 HMP Update as based on County records. According to this database and search criteria and the County records, there were 13 recorded events in the 75-year recorded storm history for a 17.3% chance to occur per year, but all were reported in the previous 22 years. While the frequency of events appears to be increasing, it should be noted that data collection, reporting, and accuracy are much better in the past 20 years. As a result, data from the most recent 20 years was used to project frequency of this hazard, and during the most recent 20 years there were 0.55 events per year. The frequency would be the same for both the County and the City. The hazard frequency data table is located in Appendix D.

Since Coastal Storms are known to produce flooding as well, hazard frequency was also explored for flooding by including these events. When Coastal Storms (hurricane, tropical storm, tropical depression) were added to the "Flash Flood" and "Coastal Flood" events [and in not double-counting Tropical Storms Tammy (2005) and Irma (2017) which also had "flood" events], there were 16 events in the last 10 years and 30 events in the last 20 years. The corresponding event frequency of a coastal storm or other flood is 1.60 and 1.50 events per year for the previous 10-year and 20-year periods, respectively. More details about the Coastal Storm hazard history are included in Section II.

C. Assets Exposed to Hazard and Estimate of Potential Losses

Several bridges within McIntosh County have the potential of being flooded should waters rise significantly. Low-lying bridges span the creeks and marshlands along White Chimney, Shellman Bluff and Youngman in the northeast section of the county. The roads could be covered with water, rendering roads near the interstate temporarily impassable.

One of the largest concerns within McIntosh County, related to flooding, is evacuation of residents during storm events. Many of the residential areas are accessed by county roads

that would quickly be flooded during storm surge or flooding events. Some areas of the County would have limited access by Emergency Services personnel during and after a flooding event.

In the previous HMP Update, the estimated exposed assets were based on the percentage of land area within the flood zone. This update utilizes a technique that linked the flood zones with the McIntosh County Tax Assessor's parcel-based data using GIS. The following FEMA flood zones were explored: (1) V-Zone (1% annual chance flood, with wave action [e.g., 100-year event]), (2) A-Zone (1% annual chance flood, no wave action [e.g., 100-year event]), (3) 0.2% annual chance flood [e.g., 500-year event]. Because of the risk of wave action, the V-Zone has a greater risk of damage, so insurance premiums are higher than for the A-Zone.

The 2013 HMP Update identified that 68% of McIntosh County and 75% of City of Darien were exposed to flood hazard, which includes the 1% annual chance floods (V-Zone and A-Zone). These percentages were based on exposure by area. In the 2018 HMP Update, an improved GIS-based technique was used to examine parcel data to determine exposure to buildings and their respective values. This approach was utilized in 2024 with updated data from the McIntosh County Tax Assessor. The results are presented in the table below. While most of the land area of the City and County are in the flood zone, many of these areas do not have buildings. The fraction of improved buildings impacted by the 1% annual chance floods totaled 28% for McIntosh County and 3.8% for City of Darien. These decreased substantially for McIntosh County from 39% in the 2018 HMP Update because the FEMA flood maps (DFIRM) were updated in coastal Georgia in 2016-2017, and adopted in late 2018. The revised flood maps were based on more accurate elevation data and a refined model, which pulled several areas out of the regulatory floodplain in the County. Overall, there was very little change on the City of Darien flood maps.

EXPOSURE TO FLOOD HAZARD (EFFECTIVE FLOOD MAPS)

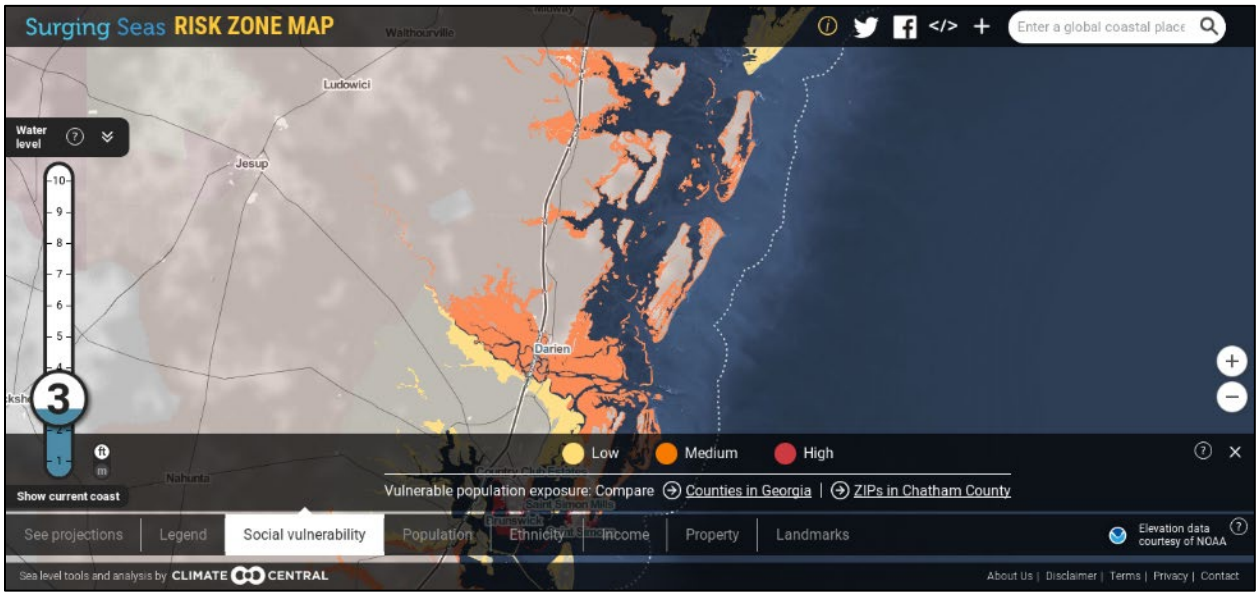
Flood Hazard	Parcels Impacted (% of Total)	"Improved Buildings" Impacted (% of Total)	Value of "Improved Buildings" (% of Total)
McIntosh County			
V-Zone (100-year event)	517 (4%)	266 (4%)	$84,207,555 (7%)
A-Zone (100-year event)	3,737 (28%)	1,830 (25%)	$440,984,036 (35%)
0.2% Annual Chance Flood (500-year event)	1,018 (8%)	571 (8%)	$71,247,675 (6%)
City of Darien			
V-Zone (100-year event)	2 (0.1%)	1 (0.1%)	$1,356,415 (0.8%)
A-Zone (100-year event)	84 (6%)	39 (4%)	$15,344,636 (9%)
0.2% Annual Chance Flood (500-year event)	1 (0.1%)	0 (0%)	$0 (0%)

Data Source: Parcel information and value are from the 2023 McIntosh County Tax Assessor Data.

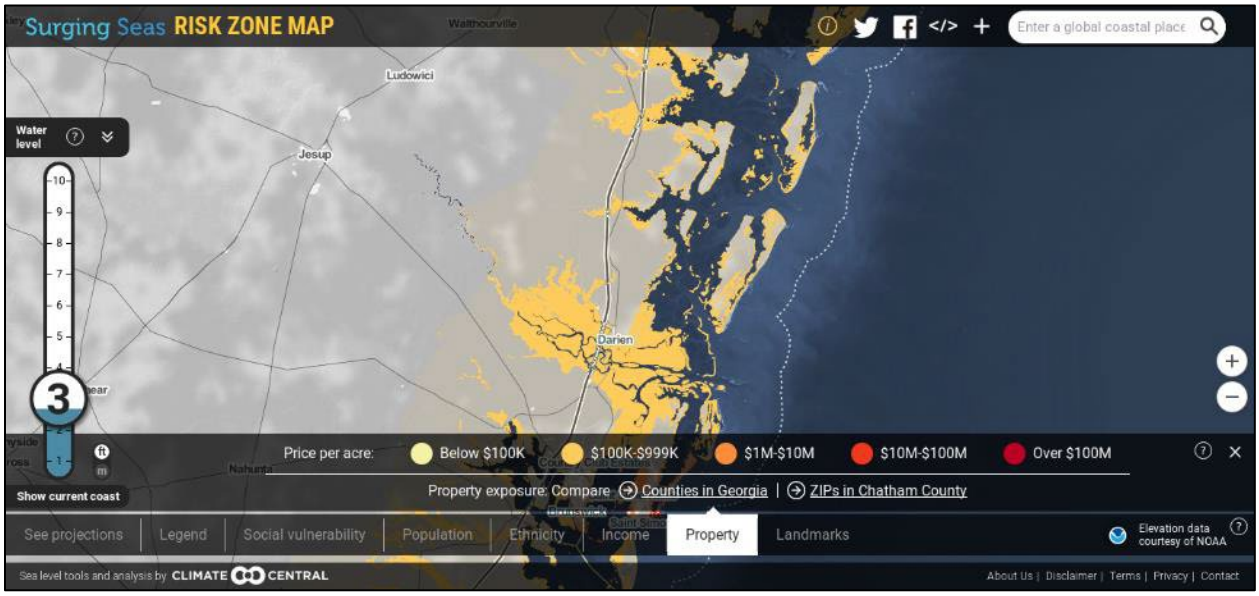
In order to estimate population, property, and other structures that will potentially be exposed to sea level rise impacts, Climate Central's online forecast tool was utilized. This tool (http://sealevel.climatecentral.org/maps) provides projections for different sea level rise scenarios and estimates exposure of population density, social vulnerability, and property values. For this plan, a sea level rise scenario that estimates 3 feet of rise in the Mean Higher High Water level was utilized. Based on this scenario, McIntosh County has the following exposures: 712 residents, 674 homes, 39 miles of roads (38 miles are local roads), and 57 square miles of land (37 square miles are protected land). The City of Darien has the following exposures: 19 residents, 41 homes, 3 miles of roads (2 miles are local roads), and 12 square miles of land (9.2 square miles are protected land). Property values were not identified on this website. Overall, most of the population, homes, and roads exposed are located in the unincorporated portion of the County.

The figures below show the Social Vulnerability Exposure and Property Value Exposure. The areas exposed to sea level rise in the county were subject to Medium Social Vulnerability Exposure. Based on McIntosh County's current population, about 5% of the population would be exposed to this hazard. Based on the Property Value Exposure map, areas with exposure were identified in the tier of $100K-$999K per acre, which was 2nd lowest of the five groupings available. Because of the percentage of population exposed, as well as the

number of homes and miles of road, action should be taken to reduce overall risk to this hazard. While this tool allows the County to explore the area exposed to inundation from sea level rise, it does not account for the subsequent increase in the base flood elevation.



Social Vulnerability of Sea Level Rise (Source: Climate Central)



Property Value Exposure to Sea Level Rise (Source: Climate Central)

The exposure to sea level rise was also calculated using the GIS-based technique that linked the McIntosh County Tax Assessor's parcel-based data with the area identified as being inundated with 3 feet of sea level rise. Overall, 3 feet of sea level rise would result in 26% of the "improved buildings" and 42% of the value of "improved buildings" to be impacted in the County. The greater percentage of value compared with total buildings is likely attributed to the more expensive structures built closer to the waterfront and marsh

front. In the City of Darien, only 6% of "improved buildings" and 15% of value of "improved buildings" are exposed to 3 feet of sea level rise. This exposure does not account for the subsequent increase in the base flood elevation.

EXPOSURE TO 3-FT OF SEA LEVEL RISE

Location	Parcels Impacted (% of Total)	"Improved Buildings" Impacted (% of Total)	Value of "Improved Buildings" (% of Total)
McIntosh County (ALL)	3,752 (28%)	1,940 (26%)	$531,176,105 (42%)
City of Darien	111 (7%)	63 (6%)	$24,737,855 (15%)

Data Source: Parcel information and value are from the 2023 McIntosh County Tax Assessor Data.

Overall, out of 68 critical facilities (26 essential critical" facilities and 42 "other critical" facilities), 0 essential facilities are in the V-Zone, 4 are in the A-Zone, 1 is in the 0.2% chance annual flood, and 2 are in the 3-ft sea level rise zone. Of the 4 critical facilities in the A-Zone flood hazard, 3 are located on Sapelo Island with the other being the Fire Station on Jones Rd. The one critical facility in the 0.2% chance annual flood is an educational facility. Overall, the critical facilities exposed to flood risk and sea level rise are Fire Stations and Educational Facilities. The major structures at risk are those on Sapelo Island, owned by University of Georgia Marine Institute.

Based on the parcel-based, County Tax Assessor database, 2,096 "improved buildings," valued at $525,191,591 are located within the 1% chance annual flood hazard area (V-Zone and A-Zone) in the County, and 40 "improved buildings," valued at $16,701,051 in the City. The number of people in this hazard area, from Worksheet #3A, was estimated at 4,998 in the County and 79 in the City. The exposure, as a percentage, was smaller for the City compared with the County as a whole.

HAZUS modeling was also conducted for McIntosh County, and it is reported in the Coastal Regional Commission's 2024 Report, "Hazard Risk Analyses: Supplement to the McIntosh County Joint Hazard Mitigation Plan." This report is included in Appendix A. Damage was calculated for a 1% chance annual flood (e.g., 100-year event) for riverine and coastal scenarios. The HAZUS modeling predicts total damage, where the values presented in the paragraphs above represent the total building value. Not all the buildings in this hazard area will suffer a total loss, so the results presented below help to estimate the potential losses of these types of hazards.

<u>HAZUS modeling predicted the following for Riverine Flooding Scenario:</u>

- Impacted 520 buildings in the County, and caused damage totaling $29,891,374.

- 17 buildings with damage totaling $4,946,282 were located in the City of Darien.
- 3 of the County's 11 fire stations were damaged – 2 had moderate damage and 1 had loss of use.
- 968 households might be displaced due to flood, and 2,245 individuals may require short-term shelter.
- 13,043 tons of debris might be generated, which includes 3,516 tons from finishes, 4,389 tons from structural, and 5,139 tons from foundations.

HAZUS modeling predicted the following for Coastal Flooding Scenario:

- Impacted 24 buildings in the County, and the damage totaled $868,755.
- 1 building with damage totaling $15,363 was located in the City of Darien.
- No essential facilities were identified as exposed.
- 271 households might be displaced due to flood, and 730 individuals may require short-term shelter.
- 2,109 tons of debris might be generated, which includes 746 tons from finishes, 579 tons from structural, and 783 tons from foundations.

The 1% chance annual flood for both riverine and coastal scenarios totaled 544 buildings. The total damage was $30,760,129, and 15,152 tons of debris generated. It was predicted up to 995 households could be displaced due to the flood and 2,975 individuals might need short-term housing. Overall, these numbers may be overestimated because the model did not account for elevated housing and parcel centroids were used, which may be located within the marsh.

D. Land Use & Development Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to flood hazards. Current and recent economic conditions have made it difficult to predict future growth. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh

County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors, out of the natural hazard area.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.

- Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
- Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
- Promote the community's water, sewer, and subsequent infrastructure capacity to support development.

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

A large portion of McIntosh County could potentially be affected by flood conditions, particularly due to concerns with a hurricane or coastal storm event. Based on the City of Darien's annexation of the Altamaha Wildlife Management area, which is primarily marshland and not developable, the City actually has a larger land area located in the 100-year flood zone. The 2013 HMP Update stated roughly 92% (over 12,000 acres) of the current City Limits falls within the 100-year flood zone, while the former area of the City (1,270 acres), only had 22% within the 100-year flood zone. While the City of Darien has a larger percentage of area located in the 100-year flood zone than the County, there is a smaller percentage of parcels and "improved buildings" within the City; therefore, the County is at greater risk for flooding.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of flooding. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of extreme weather events that affect McIntosh County and the City of Darien and result in flooding. Climate change is associated with warmer sea surface temperatures, and warmer ocean temperatures may lead to more powerful storms by increasing rainfall and causing more severe flooding. Climate change is also driving sea levels higher, which increases the potential for more dangerous storm surges.

According to NOAA's May 2023 State of the Science Fact Sheet titled "Atlantic Hurricanes and Climate Change," based on a survey of existing studies with regards to future North Atlantic, Caribbean Sea, and Gulf of Mexico tropical storm and hurricane activity, global warming is generally projected by most models to result in the following which may increase flooding potential:

- Sea level rise, which leads to more storm inundation levels during hurricane surge events;
- A 15% increase in rainfall rates associated with tropical storms and hurricanes;
- An increase in hurricanes that reach Category 4 or 5 intensity (although this has a large area of uncertainty and some studies project a decrease); and
- Increased wind strength of storms and hurricanes.

It's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like flooding can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by flooding.

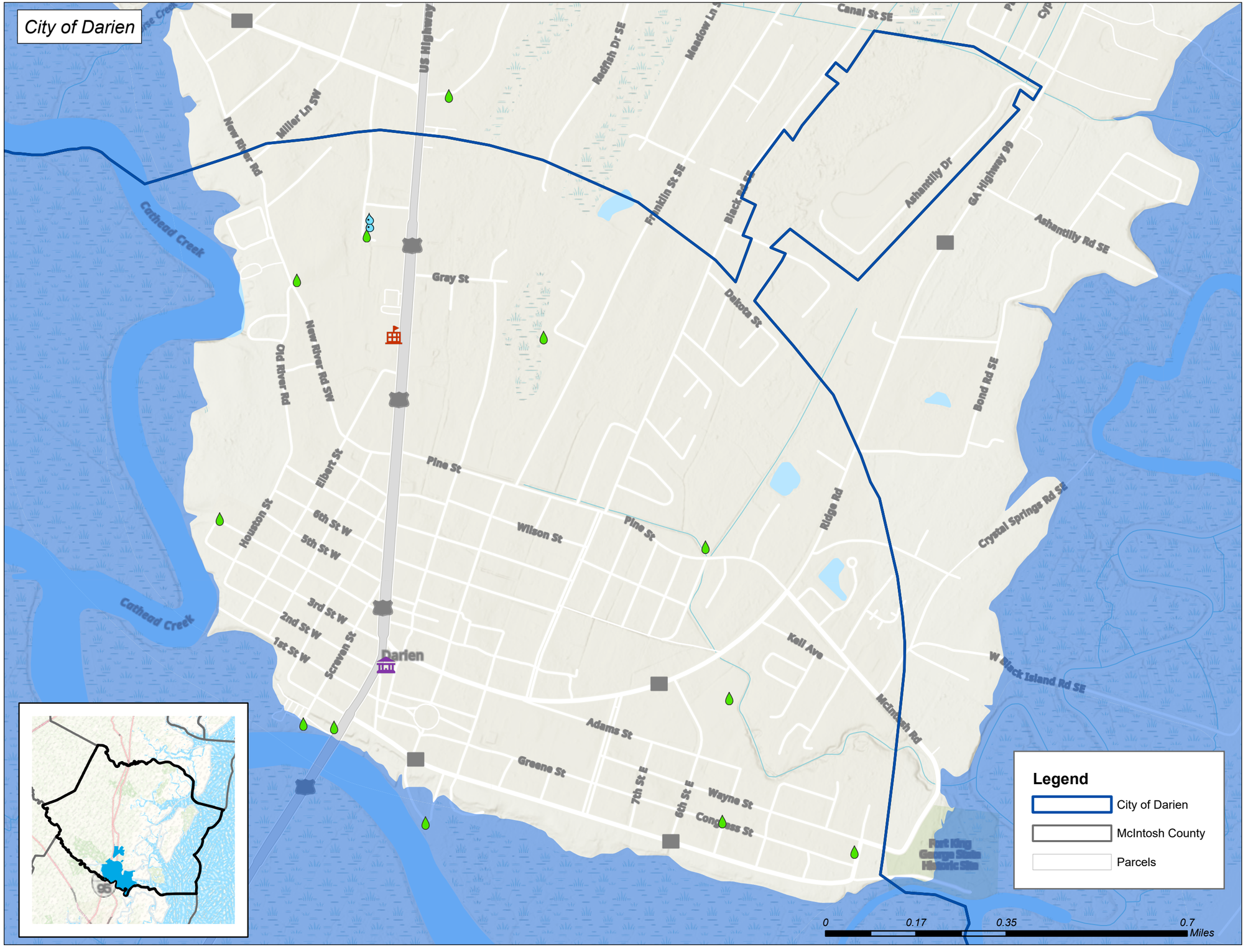
- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.
- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by flood events due to food and housing shortages and other physical and economic hardships posted by storm events.

H. Overall HRV Summary

Severe flooding has inflicted significant damage in McIntosh County in the past due to heavy rainfall and river rising events. The committee reviewed previous mitigation action steps proposed in the HMP Update. Assessments of stormwater and runoff issues were a major factor in flooding problems in the previous plans. The Storm Water Local Design Manual was adopted November 21, 2006. Both the County and City have adopted a number of ordinances designed to regulate development and to prevent adverse impacts to the current residents and existing resources. The County continues ongoing maintenance of stormwater infrastructure and to seek funding to construct and improve stormwater drainage infrastructure and retrofit/redesign bridges, roads, water and wastewater treatment plants and critical facilities to better withstand flooding. Many of the assets in the County, unincorporated and incorporated, remain extremely vulnerable to flooding events, and committee members recognized the destructive nature of flooding and identified as a high priority for many mitigation measures. In addition to current flooding risks, sea level rise has the potential to impact existing and future buildings, critical facilities, and populations in McIntosh County. As the sea level rises, so will the regulatory flood zones, but this increase will not occur linearly with the depth of sea level rise.

Flood Hazard Map

City of Darien

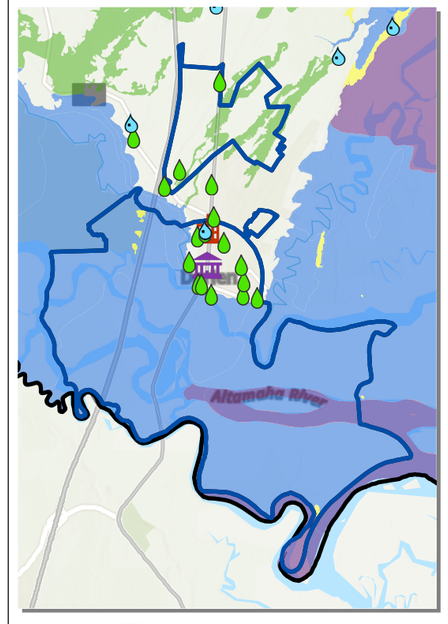


Flood Zones

- A
- AE
- VE
- X,0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- City of Darien

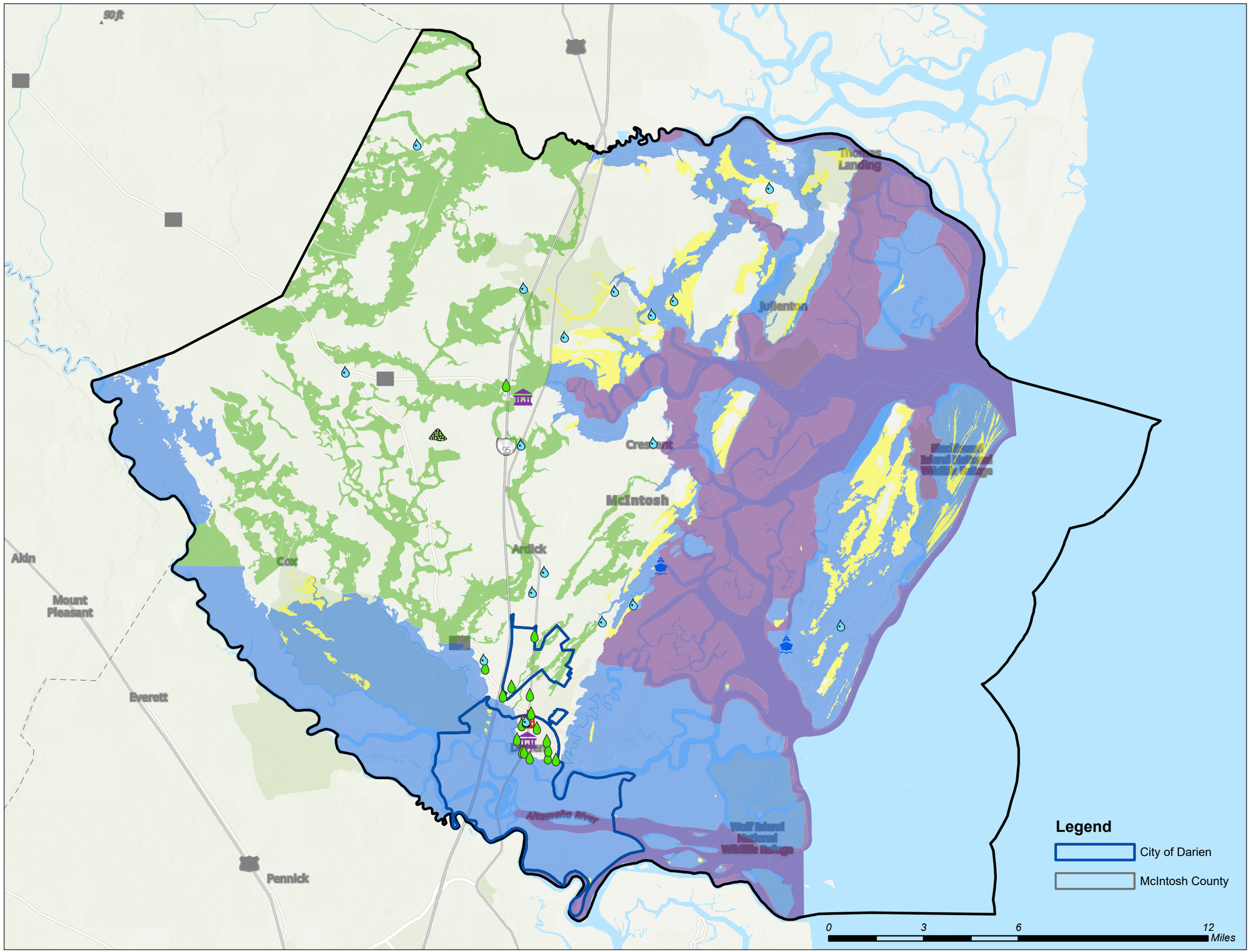
Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical
- City of Darien



GMC

Flood Hazard Map



Flood Zones

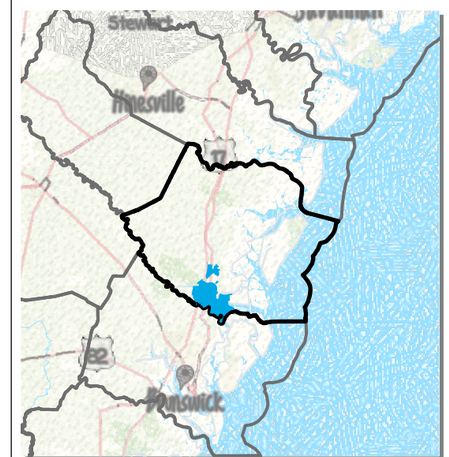
- A
- AE
- VE
- X,0.2 PCT ANNUAL CHANCE FLOOD HAZARD

Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water

StructureType

- Emergency Services
- Medical



GMC

McIntosh County Hazard Mitigation Plan

Sea Level Rise (3 feet)

City of Darien

2050 (3FT)
2100 (3FT)

Critical Facilities
- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical
- County Government
- Education,K-12
- Education,University
- Emergency Services,
- Emergency
- Emergency
- Law Enforcement,Jails
- Law
- Medical,Clinics
- Medical,Medical Offices

Critical Facilities
FacilityTypes
- City Government

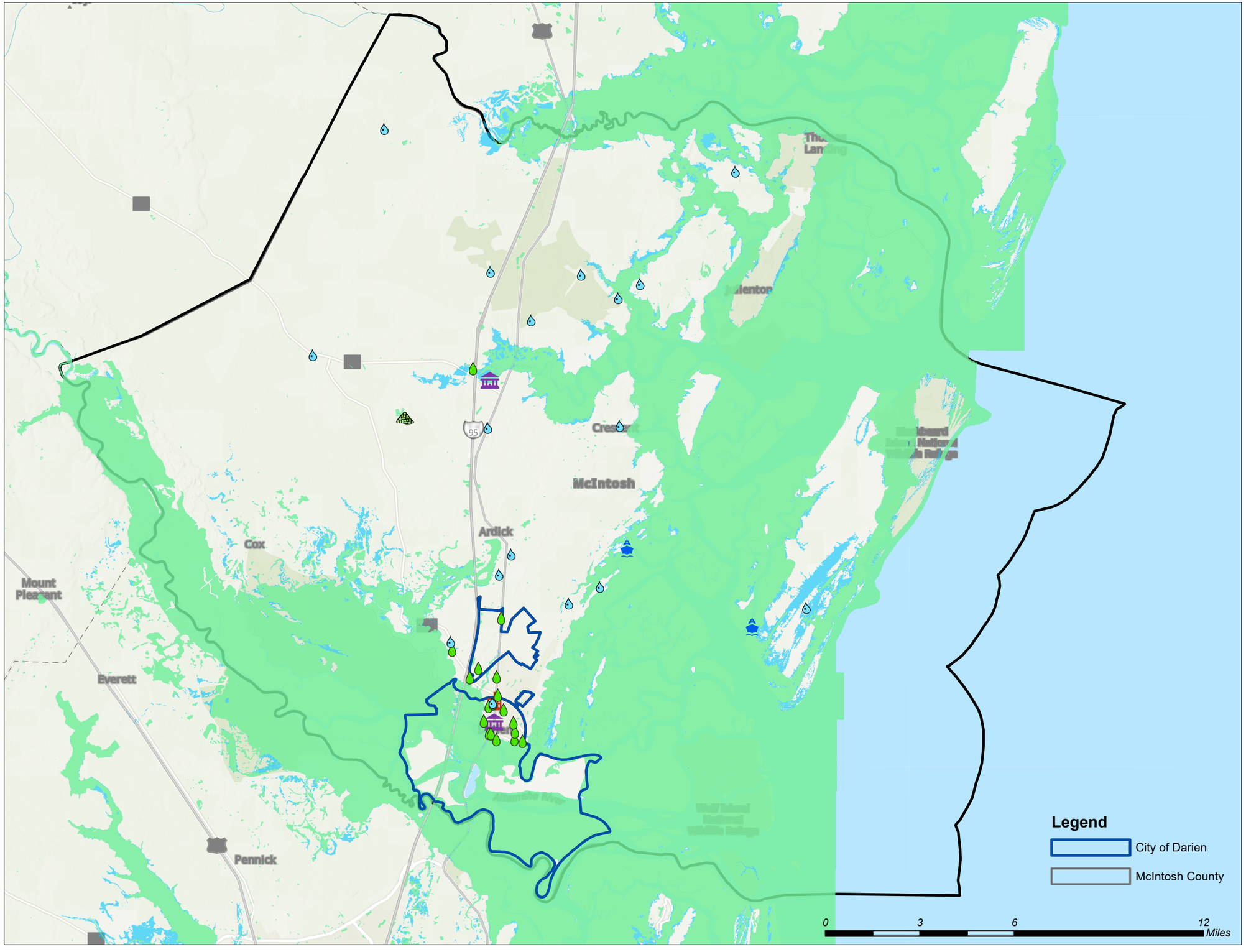
- City of Darien
- Parcels
- 2050 (3FT)
- 2100 (3FT)

Legend
- City of Darien
- McIntosh County
- Parcels

0 0.17 0.35 0.7 Miles

GMC

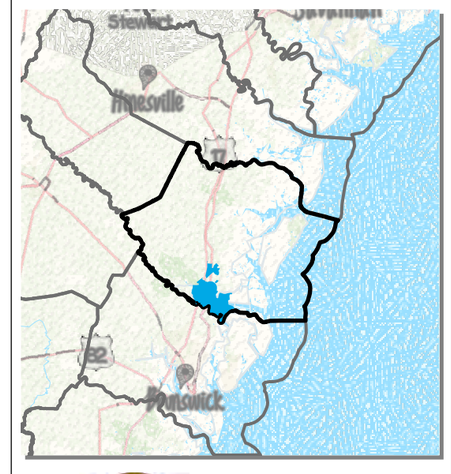
3 Foot Sea Level Rise



2050 (3FT)
2100 (3FT)

Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical

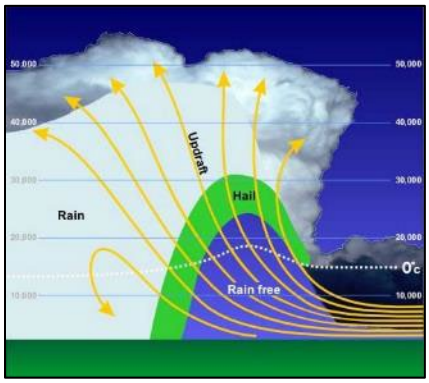


GMC

SECTION VI – HAILSTORM

A. Hazard Identification

Hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people.



Hailstones grow by collision with super-cooled water drops. (Super-cooled drops are liquid drops surrounded by air that is below freezing which is a common occurrence in thunderstorms.) There are two methods by which the hailstone grows, wet growth and dry growth, and which produce the "layered look" of hail.

In wet growth, the hailstone nucleus (a tiny piece of ice) is in a region where the air temperature is below freezing, but not super cold. Upon colliding with a super-cooled drop the water does not immediately freeze around the nucleus. Instead, liquid water spreads across tumbling hailstones and slowly freezes. Since the process is slow, air bubbles can escape resulting in a layer of clear ice. With dry growth, the air temperature is well below freezing and the water droplet immediately freezes as it collides with the nucleus. The air bubbles are "frozen" in place, leaving cloudy ice.

B. Hazard Profile

Historical frequency data for this hazard was researched on the NOAA NCEI Storm Event Database. The Storm Event Database lists 57 reports of hail, but in some cases multiple reports were given on the same day that might be associated to the same storm event. Therefore, the HMPUC defined a hailstorm event as a unique event by date, so overall, there were 39 recorded events in the 75-year recorded storm history for a 52.0% chance to occur per year. More than 80%, 31, were recorded in the previous 20 years, and all were recorded in the previous 32 years. While the frequency of events appears to be increasing, it should be noted that data collection, reporting, and accuracy are much better in the past 10 to 20 years. As stated in the Georgia State Plan, Georgia has experienced so many severe weather events that they have become common.

The size of hail for the 39 events ranged from 0.75 inches to 1.75 inches in diameter. Based on the National Weather Service comparison chart for the size of hail, this ranges from penny-sized to golf ball-sized hail. The frequency of events based on hail size is described in the table below. No losses in property and crop damages were reported in this database; however, committee members noted damage by hail events to homes and vehicles. Insurance claim data was not available to the committee.

DISTRIBUTION OF HISTORICAL HAILSTORM EVENT MAGNITUDE (1950-2023).

Diameter of Hail (inches)	National Weather Service Comparison of Hail Size	Frequency of Events During the 68-Year Historical Record
0.75	Penny	9
0.88	Nickel	5
1.00	Quarter	11
1.25	Half Dollar	3
1.75	Golf Ball	11
Total Number of Events		**39**

Source: NOAA NCEI Storm Event Database

From 2018 to 2024, there were 4 reports of hail in the NOAA NCEI Storm Event Database during 2 separate dates. Hail events occurred on 4/23/2020 and 4/25/2023. The maximum hail size by date were: 1.00 and 0.75 inches, respectively. No property damage, crop damage, or injuries were reported in the NCEI Storm Event Database.

The perceived increase in frequency provides major concern for keeping this hazard and for utilizing the most recent 20 years of data when projecting frequency of this hazard. Based on the previous 20 years, there will be, on average, 1.55 events per year. The frequency would be the same for both the County and the City. As a note, there were only 0.78 events per year when including the previous 50 years. The hazard frequency data table is located in Appendix D.

C. Assets Exposed to Hazard and Estimate of Potential Losses

Vulnerable assets in the County include all buildings, and crops, excluding timber. The timber industry, aggregated in the agricultural category, was thought to be immune from hail damage. Therefore, the committee decided that 15% of the agriculture category in the County would be excluded from the vulnerability data. However, the current HMPUC identified that up to 15% of the entire County and 25% of the City would be susceptible for a major, individual event, with the City having a higher percentage due to higher density of development.

The exposure includes all 68 critical facilities; however, some have been protected or reinforced to limit damage from this type of hazard. Based on the 2023 Consolidated Tax Digest Summary, existing structures in the wildfire hazard area may number 6,118 residential, commercial, industrial, agricultural, and nonprofit structures, 5 infrastructure structures, as well as 81 government and education structures. The value of these structures is

$330,244,412. The population at risk includes 2,677 people. More details on the inventory of exposed assets are reported in Appendix A, Section VI (GEMA Worksheet #3A).

D. Land Use & Developmental Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to hailstorm hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent

building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
    - Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City.

These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County and City of Darien can equally be impacted by hailstorm events. The impacts from these storms are typically isolated.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of extreme weather events such as hailstorms. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of extreme weather events, including hailstorms, that affect McIntosh County and the City of Darien.

Currently, it is unclear how climate change could impact hailstorm frequency and severity in the future, particularly became many climatic models are based on a larger scale and do not account for the smaller-scale regional weather and geographical differences that affect hailstone formation. Some studies predict that hailstorms will become more likely in the future with increased potential to form larger hailstones (thereby increasing hailstorm severity), while others project that hailstorms may become less common as global warming continues, resulting in warmer overall temperatures and more high heat extremes, and cold extremes become less common. It's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like hailstorms can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by hailstorms.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.
- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.

- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by hailstorms due to food and housing shortages and other physical and economic hardships posted by storm events.

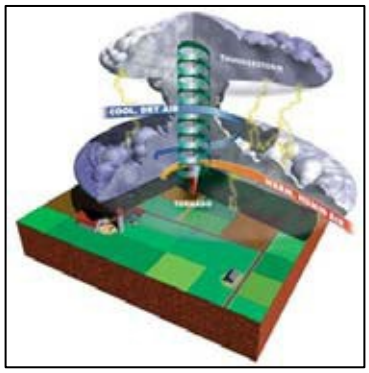
H. Overall HRV Summary

Hailstorms are an element of severe weather that may include lightning and tornadoes. Typically, these storm events afford communities some limited advanced warning. The National Weather Service issues storm warnings and advisories as these storms approach. Advanced warning may allow citizens to protect life and some property, but crops, buildings and automobiles may sustain severe damage. Also, motorists pose an additional danger on roads and highways. Overall, the entire County and City are exposed to this hazard; however, the anticipated damage will likely only affect a small area since these storms are generally isolated.

SECTION VII – TORNADO

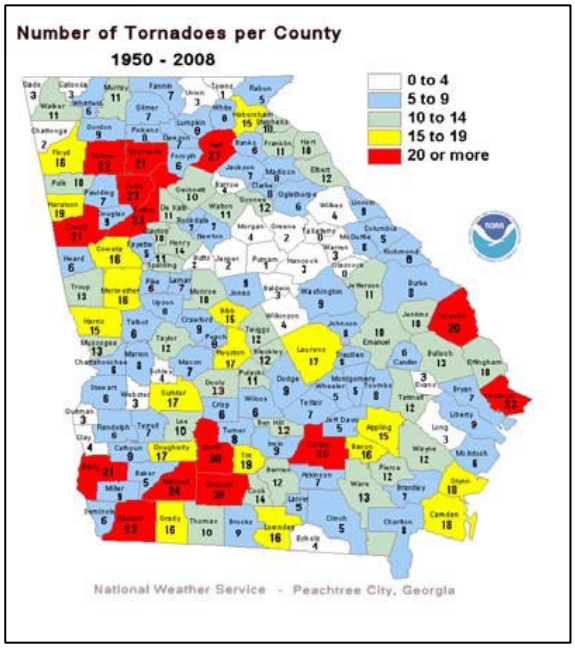
A. Hazard Identification

A tornado is a violently-rotating column of air extending from thunderstorms and cyclonic events. Thunderstorms and hurricanes spawn tornadoes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. Funnel clouds are rotating columns of air not in contact with the ground; however, the violently-rotating column of air can reach the ground very quickly and become a tornado. If the funnel cloud picks up and blows debris, it has reached the ground and is a tornado. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 miles per hour or more. A wind velocity of 200 miles per hour will result in a wind pressure of 102.4 pounds per square foot of surface area—a load that exceeds the tolerance limits of most buildings. Damage paths can be seen in excess of 1-mile wide and 50-miles long. Tornadoes are among the most unpredictable of weather phenomena. Tornado season typically from March through August; however, tornadoes can strike at any time of the year if the essential conditions are present. Tornadoes pose a great risk to the state of Georgia and its citizens, and their unpredictability makes them one of Georgia's most dangerous hazards.

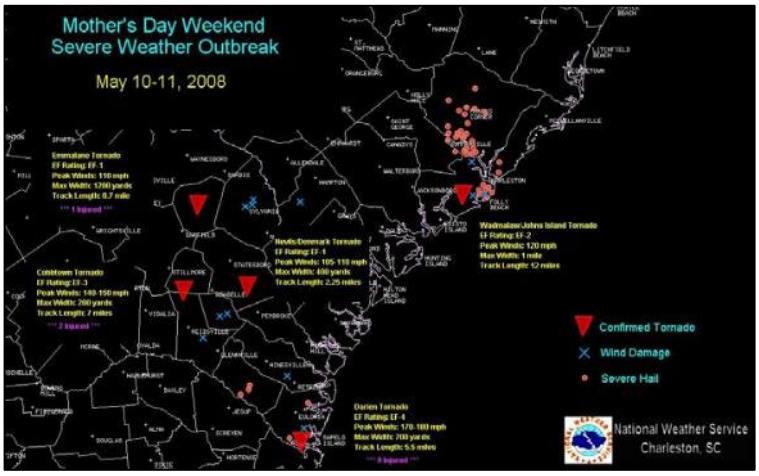


B. Hazard Profile

According to records maintained by the NOAA NCEI Storm Event Database, McIntosh County has been impacted by 8 tornadoes in the last 75 years. The was one event since the last HMP Update, a funnel cloud in Eulonia on 3/4/2020 that did not cause any reported damage. The frequency of occurrence can be expected at once every 9.4 years (10.7% per year).



Two tornado events occurring in 2008 and 2009 in McIntosh County resulted in more than $12.5 million in property damage. On May 11, 2008, five tornadoes struck Southeast Georgia and Southeast South Carolina. The strongest tornado, a violent EF-4, caused significant damage in McIntosh County, GA. This was only the second EF-4 tornado to ever hit in the NWS Charleston, SC Forecast Area, and only the 9th EF-4 tornado to strike anywhere in the State of Georgia since 1950. The only other EF-4 tornado to hit in the Charleston, SC Forecast Area was in Bulloch County, GA on April 25, 1929. That tornado killed 40 people and injured 300.



The May 2008 tornado formed at 9:52 am, approximately 3 miles northwest of Darien, Georgia and tracked east about 11 miles before dissipating at 10:07 am as a water spout in Doboy Sound. The tornado struck a Marine Sales and Services business located on the east side of Route 251. Approximately 50 boats were tossed around and destroyed. No one was in the building at the time the tornado struck and damage to the building and all the boats were estimated to be $5 million.

Approximately 100 yards to the south-southeast of the Marine Sales and Services Building, the McIntosh Emergency Medical Services Building was destroyed by the tornado with damage to three ambulances and one fire truck. Many of the metal support beams from this facility were torn from the concrete slab or snapped off. This building was rated for 120 mph winds. No one was in this building at the time of the tornado because they were out on a non-weather-related call. The Gateway Behavioral Health and Services Building was totally destroyed. Of the 12 people that were in the building when the tornado hit, 9 were injured sustaining broken bones and or lacerations. Six vehicles around this building were damaged or destroyed. Damage to the Marine Sales and Services Business and the Gateway Behavioral Health and Services Building indicated that EF-4 damage had occurred with winds estimated to be between 170 and 180 mph. The tornado reached its maximum width of 700 yards as it crossed Interstate 95, and then decreased in size and was mainly from 200 to 500 yards wide during the remainder of the path. The tornado damaged or destroyed four billboards along Interstate 95, produced mainly minor roof damage to several dozen homes mainly in the Ridgeville area, snapped off or uprooted thousands of trees, some of them falling on homes or vehicles, and damaged or destroyed numerous outbuildings. A Ridgeville resident's home suffered minor damage in the Tornado, and they took shelter in a closet after seeing a National Weather Service Severe Weather Statement on the television mentioning that Ridgeville was in the path of the Tornado. The tornado also damaged the Blue-N-Hall Marina and Fishing Dock. In this area, a large boat hoist along with 18 boats and several boat trailers were damaged or destroyed. Several power poles were also snapped off and several vehicles were damaged. Numerous trees were also snapped off on Hird Island. The Tornado likely dissipated over Doboy Sound as a waterspout. Besides portions of the Gateway roof, debris including signs were deposited on Sapelo Island.

Because the McIntosh County Emergency Medical Services Building was destroyed, it was

rebuilt as the McIntosh County Emergency Operations Center (EOC) at 1019 Production Row SW. This new facility was built with state-of-the-art materials to protect it from extreme weather events, and it serves as a storm shelter. This facility, built with FEMA funds, also houses the Wiregrass Emergency 911 Center.

Another tornado struck April 13, 2009. A National Weather Service Storm Survey Team determined the tornado occurred south of the Credit Hill community off Briardam Road around 4:40 PM Eastern Daylight Time, which is located about 3 miles southeast of Townsend. Both the tree and structural damage to the church were consistent with an EF-1 tornado on the Enhanced Fujita Scale with winds estimated to be around 100 miles per hour. The tornado continued to move rapidly northeast while skirting the ground in various locations. The tornado appeared to have lifted around 4:57 PM eastern daylight time shortly before reaching highway 17 near the intersection with Tramm Road. The total track length of the tornado was 8 miles with a maximum width of 770 yards. No fatalities or injuries were reported with this event. A vehicle was hit by a snapped tree. This event resulted in $200,000 in property damage claims.

Tornadoes are classified according to the Fujita tornado intensity scale. Originally introduced in 1971, the scale was modified in 2007 to better define the damage and estimated wind scale. The Enhanced Fujita Scale ranges from low intensity EF0 with effective wind speeds of 65 to 85 miles per hour, to EF5 tornadoes with effective wind speeds of over 200 miles per hour. The Enhanced Fujita intensity scale is included in Table 12.

Enhanced Fujita Scale		
Category	**Wind Speed**	**Potential Damage**
EF0	105–137 km/h 65–85 mph	Light damage. Peels surface off roofs; some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; mobile homes pushed off foundations or overturned; sign boards damaged.
EF1	138–179 km/h 86–110 mph	Moderate damage. Roofs torn off frame houses; windows and glass doors broken; moving autos blown off roads; mobile homes demolished; boxcars overturned.
EF2	180–217 km/h 111–135 mph	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	218–266 km/h 136–165 mph	Severe damage. Some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	267–324 km/h 166–200 mph	Devastating damage. Well-constructed houses and whole frame houses completely leveled; structures with weak foundations blown away some distance; trees debarked; cars thrown and small missiles generated.
EF5	>324 km/h >200 mph	Incredible damage. Strong frame houses leveled off foundations and swept away; with strongest winds, brick houses completely wiped off foundations; automobile-sized missiles fly through the air in excess of 100 m (109 yd); cars thrown and large missiles generated; incredible phenomena will occur.

NOAA's NWS: The Enhanced F-scale is a set of wind estimates (not measurements) based on damage.

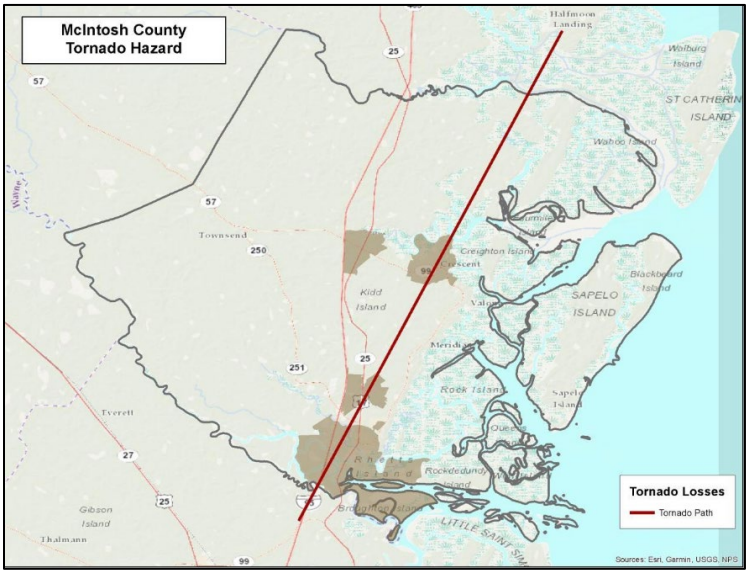
There has only been 1 tornado during the previous 10 years, but 5 during the previous 20 years. Including the entire 75-year dataset shows the probability of a tornado in McIntosh County is 10.7% per year. Only one of the eight tornadoes on record was larger than an

EF-1, and it was the EF-4 that struck the County in May 2008. Based on the previous 10 years, there will be, on average, 0.10 tornadoes per year, and when including the previous 20 years, it increases to 0.25 tornadoes per year. The frequency would be the same for both the County and the City because of the unpredictability with tornadoes. The hazard frequency data table is located in Appendix D.

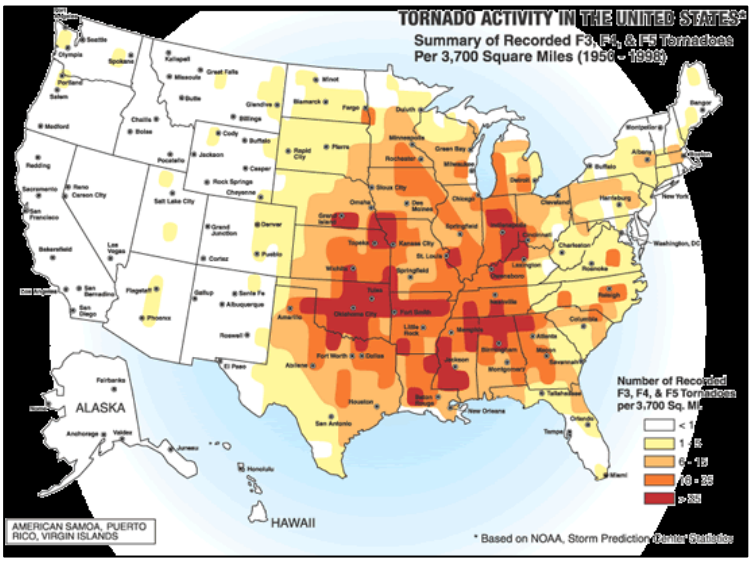
C. Assets Exposed to Hazard and Estimate of Potential Losses

All structures and facilities within McIntosh County could be damaged by a tornado, as tornadoes are among the most unpredictable of weather phenomena and are indiscriminate as to when or where they strike. All 68 critical facilities, as well as all public, private and commercial property, are susceptible to tornados; however, the current HMPUC identified that up to 15% of the entire County and 25% of the City would be susceptible for a major, individual event, with the City having a higher percentage due to higher density of development. Based on the 2023 Consolidated Tax Digest Summary, existing structures in the windstorm hazard area may number 6,118 residential, commercial, industrial, agricultural, and nonprofit structures, 5 infrastructure structures, as well as 81 government and education structures. The value of these structures is $330,244,412. The population at risk includes 2,677 people. This exposure is detailed in Appendix A, Section VII, for McIntosh County and the City of Darien (GEMA Worksheet #3A).

HAZUS modeling was conducted for McIntosh County, and it is reported in the Coastal Regional Commission's 2024 Report, "Hazard Risk Analyses: Supplement to the McIntosh County Joint Hazard Mitigation Plan." This report is included in Appendix A. Damage was calculated for a hypothetical EF-3 tornado. The tornado path was placed to travel through Darien and Crescent, which is one of more densely-populated portions of the County. Tornado damage impacted 459 buildings, and the total damage was $14.7 million. There were 2 essential facilities that suffered minor damage.



As was seen with the May 2008, EF-4 tornado, the track has a major influence on the amount of destruction and damage. The 2008 tornado, while one category more intense, caused about a similar amount of damage ($12.5 million in 2008, which is worth $18.3 million today).



Strong winds are a threat associated with tornadoes. While the threat of strong winds in McIntosh County and the hazard ratings described below are primarily from hurricanes, the potential for tornadoes also contributes to these ratings and corresponding design codes. According to the GEMA Georgia Mitigation Information System (GMIS) online mapping tool developed by UGA Information Technology Outreach Services (ITOS), all of Darien and about two-thirds of the County (mostly east of I-95) is located in Wind Hazard Area 5 (most extreme), and the western portion of the County is in Wind Hazard Area 4. According to the Georgia Office of Insurance and Safety Fire Commissioner, McIntosh County is in Zone 2 of the Georgia Manufactured Housing Wind Zones. This zone is rated for 100 to 109 MPH and is the highest in the state of Georgia. Therefore, structures in McIntosh County, especially in Darien and the unincorporated section east of I-95, have the greatest potential within the state to exposure of strong winds, and as a result, structures need to be built to withstand higher wind speeds. Unincorporated County's code states that all structures must meet wind loading requirements of Federal Emergency Management Administrator and the Southern Building Code Congress International (SBCCI) Codes. The local continuous design wind speed in the unincorporated area is 120 MPH. Therefore, McIntosh County is following appropriate building codes to withstand the elevated threat of high winds in the county.

D. Land Use & Developmental Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to tornado hazards. Current and recent economic conditions have made it difficult to predict future growth. . In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;

- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
    - Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County has the same design wind speed, as determined by the American Society of Civil Engineers (ASCE). Both the city and county have personnel trained in code enforcement. McIntosh County is an official StormReady community. To be designated, a community or site must:

- Establish a 24-hour warning point and emergency operations center;
- Have redundant communications systems to receive severe weather forecasts and warnings and to alert the public.
- Create a system that monitors local weather conditions;
- Promote the importance of public readiness through community seminars;
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

At a minimum, NOAA Weather Radios, with tone alert and/or Specific Area Message Encoding capability, must be located at four sites within StormReady communities including emergency operations centers, 24-hour warning points, city hall, and all school superintendent offices. StormReady communities must stay freshly prepared, because the designation is only valid for two years.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of tornadoes. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises CAPE, which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of extreme weather events, including tornadoes, that affect McIntosh County and the City of Darien.

According to NOAA's September 2023 State of the Science Fact Sheet titled "Tornadoes, Climate Variability, and Climate Change," climatic change may impact tornado-producing storms, atmospheric instability, vertical wind shear, and other conditions associated with tornadoes. However, there is a lot uncertainty regarding projected long-term changes in tornado climatology due to the inability to accurately assess how these variables will affect tornado activity as well as inconsistencies in historical tornado tracking. It's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like hailstorms can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by tornadoes.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals

of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.

- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by tornadoes due to food and housing shortages and other physical and economic hardships posted by storm events.

H. Overall HRV Summary

Due to the threat of a tornado occurrence during a hurricane, coastal storm or thunderstorm event, McIntosh County has a fairly high potential for damage from tornadoes. McIntosh County residents need to be prepared for a tornado event as much as is possible. Should a tornado hit certain portions of the county that are highly concentrated with homes, or any of the critical facilities identified, significant damage could occur. Due to the destructive nature of tornadoes and recent history, mitigation actions related to tornadoes should be implemented.

SECTION VIII – WILDFIRE

A. Hazard Identification

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and spread quickly and are usually signaled by dense smoke that fills the area for miles. Naturally occurring and non-native species of grasses, brush and trees fuel wildfires.

A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities.

An urban-wildland interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. A concern for McIntosh County is the increasing amount of residential "sprawl" that dilutes a definitive line between urban/rural areas.

Communities with a large amount of wooded brush and grassy areas are at highest risk of wildfires. Additionally, areas that have experienced prolonged droughts, or are excessively dry, are also at risk of wildfires. People start more than four out of every five wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. The Georgia Forestry Commission tracks the following causes of fires: campfire, children, debris burning, incendiary, lightning, machine use, miscellaneous, and smoking.

There are three different classes of wildfires: (1) "surface fire," (2) "ground fire," and (3) "crown fire." "Surface fire" is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. "Ground fire" is usually started by lightning and burns on or below the forest floor in the humus layer down to the mineral soil. "Crown fires" spread rapidly by wind and move quickly by jumping along the tops of trees.

Wildfire hazard potential maps for McIntosh County and the City of Darien are presented at the end of Section VIII.

B. Hazard Profile

McIntosh County is one of the most rural coastal counties, and it is also one of the most heavily forested. Most of the upland land area is extensive forested tracts. Even though a large portion of the eastern half of the county is tidal marsh and barrier islands, there are still almost 150,000 acres (234 square miles) of commercial timberland within the confines of the County. While the traditional population centers were Darien and a handful of small waterfront communities along the waterways, there are now numerous small communities and developments spread the length of the county, primarily east of I-95 with a significant risk as from the wildland urban interface around them.

The hazard frequency data table is located in Appendix D. According to the McIntosh County Community Wildfire Protection Plan (CWPP), McIntosh County has averaged 138.0 reported wildland fires per year over the past 50 years for a total of 6,900 wildfires over the 50-year period. Over the most recent 10 years, this has declined to 11.3 per year. The average area burned annually has also decreased from 705 acres over the past 50 years to 65.2 acres over the most recent 10 years. The number of fires and acreage lost has noticeably declined over the past 20 plus years since the advent of the burning permit law. Despite this trend in fire behavior, more homes are being built outside of traditional communities into the wildland urban interface.

According to the CWPP, 70% of the acreage lost over the past 50 years occurred during the months of January, February, March, and April. During the most recent 20 years, these months accounted for 75% of the fires. The McIntosh County HMPUC worked with the Georgia Forestry Commission to collect information and formulate mitigation strategies.

NASA Satellite Captures Image of Georgia Wildfires 05.02.07

In the most recent CWPP, Georgia Forestry Commission wildfire records showed that from 2014-2018, only one home was damaged by wildfire in McIntosh County resulting in estimated losses of $100 along with 4 outbuildings valued at $18,300. According to reports during this period 9 homes have been directly or indirectly threatened by these fires. Additionally, 10 vehicles valued at $230,000 and 3 pieces of equipment valued at $155,000 were lost. In the years since the 2018 HMP Update was last approved, the total number of wildland fires by year, as reported by the Georgia Forestry Commission, were 12 in 2018, 13 in 2019, 7 in 2020, 8 in 2021, 10 in 2022, 9 in 2023, and 4 in 2024 for an average of 9 fires per year. The total acreage burned each year were 23 acres in 2018, 155 acres in 2019, 6 acres in 2020, 16 acres in 2021, 18 acres in 2022, 44 acres in 2023, and 42 acres in 2024 for an average of 43.5 acres per year. Both are well below the 10-year average of 11.3 fires per year and 65.2 acres burned per year and the 50-year averages.

The correlation between drought and wildfire threat is obvious during the past 10 years. In 2011, when nearly the entire year had conditions with at least a severe drought (D2) and long periods of extreme (D3) and exceptional (D4) droughts, the wildfire total and total acreage burned was the highest during this 10-year period with 83 events and 2,428 acres burned.

C. Assets Exposed to Hazard and Estimate of Potential Losses

All structures and facilities within McIntosh County could be damaged by a wildfire. All 68 critical facilities, as well as all public, private and commercial property, are susceptible to wildfire; however, the current HMPUC identified that up to 15% of the entire County and

25% of the City would be susceptible for a major, individual event. Based on the 2023 Consolidated Tax Digest Summary, existing structures in the wildfire hazard area may number 6,118 residential, commercial, industrial, agricultural, and nonprofit structures, 5 infrastructure structures, as well as 81 government and education structures. The value of these structures is $330,244,412. The population at risk includes 2,677 people. This exposure is detailed in Appendix A, Section VII, for McIntosh County and the City of Darien (GEMA Worksheet #3A).

The previous HMP Update identified that 100% of the County was vulnerable to wildfires, and 100% of City of Darien was vulnerable, due to concern of a major wildfire hazard event from November 2016 to December 2016 in Gatlinburg, Tennessee. Gatlinburg is about 300 miles northwest of McIntosh County, so this event had no direct impact on McIntosh County; however, it made the HMPUC concerned that something similar could happen in their County. The current HMPUC decided that while the entire County and City are vulnerable, a single-event is unlikely, so they reduced the scale to 15% of the County and 25% of the City. The City had a higher rate due to a higher density of development. From the most recent 10 years of available data (2014-2024), the typical average area burned each year is about 65 acres from 11.3 separate fires, so the average area burned per fire is about 6 acres. While McIntosh County has been fairly lucky compared to most counties in this regard, the potential is present for significant losses to non-timber property from wildfire.

D. Land Use & Developmental Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to wildfire hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh

County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.

- Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
- Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
- Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

McIntosh County is dominated by large tracts of undeveloped land, much of it in state or federal ownership, or held in commercial forest land by pulp and paper companies. According to the 2023 Consolidated Tax Digest Summary, 26.0% of the land in McIntosh County is considered Agricultural, dominated by forestry, and an additional 23.2% is considered Forest Land Conservation Use. Since the most recent HMP Update, the Georgia Forestry Commission updated McIntosh County's Fire Wildfire Risk Assessment. This assessment includes enhanced mapping features that are published in the current version of the Community Wildfire Protection Plan, October 2018. This plan provides an action plan for wildfire mitigation and conservation of natural resources, which were used as tools to provide greater mitigation action steps in the HMP Update.

E. Multi-Jurisdictional Concerns

Most of the wildfire danger is in the county, but as lightning strikes can cause a wildfire in any location, any mitigation steps taken related to wildfire should be undertaken on a countywide basis and include the City of Darien. In addition, many of the County's structures are exposed to the Wildland-Urban Interface.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of wildfires. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises CAPE, which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of extreme weather events, including wildfires, that affect McIntosh County and the City of Darien.

According to NOAA's February 2021 State of the Science Fact Sheet titled "Fire Weather" and GEMA's 2019-2024 Georgia Hazard Mitigation Strategy and Enhanced Plan, climate-induced changes may increase the risk and extent of wildfires, resulting in a longer fire season, by creating warmer drier conditions and more drought. New fires may result from more lightening over dry vegetation during warmer and longer dry seasons associated with climate change. Increases in wildfire activity are more likely for the western United States, as there is more land and vegetation to burn. However, it's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like wildfires can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by wildfires.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.
- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by wildfires due to food and housing shortages and other physical and economic hardships.

H. Overall HRV Summary

As so much of McIntosh County is forest, wildfire remains a critical threat and remains a frequently occurring hazard. Wildfire threatens not only structures, but the health and safety of County residents. Due to the destructive nature of wildfires, the HMPUC feels that mitigation strategies for reducing the likelihood or impact of wildfire are critical to the health and safety of McIntosh County residents.

Wild Fire Potential

City of Darien

Horse Creek
New River Rd
Miller Ln SW
US Highway 17
Redfish Dr SE
Meadow Ln SE
Canal St SE
Cathead Creek
Franklin St SE
Blackbeard Island Rd SE
Ashantilly Dr
GA Highway 99
Ashantilly Rd SE
Gray St
Dakota St
Old River Rd
New River Rd SW
Elbert St
Pine St
Houston St
6th St W
5th St W
Wilson St
Bond Rd SE
Crystal Springs Rd SE
3rd St W
2nd St W
1st St W
Screven St
Darien
Kell Ave
W Black Island Rd SE
Adams St
Greene St
7th St E
6th St E
Wayne St
Congress St

Legend

- City of Darien
- McIntosh County
- Parcels

0 0.17 0.35 0.7 Miles

Average Wildfire Hazard Potential Score

5

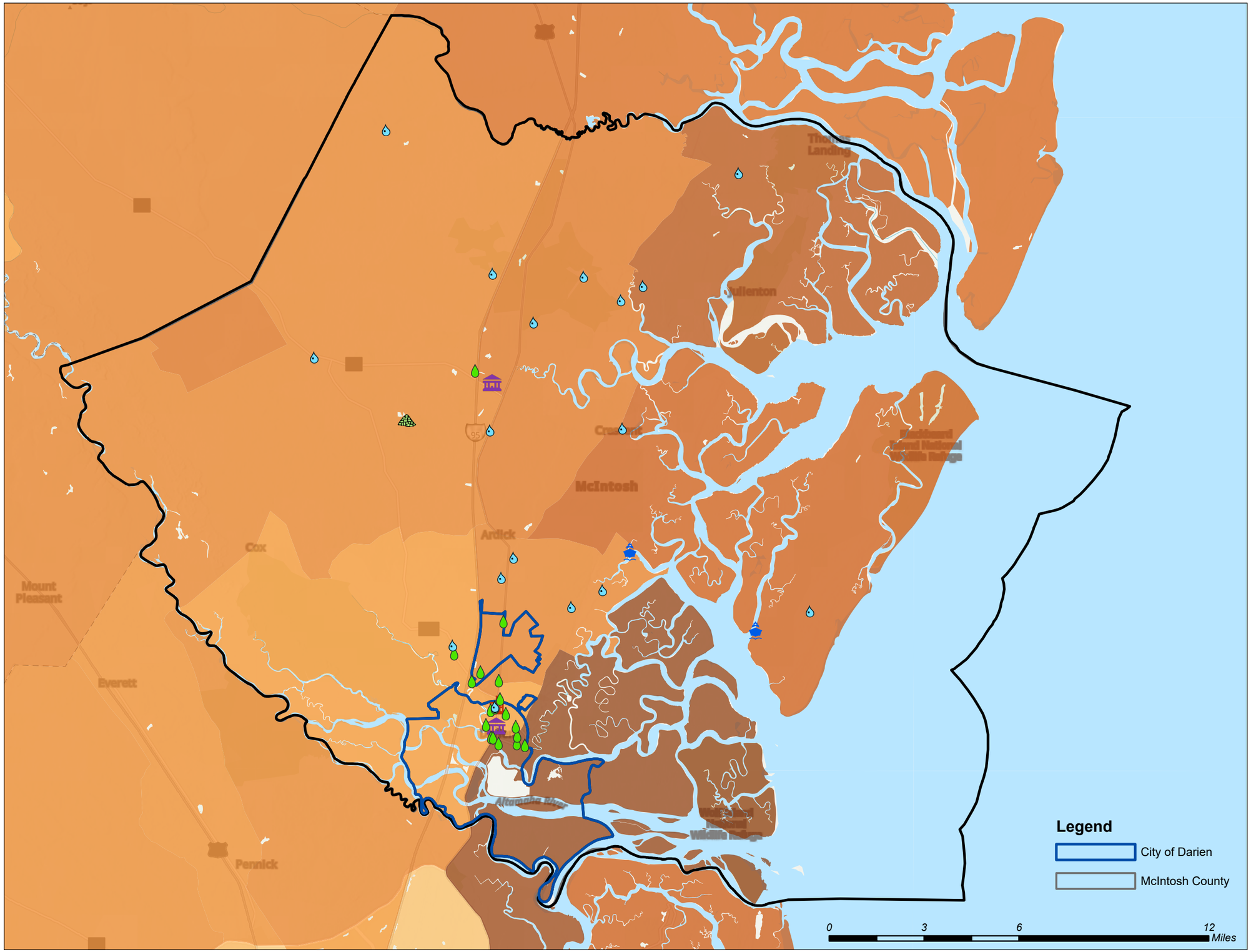
0

Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical

GMC

Wildfire Hazard Potential



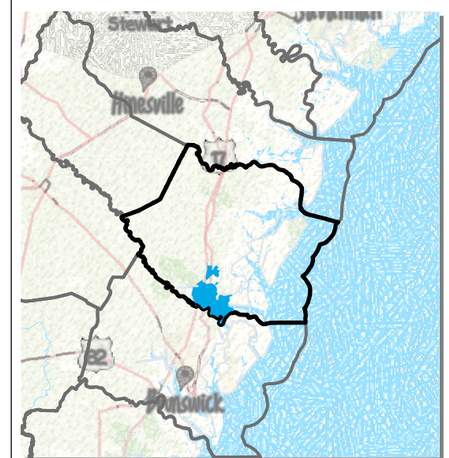
Average Wildfire Hazard Potential Score

5

0

Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



GMC

SECTION IX – WINDSTORM

A. Hazard Identification

Windstorms are formed when moist air near the earth's surface is forced upward through some catalyst (convection or frontal system). As the moist air rises, the air condenses to form clouds. Because condensation is a warming process, the cloud continues to expand upward. When the initial updraft is halted in the upper atmosphere, the characteristic anvil shape forms as well as a downdraft. This system of up-drafting and down-drafting air columns is termed a "cell". As the process of updrafts and downdrafts feeds the cell, the interior particulates of the cloud collide and combine to form rain and hail which falls when the formations are heavy enough to push through the updraft. The collision of the water and ice particles within the cloud creates a large electrical field that must discharge to reduce charge separation. This discharge is the lightning that occurs from cloud to ground or cloud to cloud in the thunderstorm cell. In the final stage of development, the updraft weakens as the downdraft-driven participation continues until the cell dies. Duration of thunderstorm winds are generally short and involve straight-line winds and/or gusts in excess of 50 mph. Thunderstorm winds tend to affect areas of the county with significant tree stands, as well as areas with exposed property and infrastructure, and above ground utilities. Thunderstorm winds can cause power outages, transportation and economic disruptions, significant property damage and pose a high risk for injuries and loss of life.

Lightning is a major threat during thunderstorms. Lightning is very unpredictable, which increases the risk to individuals and property. Lightning is the second leading cause, following human-caused, of wildfires. Another threat accompanying thunderstorms is the threat of tornadoes. Wind hazard maps for McIntosh County and the City of Darien are provided at the end of this section.

B. Hazard Profile

A prevalent natural hazard event occurring in McIntosh County is thunderstorm winds. During the spring and summer months, the county typically experiences countless thunderstorms, some packing significant winds. Historical frequency data for this hazard was researched on the NOAA NCEI Storm Event Database. The Storm Event Database lists 137 reports of thunderstorm wind, but in some cases multiple reports were given on the same day that might be associated to the same storm event. Therefore, the HMPUC defined a thunderstorm wind event as a unique event by date, so overall, there were 89 recorded events in the 75-year recorded storm history for a historic recurrence interval of one event per 0.84 years. The magnitude of winds ranged from 40-75 knots (46-86 MPH), but only two events exceeded 60 knots (69 MPH). This database reported $340,550 in property damage and $30,000 in crop damage from these events. The most prevalent damage caused by the high winds is downed trees and power lines and the impacts of these falling on cars, homes, and buildings.

Magnitude is measured by the Beaufort Wind scale represented below. McIntosh County should prepare for winds of a violent storm, Beaufort Wind Scale of 11, wind speeds of 56-63 knots, but could expect winds on the Beaufort Wind Scale of 12 (64 knots or greater).

BEAUFORT WIND SCALE AND DESCRIPTIONS

Specifications and equivalent speeds									
Beaufort wind scale	Mean Wind Speed		Limits of wind speed		Wind descriptive terms	Probable wave height in metres*	Probable maximum wave height in metres*	Seastate	Sea descriptive terms
	Knots	m/s	Knots	m/s					
0	0	0	<1	0-0.2	Calm	-	-	0	Calm (glassy)
1	2	0.8	1-3	0.3-1.5	Light air	0.1	0.1	1	Calm (rippled)
2	5	2.4	4-6	1.6-3.3	Light breeze	0.2	0.3	2	Smooth (wavelets)
3	9	4.3	7-10	3.4-5.4	Gentle breeze	0.6	1.0	3	Slight
4	13	6.7	11-16	5.5-7.9	Moderate breeze	1.0	1.5	3-4	Slight-Moderate
5	19	9.3	17-21	8.0-10.7	Fresh breeze	2.0	2.5	4	Moderate
6	24	12.3	22-27	10.8-13.8	Strong breeze	3.0	4.0	5	Rough
7	30	15.5	28-33	13.9-17.1	Near gale	4.0	5.5	5-6	Rough-Very rough
8	37	18.9	34-40	17.2-20.7	Gale	5.5	7.5	6-7	Very rough-High
9	44	22.6	41-47	20.8-24.4	Severe gale	7.0	10.0	7	High
10	52	26.4	48-55	24.5-28.4	Storm	9.0	12.5	8	Very High
11	60	30.5	56-63	28.5-32.6	Violent storm	11.5	16.0	8	Very High
12	-	-	64+	32.7+	Hurricane	14+	-	9	Phenomenal

From 2018 to 2024, there were 27 reports of thunderstorm wind in the NOAA NCEI Storm Event Database during 14 separate dates (3 in 2019, 3 in 2020, 1 in 2021, 1 in 2022, 3 in 2023, and 3 in 2024 as of 11/30/2023), for a total of 14 unique events. The distribution by month was: 1 in January; 6 in April; 3 in May; 1 in June; 1 in July; 1 in August; and 1 in December. They were concentrated in the spring and summer months. The wind speed distribution was: 1 at 60 knots; 1 at 59 knots; 1 at 51 knots; 10 at 50 knots; and 1 at 45 knots. The two highest wind speeds in the 75-year record were recorded in 2013 and 2016. A 75-knot event was on 4/14/2013, 1 mile west of Doboy, and it was reported that an 86 MPH gust was measured at the National Estuarine Research system on Sapelo Island. A 65-knot (75-MPH) event was on 6/1/2016, 4 miles west of Townsend, and it was reported that numerous trees were down on Blues Reach Road near Cox Road. No monetary crop or property damage was reported in the Storm Event Database for either report. For all 27 reports from 2018 to 2024, the reported property damage on the Storm Event Database totaled $3,000. Damage reports included: power lines down, trees down, and trees on structures.

Similar with hailstorms, more than 60% of the thunderstorm wind events, 54 out of 89 events, were recorded in the previous 20 years. While the frequency of events appears to be

increasing, it should be noted that data collection, reporting, and accuracy are much better in the past 10 to 20 years. As stated in the Georgia State Plan, Georgia has experienced so many severe weather events that they have become common. The perceived increase in frequency provides major concern for keeping this hazard and for utilizing the most recent 20 years of data when projecting frequency of this hazard. Based on the previous 20 years, there will be, on average, 2.7 events per year. The frequency would be the same for both the County and the City. As a note, there were only 1.68 events per year when including the previous 50 years. The hazard frequency data table is located in Appendix D.

C. Assets Exposed to Hazard and Estimate of Potential Losses

In evaluating assets that are susceptible to thunderstorm winds, the committee determined that all 68 critical facilities, as well as all public, private and commercial property, are susceptible to thunderstorm winds. Based on the 2023 Consolidated Tax Digest Summary, existing structures in the windstorm hazard area may number 40,789 residential, commercial, industrial, agricultural, and nonprofit structures, 35 infrastructure structures, as well as 543 government and education structures. The value of these structures is $2,201,629,413. The entire population, 17,849 people, would also be at risk. This exposure is detailed in Appendix A, Section II, for McIntosh County and the City of Darien (GEMA Worksheet #3A).

According to the GEMA Georgia Mitigation Information System (GMIS) online mapping tool developed by UGA Information Technology Outreach Services (ITOS), all of Darien and about two-thirds of the County (mostly east of I-95) is located in Wind Hazard Area 5 (most extreme), and the western portion of the County is in Wind Hazard Area 4. According to the Georgia Office of Insurance and Safety Fire Commissioner, McIntosh County is in Zone 2 of the Georgia Manufactured Housing Wind Zones. This zone is rated for 100 to 109 MPH and is the highest in the state of Georgia. Unincorporated County's code states that all structures must meet wind loading requirements of Federal Emergency Management Administrator and the Southern Building Code Congress International (SBCCI) Codes. The local continuous design wind speed in the unincorporated area is 120 MPH. Only two events reported had wind speeds in excess of 69 MPH, so these design wind speeds are more directed towards hurricane-force winds and winds associated with tornadoes.

D. Land Use & Developmental Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to windstorm hazards. Current and recent economic conditions have made it difficult to predict future growth.. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The

updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
    - Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County has the same design wind speed, as determined by the American Society of Civil Engineers (ASCE). Both the city and county have personnel trained in code enforcement. In addition, McIntosh County is an official StormReady community. To be designated, a community or site must:

- Establish a 24-hour warning point and emergency operations center;
- Have redundant communications systems to receive severe weather forecasts and warnings and to alert the public;
- Create a system that monitors local weather conditions;
- Promote the importance of public readiness through community seminars;
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

At a minimum, NOAA Weather Radios, with tone alert and/or Specific Area Message Encoding capability, must be located at four sites within StormReady communities including emergency operations centers, 24-hour warning points, City Hall, and all school superintendent offices. StormReady communities must stay freshly prepared, because the designation is only valid for two years.

G. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of thunderstorm winds. Increased greenhouse gases in the atmosphere are known to cause atmospheric warming. This warming raises convective available potential energy (CAPE), which is the measure of energy available for storms to form. This warming and increase of CAPE may significantly increase the number of days, frequency and/or intensity of wind-producing storms that affect McIntosh County and the City of Darien. However, it's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on specific weather phenomena like thunderstorm winds can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

H. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by thunderstorm winds.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.

- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by thunderstorm winds due to food and housing shortages and other physical and economic hardships posted by storm events.

H. Overall HRV Summary

Overall, thunderstorm winds pose a great threat to McIntosh County in terms of property damage. Thunderstorm winds occur frequently and have the greatest chance of affecting the county each year.

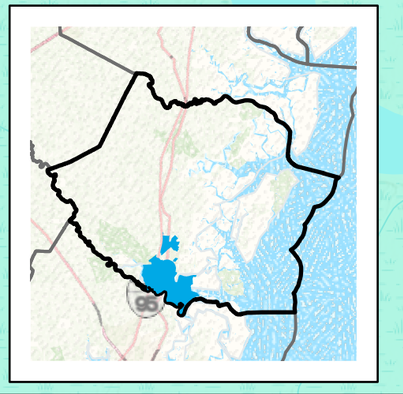
Wind Zones

City of Darien

Horse Creek
Cathead Creek
US Highway 17
New River Rd
Miller Ln SW
Redfish Dr SE
Meadow Ln SE
Canal St SE
Bay
Palmetto
Cypress
Franklin St SE
Black Island Rd SE
Ashantilly Dr
GA Highway 99
Ashantilly Rd SE
Gray St
Dakota St
Old River Rd
New River Rd SW
Bond Rd SE
Elbert St
Houston St
6th St W
5th St W
3rd St W
2nd St W
1st St W
Screven St
Pine St
Wilson St
Darien
Ridge Rd
Crystal Springs Rd SE
Kell Ave
W Black Island Rd SE
McIntosh
Adams St
Greene St
7th St
8th St
Wayne St
Congress St
Altamaha River

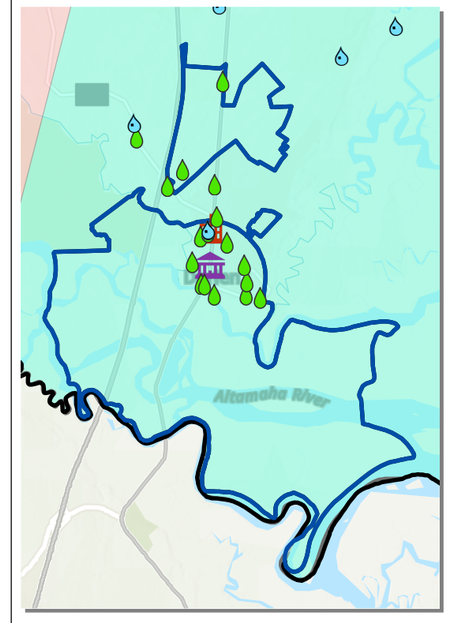
Wind Zones
- Zone 4
- Zone 5

Critical Facilities
- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical



Legend
- City of Darien
- McIntosh County
- Parcels

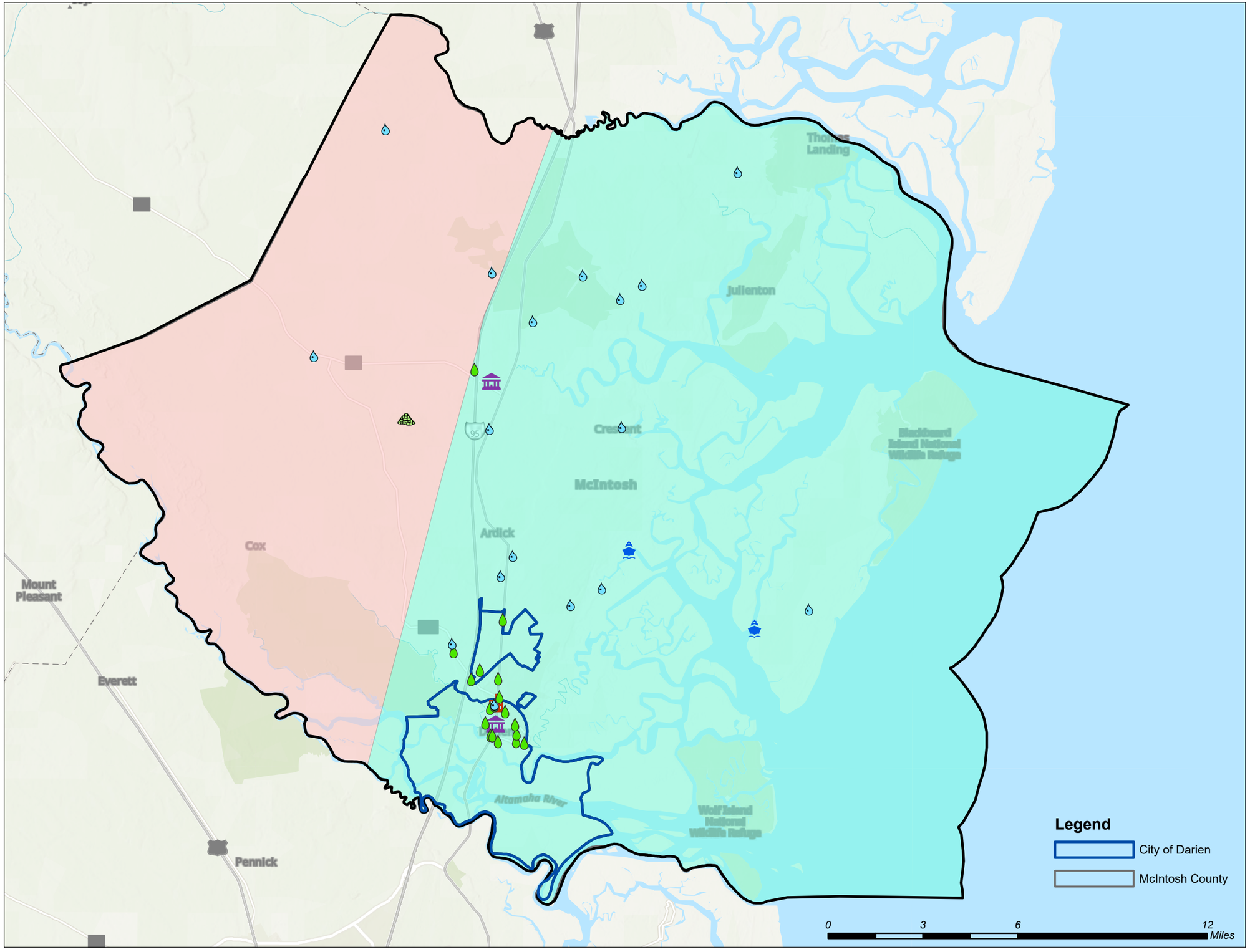
0 0.17 0.35 0.7 Miles



McIntosh County

GMC

Wind



Wind Zones

- Zone 4
- Zone 5

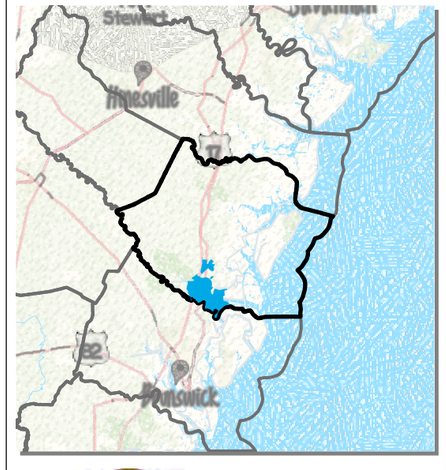
Critical Facilities

- Education
- Fire
- Government
- Landfill
- Police
- Sewer
- Transportation
- Water
- Emergency Services
- Medical

Critical Facilities

CriticalFacilities_GMIS_122016.SimpleType

- Education



GMC

SECTION X – MOSQUITO CONTROL

A. Hazard Identification

Mosquitoes are found throughout the world and many transmit pathogens which may cause disease. These diseases include mosquito-borne viral encephalitis, dengue, yellow fever, malaria, and filariasis. Most of these diseases have been prominent as endemic or epidemic diseases in the United States in the past, but today, only the insect-borne (arboviral) encephalitis occurs annually and dengue occurs periodically in this country. The major types of viral encephalitis in the United States include St. Louis, LaCrosse, Eastern equine and Western equine. These viruses are normally infections of birds or small mammals. During such infections, the level of the virus may increase in these infected animals facilitating transmission to humans by mosquitoes. The West Nile virus, which can also cause encephalitis, was found in the northeastern United States for the first time in 1999, is a good example of this mode of transmission. Most people who become infected with West Nile Virus will have either no symptoms or only mild symptoms. However, on rare occasions, West Nile Virus can result in severe and sometimes fatal illnesses. Human cases of encephalitis range from mild to very severe illnesses that, in a few cases, can be fatal. Dengue is a viral disease transmitted from person to person by mosquitoes. It is usually an acute, nonfatal disease, characterized by sudden onset of fever, headache, backache, joint pains, nausea, and vomiting. While most infections result in a mild illness, some may cause the severe forms of the disease. Dengue hemorrhagic fever, for example, is characterized by severe rash, nosebleeds, gastrointestinal bleeding and circulatory failure resulting in dengue shock syndrome and even death. Dengue is endemic in the Caribbean, Central and South America. Recently, dengue has occurred with increasing frequency in Texas. Other pathogens transmitted by mosquitoes include a protozoan parasite which causes malaria, and *Dirofilaria immitis*, a parasitic roundworm and the causative agent of dog heartworm. Disease carrying mosquito species are found throughout the U.S., especially in urban areas and coastal or in inland areas where flooding of low lands frequently occurs.

A health-concern associated with mosquitos that has received a lot of publicity during the 2018 HMP Update was the Zika virus. According to the Center for Disease Control (CDC), Zika is spread mostly by the bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*). Zika can be passed from a pregnant woman to her fetus, and infection during pregnancy can cause certain birth defects. There is no vaccine or medicine for Zika. Local mosquito-borne Zika virus transmission has been reported in the continental United States, including Miami-Dade County in Florida. Pregnant women were advised not to travel to this area between August 1, 2016, and June 2, 2017. The travel restriction was recently lifted, but people living in or traveling to this area should still be on alert to protect themselves from mosquito bites. Internationally, there are areas with risk of Zika in Africa, Asia, the Caribbean, Central America, Pacific Islands, and South America. The virus can be carried by travelers and transmitted to others can be transmitted through mosquito bites, from mother to child, and through sex.

B. Hazard Profile

Vector-borne diseases have been recorded since the 1600's. In 1847, thirteen persons living in McIntosh County succumbed to Yellow Fever. A worse epidemic in 1854 resulted in hundreds of deaths in McIntosh County. Cases of West Nile Virus have been reported in Georgia by the Center for Disease Control (CDC) for year 2003. Local mosquito-borne Zika virus transmission was reported in Miami-Dade County in Florida in 2016 and 2017. Mosquito control remains costly, and the possibility of mosquito related diseases is a concern.

In inland areas of the U.S. where these mosquitoes breed, heavy rains and flooding can produce millions of mosquitoes in a short time. Similar situations occur along coastal areas with mosquitoes adapted to salt marsh habitats. Some salt marsh mosquitoes are strong fliers and can sometimes travel up to 50 miles from the breeding site. Some mosquitoes can fly from floodplains, coastal marsh areas, or protected habitats to impact urban residential areas. In these cases, it is often necessary to apply pesticides to kill adult mosquitoes. Surveillance data may prompt insecticide applications when mosquitoes are abundant. Applications usually coincide with the maximum adult mosquito activity in urban residential areas.

To be successful, mosquito control officials must apply insecticides under proper environmental conditions (e.g., temperature and wind) and at the time of day when the target species is most active. They must also apply these pesticides with carefully calibrated equipment that generates the proper-sized insecticide droplets that will impinge on adult mosquitoes while they are at rest or flying. If the droplets are too large, they will fall to the ground. If they are too small, the prevailing winds will carry them away from the target area. Once the insecticide spray mist dissipates, they break down in the environment (generally within 24 hours) producing little residual effect. Depending on the situation, mosquito control officials may safely apply these insecticides from spray equipment mounted on trucks, airplanes or helicopters. All insecticides used in the U.S. for public health use have been approved and registered by the EPA following the review of many scientific studies.

C. Assets Exposed to Hazard and Estimate of Potential Losses

The mosquito hazard does not impact value of structures, but rather impacts the county and city budgets. Mosquito control activities are important to the public health, and responsibility for carrying out these programs rest with local governments. The current interests in ecology and environmental impact of mosquito control measures, and the increasing problems that have resulted from insecticide resistance emphasize the need for "integrated" control programs. EPA and CDC encourage maximum adherence to *integrated pest management* (IPM). IPM is an ecologically-based strategy that relies heavily on natural mortality factors and seeks out control tactics that are compatible with or disrupt these factors as little as possible. IPM uses pesticides, but only after systematic

monitoring of pest populations indicates a need. Ideally, an IPM program considers all available control actions, including no action, and evaluates the interaction among various control practices, cultural practices, weather, and habitat structure. This approach thus uses a combination of resource management techniques to control mosquito populations with decisions based on surveillance. Fish and game specialists and natural resources biologists should be involved in planning control measures whenever delicate ecosystems could be impacted by mosquito control practices.

It is difficult to estimate potential losses mosquito control has on the economy of McIntosh County. Mosquito control activities are important to public health and estimates of the impact on tourism and business are approximations. Many commercial and industrial concerns are located along the waterfront and are impacted during the mosquito season. A quote in 2016 after Hurricane Matthew for an aerial spray was $60,000 for each spray. Because of this high cost, the County has not done airborne spraying since 2012. The County currently does regular ground spraying with 2 trucks and sprays the entire county and also applies larvicide.

The HMPUC decided to keep the exposure thresholds identified in the previous HMP Update constant. This exposure was 90% of commercial entities, 100% of industrial entities, and 20% of residential, government, education and other entities. Therefore, a mosquito infestation could potentially impact 5,906 people in the County and 969 in the City. The exposure is detailed in Appendix A, Section X, for McIntosh County and the City of Darien (GEMA Worksheet #3A).

D. Land Use & Developmental Trends

Overall, there has been very limited new development or redevelopment in the County since the previous HMP Update that would affect the overall vulnerability of the County to mosquito control hazards. Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

During the most recent HMP update, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only

projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);

- Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
- Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County and City of Darien can equally be impacted by mosquito infestations.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on mosquito populations and associated disease spread. Currently, there is uncertainty regarding how climate change could impact mosquito populations and disease spread. According to NOAA's March 2021 State of the Science Fact Sheet titled "How Changing Climate Affects Extreme Events," it is well-documented that the frequency and intensity of some types of extreme weather events are changing due to human-induced changes in Earth's climate system. In the last century, cold extremes have become less common; there have been many more record high temperatures than record low temperatures in the United States. Some mosquito species are more heat tolerant than others and therefore certain temperatures may raise the risk of mosquito-borne diseases, while other temperatures are suboptimal. Some researchers predict that rising temperatures could reduce transmission rates, and/or result in changes in mosquito population distribution, while others predict that rising temperatures may not be as much of a limiting factor

because the optimal temperature range of mosquitos expands due to their adaptability and changes in their biodiversity. It's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on hazards such as mosquito-borne diseases can also vary based on location and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by extreme heat.

- The most vulnerable individuals to this hazard are likely lower-income populations. Some studies show that lower-income neighborhoods have higher mosquito densities due to concrete structures and standing water via residential abandonment, garbage dumps, and inadequate sewage, resulting in disproportionate exposure to more mosquito-borne illnesses.
    - Based on 2022 U.S. Census data, approximately 20% of the County's population (2,240 individuals) live below the poverty level and are therefore most likely to be exposed to mosquito-borne diseases.
- Mosquito-borne illnesses may also affect the very old and young, as well as individuals who have chronic diseases or reduced immunity.
    - According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.
- Minorities, particularly non-English speakers or those that live in lower-income neighborhoods, could be disproportionately impacted.
    - Approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County.
    - According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand health advisories that are disseminated in these languages that provide information about how to prevent

H. Overall HRV Summary

There is no vaccine against Eastern equine encephalitis virus (EEEV) or Zika virus for humans. Reducing exposure to mosquitoes is the best defense against infection with EEEV and other mosquito-borne viruses. To be of maximum effectiveness, residents of McIntosh County must understand and support mosquito control. An integral part of most organized

mosquito control programs is public education. It is important that residents have a good understanding of mosquitoes, the benefits realized from their control and the role people have in preventing certain mosquito-borne diseases. Being aware of pesticide application times is also important for individuals so they may decide on precautions they may need to take. While this usually involves education of the public through announcements in the media, some control programs have staffs that develop and present educational programs in public schools. People who are informed about mosquito biology and controls are more likely to mosquito-proof their homes and eliminate mosquito breeding places on their own property.

SECTION XI – TECHNOLOGICAL (HAZARDOUS AND RADIOLOGICAL)

A. Hazard Identification

The term "hazardous material" refers to any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment if it is released. This may include flammable and combustible materials, toxic materials, corrosive materials, oxidizers, aerosols, and compressed gases. Hazardous materials include flammable and combustible materials, toxic materials, corrosive materials, oxidizers, aerosols, and compressed gases. Specific examples of hazardous materials are gasoline, bulk fuels, propane, propellants, mercury, asbestos, ammunition, medical waste, sewage, and chemical, biological, radiological, nuclear, and explosive threat agents.

Generally, a hazardous material is a substance or combination of substances which, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to an increase in mortality or serious illness. Hazardous materials pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous material incidents can occur while a hazardous substance is stored at a fixed facility, or while the substance is being transported along a road corridor or railroad line or via an enclosed pipeline or other linear infrastructure.

According to the International Atomic Energy Agency, a radiological emergency is an emergency in which there is, or is perceived to be, a hazard due to radiation exposure from a source. A radiological incident is an occurrence resulting in the release of radiological material at a fixed facility (such as power plants, hospitals, laboratories, etc.) or in transit. The release could affect the natural environment as well as the health and safety of anyone in its path. Radiological incidents related to transportation are described as an incident resulting in a release of radioactive material during transportation.

For purposes of this Plan, the term "technological" will be used to refer to threats that result from releases of all types of hazardous materials during transport as well as radiation exposure that may occur from release of radioactive materials during transport. Threats posed by fixed releases of hazardous and radioactive materials are not addressed within this Plan as the main threat in McIntosh County would occur from releases during transportation along the I-95 corridor.

B. Hazard Profile

A technological incident, for purposes of this Plan, is the accidental release of hazardous or radioactive materials during transport. Transportation-related technological incidents in McIntosh County and the City of Darien would primarily occur during roadway transport, specifically along the I-95 corridor. Roadway accidents involving hazardous and radiological materials pose a great potential for public exposures. Both nearby populations and

motorists can be impacted and become exposed by accidents and releases and greater exposure risks may be incurred if releases become airborne or reach waterways.

C. Assets Exposed to Hazard and Estimate of Potential Losses

It is difficult to determine potential damage to the environment caused by technological threats. No radiological releases are known to have occurred in McIntosh County, including the City of Darien. In addition, no recorded information was located that mentioned damage to any critical facilities as a result of hazardous material release. Historical data indicates that most hazardous material releases within the County and/or City have been relatively minor in nature. The most common hazardous material releases include automotive-related wastes or materials such as diesel, gasoline, oil, antifreeze, paint, and battery acid, as well as sewage. It should be noted however, when transportation-related releases do occur, there are significant costs incurred relating to emergency response, road closings, evacuations, watershed protection, expended man-hours, and cleanup materials and equipment. Such releases can occur in virtually any part of the County or City accessible by road.

Transportation-related technological spills and releases represent tremendous threats to McIntosh County. I-95 runs through the center of McIntosh County from north to south, and is a major throughfare for transportation of a wide range of hazardous and radiological materials. The extent of a technological emergency depends on the type and amount of the material, and the manner in which it was released. The worst case would be a catastrophic release with the atmospheric release reaching highly populated areas. The extent of such a hazard would need to be carefully studied on a case-by-case basis.

D. Land Use & Developmental Trends

Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

Previously, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so

there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;
- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;

- Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County and City of Darien can be impacted by technological threats with those areas adjacent to I-95 being at risk due to closer proximity to the location of potential releases. If releases were to become airborne, however, this risk would be exacerbated and affect all of the County and City of Darien and neighboring areas as well.

F. Future Impacts of Climate Change

The potential impact of climate change on technological hazards has not been well studied and doesn't appear to be of significance.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by technological hazards.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.

- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.

H. Overall HRV Summary

Reducing exposure to releases of radioactive and hazardous materials through better emergency preparedness response and training is the best defense against transportation-related technological threats. Because of these considerations, the HMPUC has developed mitigation actions with technological hazards in mind.

SECTION XII – PANDEMIC / EMERGENT INFECTIOUS DISEASE

A. Hazard Identification

A pandemic is defined as "an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people". It is determined by how the disease spreads (and not the number of deaths that may occur). A widespread endemic disease that is stable in terms of how many people are getting sick from it is not a pandemic. Throughout history there have been a number of pandemics, such as smallpox and tuberculosis. More recent pandemics include the human immunodeficiency virus (HIV) pandemic, the H1N1 pandemic and SARS-COVID-19 (COVID-19).

B. Hazard Profile

A pandemic could potentially cause serious health problems for those living within the planning area. An influenza pandemic, which occurs when a new influenza virus emerges for which people have little or no immunity, can cause serious illness and spreads easily person-to-person. A pandemic can spread across the country and around the world in a very short period of time causing millions of deaths. The Georgia Department of Public Health is prepared to respond to the unique and complex challenges a pandemic will pose and is working with many public and private providers to ensure all relevant areas of preparedness are addressed adequately.

The Georgia Department of Public Health indicates there have been five pandemics in the past century. These pandemics were all flu-related and included the following:

1. 1918-1919 (flu)
2. 1957-1958 (flu)
3. 1968-1969 (flu)
4. 2009-2010 (flu)
5. 2019-2022 (Covid-19)

C. Assets Exposed to Hazard and Estimate of Potential Losses

In McIntosh County and the City of Darien, assets exposed to the pandemic hazard would be the risks to people from contact or exposure to the pandemic flu (no risk to structures). All residents are at risk.

D. Land Use & Developmental Trends

Current and recent economic conditions have made it difficult to predict future growth. In the 10-year timeframe between the 2010 and 2020 Decennial Census, the populations of both McIntosh County and the City of Darien was reported to have decreased by approximately 25% (23% for McIntosh, with a population decrease from 14,333 to 10,975, and 26% for Darien, with a population decrease from 1,975 to 1,460). The updated 2022 U.S. Census population estimated a slight 2% increase in population for McIntosh County and a 14% decrease for the City of Darien.

Previously, the projected population in McIntosh County was projected to decrease by 25% over 25 years from 13,325 in 2025 to 9,958 in 2050. This trend has since reversed and some growth is now projected over the next couple of decades. The most recent population projections from Georgia Governor's Office of Planning and Budget (OPB) in 2024 indicate that the projected population in McIntosh County is expected to continue to increase slightly until 2040 and then experience a small decline through 2060. Over the next 36 years (2024 to 2060), the population is only projected to grow by 5% (574 people). Georgia Governor's OPB only provides countywide population projections, so there are no projections for the City of Darien. Based on the recent results from the U.S. Census Bureau and projected population from the Georgia Governor's OPB, future development in McIntosh County is expected to be limited.

In 2008, when development was still booming, land use and developmental trends were identified in the 2008 McIntosh County and the 2008 City of Darien Comprehensive Plan Update processes. These plans identified that areas of rapid development were waterfront property along the Darien River for multi-family condominiums and commercial services development. Other areas in high demand for high-end single-family and occasionally condominium developments were Cooper's Point, Shellman Bluff, Julienton Plantation area, Tolomato Island, and the barrier islands because of their proximity to the water and coastal marshland. Most of the development in McIntosh County was taking place north of Darien, along State Highway 99, Youngman Road, Shellman Bluff Road, east of Eulonia, and along coastal marsh areas.

This type and level of development was not identified in the 2018 Comprehensive Plans for McIntosh County and City of Darien because it stalled with the housing market crash in 2008. The 2018 Plans noted increased vacancy rates and presence of blight along with opportunities for infill housing and redevelopment that would be held to the most recent building codes and ordinance requirements. These Plans also listed protecting environmentally-sensitive areas and natural areas and implementing an urban redevelopment plan as community objectives related to land use and development trends. Information provided in these Plans also identified commercial development in the future land use maps as occurring along I-95 interchanges and along Highway 17 and 99 corridors.

The 2023 Joint Comprehensive Plan for McIntosh County and City of Darien has more expanded goals than the previous 2018 iterations related to land development and future desired growth patterns. Goals include:

- Remove blight and improve cost-burdened housing by ensuring zoning ordinances support affordable housing solutions, and offering a diverse range of housing options;
- Ensure that development supports the community's sense of place;
- Develop transportation alternatives and ensuring urban areas are pedestrian friendly;

- Attract development and ecotourism opportunities that complement the area's natural resources including:
    - Promote development that supports the ecotourism industry.
    - Support small to medium industrial development at designated industrial sites (with environmental preservation and protection in mind);
    - Work with the state to promote and develop safe access to the community's natural resources to expand ecotourism opportunities;
    - Promote the community's water, sewer, and subsequent infrastructure capacity to support development

The future land use map for the City of Darien in the 2023 Joint Comprehensive Plan shows general commercial as the main future development pattern immediately adjacent to the Highway 17 corridor with surrounding residential development; less densely populated areas with small farms and agricultural / residential uses to the north of the City ("residential agriculture"); and large areas of undeveloped land and marsh protected from development to the south of the City ("conservation preservation"). The future land use map for McIntosh County shows more diverse and mixed-use development and land uses throughout the County including a wide variety of residential commercial and light industrial development to the east of the I-95 corridor and large tracts of land and marsh for conservation preservation immediately along and to the west of the I-95 corridor. Other projected land uses in the County include areas reserved for public and semi-public uses for governmental and institutional entities (public / institutional); agriculture and forestry; and Hog Hammock (the Hog Hammock community on Sapelo Island). All the community growth and development are guided by local comprehensive planning for the County and the City. These plans reflect the natural hazard vulnerabilities and risk and include objectives to direct and guide growth away from these areas where they cannot be adequately mitigated.

E. Multi-Jurisdictional Concerns

All of McIntosh County and the City of Darien can equally be impacted by a pandemic.

F. Future Impacts of Climate Change

Another aspect that must be taken into consideration is the effect climate change can have on the frequency, probability, and intensity of pandemics and infectious disease spread. For example, climate change may impact infectious disease dynamics by worsening risk factors and/or affecting the spread of disease to naïve populations; however, current predictive models are not well equipped to take changes in human behavior into account or assess disease outcomes. However, it's important to note that while there is a scientific consensus that climate change is happening and is largely driven by human activities, its exact impacts on pandemics and emergent diseases can also vary based on location, changes in human behaviors, and other natural factors such as changes in wind patterns, storms, flooding, or changes in land use and/or topography, etc. that impact human populations and disease spread.

G. Impacts on Vulnerable Populations

Underserved and disadvantaged populations in McIntosh County and the City of Darien (i.e., vulnerable populations) may be adversely impacted by pandemics and infectious diseases.

- According to the 2022 U.S. Census, 29% of the County's population (3,236 individuals of the County's total population of 11,021) are currently aged 65 or older, with a heavier distribution of seniors in District 4 of the County and within the City limits of Darien. Some of these seniors live in retirement villages and assisted living facilities that may not receive emergency notifications through existing emergency notifications systems.
- According to the County's Language Access Plan that was updated in 2024, 3% of the County's residents are non-English speaking, and 1.8% of the County's residents speak neither English nor Spanish. Citizens who do not speak English or Spanish may not understand emergency notifications that are disseminated in these languages.
- Based on U.S. Census data, approximately 37% of the County's population (4,085 individuals) are minorities, many of whom reside in District 3 (which includes Sapelo Island), as well as elsewhere within the County, and approximately 20% of the County's population (2,240 individuals) live below the poverty level. This includes a small number of housing and food insecure residents. These vulnerable populations may be disproportionately impacted by pandemics and other diseases due to physical and economic hardships.

F. Overall HRV Summary

A pandemic could have serious and in more extreme situations, devastating effects on McIntosh County and the City of Darien. These impacts would be immediate and long-lasting and could be potentially economically crippling. However, the likelihood of a pandemic impacting McIntosh County should be considered relatively low. It should be noted that in a true pandemic, unlike many other disasters, little help from outside the County can be expected since other jurisdictions will be experiencing the same conditions. Because of these considerations, the HMPUC has developed mitigation actions with pandemics / emergent infectious diseases in mind.

CHAPTER 3 – NATURAL HAZARD MITIGATION STRATEGY

The table below provides a brief description of each section in this chapter and a summary of the changes that have been made.

SUMMARY OF UPDATES TO CHAPTER 3

Chapter 3 Section	Updates to Section
I. Introduction to Mitigation Strategy	This section was updated to reference hazard events that have taken place since 2018. The Capability Assessment stayed largely the same with minor edits. Summary of Action steps was updated to reflect the changes made to the Mitigation Action Step List Table.
II. Natural Hazards	Specific objectives, and associated action steps are referenced in this section. New action steps are summarized in the rows below for each of the natural hazards.
Natural Hazard I: Coastal Erosion	New action step to develop and implement an erosion management plan.
Natural Hazard II: Coastal Storm/Hurricane & Flood	Multiple deferred strategies were revised to be ongoing action steps. New action steps focused on purchasing general heavy equipment and machinery for drainage system maintenance and purchase of a safety boat to provide emergency services, water patrol, and transportation for Island residents.
Natural Hazard III: Drought	New action steps focused on applying for grant funding to hire a paid fire department and purchase HAZMAT equipment and training.
Natural Hazard IV: Extreme Heat	New action step focused on seeking funding to develop an "Are You OK" Program.
Natural Hazard V: Flooding	Multiple deferred strategies were revised to be ongoing action steps. New action step focused on purchasing general heavy equipment and machinery for drainage system maintenance.
Natural Hazard VI: Hailstorm	New action steps focused on retrofitting shelters.
Natural Hazard VII: Tornado	New action steps focused on adding lighting alert systems, updating existing critical and municipal facilities to be shelter compatible; enhancing the gymnasium to be shelter compatible and/or creating a new shelter; and adding or enhancing responder housing at existing critical facilities.

Chapter 3 Section	Updates to Section
Natural Hazard VIII: Wildfire	No new action steps were added.
Natural Hazard IX: Windstorm	New action steps focused on adding lighting alert systems, updating existing critical and municipal facilities to be shelter compatible; enhancing the gymnasium to be shelter compatible and/or creating a new shelter; and adding or enhancing responder housing at existing critical facilities.
Natural Hazard X: Mosquito Control	No new action steps were added. Several previously new action steps were kept and revised to be ongoing.
Hazard XI - Technological (Hazardous and Radiological)	This is a new hazard and action steps that may be applicable have been cross-referenced.
Hazard XII – Pandemic / Emergent Infectious Disease	This is a new hazard and action steps that may be applicable have been cross-referenced.
III. Mitigation Action Step List	This section was revised to include all action steps and associated hazards in one table. The table is organized by Goal and Objective. New action steps were added based on committee recommendations. A second table was added for Action Steps that were completed and no longer necessary, and they are summarized by hazard type. A third table was added for Action Steps that were deleted either because they were not relevant, no longer a priority, or needed substantial edits.

SECTION I – INTRODUCTION TO MITIGATION STRATEGY

A. How Have Priorities Changed Since Plan Last Adopted

The 2018 HMP was revised to reflect hazard events like Hurricane Matthew, Tropical Storm Irma, the Zika Virus in Florida and major wildfires in the Great Smokey Mountains in Gatlinburg, Tennessee that had occurred since the 2013 Plan update. Similarly, this 2024 HMP iteration has been updated to include the following natural hazards that have occurred between 2018 and 2024; see table below. Nothing of significance has occurred for other hazards or for floods that were not a named storm.

Hazard	Year	Federal & Emergency Declaration	Declaration Number
Hurricane Dorian	2019	Yes, named as a flood event by NOAA	See footnote A
COVID-19 Pandemic	2020	Yes-Presidential Declaration	FEMA-DR-4501
Hurricane Elsa	2021	Yes, named as a flood event by NOAA	See footnote A
Hurricane Idalia	2023	Yes, named as a flood event by NOAA	See footnote A
Hurricane Debby	2024	See footnote B	See footnote A
Hurricane Helene	2024 (October)	See footnote B	See footnote A

A/Due to Hurricane Helene's impacts on Asheville, NC, the NOAA data housed at https://www.ncdc.noaa.gov/stormevents/ cannot be accessed and therefore the Declaration Number cannot be accessed at this time. Once the NOAA data becomes available online, this Plan will be updated accordingly.
B/These storms occurred in 2024 and are in the process of being declared.

In addition to these natural hazard events, the recent studies and research on sea level rise caused this hazard to come on the radar for the McIntosh County as it touches the Atlantic Ocean. Recent storm event data shows that the frequency of hailstorm and windstorm events are increasing; however, this is partially attributed to better data collection, reporting, and accuracy of these types of events.

B. Capability Assessment

A capability assessment helps to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. As in any planning process, it is important to try to establish which goals, objectives, and/or actions are feasible based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps to determine which mitigation actions are practical, and likely to be implemented over time, given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A capability assessment has two primary components: 1) an inventory of a local

jurisdiction's relevant plans, ordinances, or programs already in place and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts. The Capability Assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy portion of the Pre-Disaster Hazard Mitigation Plan. It not only helps establish the goals and objectives for the County to pursue under this Plan, but it also ensures that those goals and objectives are realistically achievable under given local conditions.

A list of plans, ordinances, and programs currently in place include:

- 2024 Joint Hazard Mitigation Plan for McIntosh County and City of Darien (i.e., this Plan)
- 2024 Language Access Plan
- 2023 Joint Comprehensive Plan of McIntosh Count and City of Darien
- 2022 Regional Plan of Coastal Georgia
- 2019 Disaster Recovery and Redevelopment Plan (DRRP)
- 2019 – 2024 State of Georgia Hazard Mitigation Strategy
- 2018 Community Wildfire Protection Plan (in the process of being updated by the Georgia Forestry Commission)
- 2013 Local Emergency Operations Plan
- Floodplain Management Program (County and City); the County currently participates in the NFIP Community Rating System (CRS) program and the City is in the process of applying to be a CRS community
- Watershed Management Plan (City of Darien)
- Water Conservation Plan (City of Darien)
- Water Resources Protection Ordinance (City of Darien)
- Evacuation Plan (State of Georgia Evacuation Plan, GEMA)
- FEMA Flood Insurance Study (through flood insurance maps)
- Capital Improvement Plan (McIntosh County; SPLOST schedule is used as the CIP)
- Economic Development Plan (Unified Economic Development Plan [UEDP])
- Historic Preservation Ordinance (Ordinance – Chapter 24)
- Zoning Ordinance (Ordinance – Appendix C)
- Subdivision Ordinance (Ordinance – Appendix B)
- Land Development Code
- Building Code

- Flood Damage Prevention Ordinance (City of Darien's is in Water Resources Protection Ordinance, and McIntosh County's is in its Building Code Chapter)

The County does not have a specific Flood Mitigation Assistance Plan nor a Flood Insurance Plan.

Relevant sections of the plans, codes, ordinances, and studies were reviewed by the HMPUC and/or the Executive Committee to determine the ability of the County and City to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. This review helped to identify new action steps and shifts in prioritization since the HMP was last updated as well as determine recent accomplishments, activities, and trends.

Information from the 2024 HMP Update will be incorporated into the plans above during their respective future updates and information from these plans, where appropriate, has similarly been used in this HMP update and/or to make informed decisions. For example:

- The final 2018 HMP Update was available on the County's website for review during the 2023 comprehensive plan update process, so the information was available for incorporation into the Joint County and City Comprehensive Plan.
- Multiple members of the HMPUC also helped to update the Comprehensive Plan, so they were able to include ideas, information, and outcomes developed during the planning process for the 2024 HMP Update.
- For the 2023 McIntosh County Comprehensive Plan, HMPUC members served on the Steering Committee and Stakeholder Committee. In the 2023 Comprehensive Plan, there is a chapter on Coastal Vulnerability and Resilience; a section about vulnerable populations; and a section about which were items added to and discussed within the 2018 HMP Update. This new chapter was a recommendation of the 2017 Regional Plan of Coastal Georgia, to promote integrating hazard mitigation into updates to the local comprehensive plans.
- A Disaster Recovery and Redevelopment Plan (DRRP) was developed for McIntosh County in 2019 and the 2018 Comprehensive Plans were available for review to incorporate in the DRRP. When the DRRP is updated, the 2023 Joint Comprehensive Plan will be available.
- In a few instances, for multi-jurisdictional items, the McIntosh County EMA Director will also coordinate with the appropriate City agency personnel in order to execute multi-jurisdictional steps. The EMA Director will also coordinate the midpoint evaluation meeting in 2027 with HMPUC members from both McIntosh County and the City of Darien to ensure steps are being taken by each jurisdiction to implement the HMP Update and associated mitigation action steps.

C. Community Mitigation Goals

Coastal Erosion

The McIntosh County HMPUC developed the goal of reducing the threat of riverine and coastal erosion in McIntosh County and City of Darien to minimize losses to structures and existing land. Storm events create the tidal surge, winds, and heavy rainfall that erode the land supporting roads, bridges and structures in the county.

Coastal Storm/Hurricane

Coastal storms, including hurricanes, can cause significant damage in McIntosh County and City of Darien through the impact of heavy rainfall, coastal erosion, storm surge, flooding, high winds, and even tornadoes. Exposure to coastal storms and hurricanes impact all essential critical and other critical facilities, structures, and populations in McIntosh County and City of Darien. Specific mitigation measures identified by the HMPUC are designed to lessen the effects of flooding and wind damage in the future, as well as address evacuation procedures, educate the public on storm preparation measures, and enhance the ability of local governments to recover quickly from a catastrophic event.

Drought

Drought conditions can negatively impact the local economy by affecting the seafood and agricultural industry. Potential drought losses are calculated on the value of agriculture in the county. According to data maintained by Georgia DNR, Coastal Resources Division, the market value of production in seafood harvesting represents more than $5 million annually.

The greatest threat posed by drought conditions for the County is the potential for wildfires. Forest fires are generally the result of dry conditions combined with lightning or human carelessness. Much of the county is made up of forest and woodlands. The McIntosh County Joint Hazard Mitigation Plan Update Committee remains concerned about the correlation between drought conditions and the threat of wildfire. Another threat is to shallow private wells for some County residents. Therefore, an additional goal is to conserve water to protect these private water supplies during periods of drought.

Extreme Heat

The most vulnerable individuals to extreme heat are the very old and the young, as well as low-wealth and housing insecure individuals. Older adults, young children, and those who are sick or overweight are also impacted. The present economic conditions have resulted in more people leaving their air conditioners off to save money. The vulnerability of the low-income population segment is a concern for emergency medical and law enforcement personnel. The committee determined that extreme heat events may potentially impact 20% of the residential population in McIntosh County and 37% in the City of Darien.

Flood

Flooding has caused considerable damage in McIntosh County and City of Darien in the past 200 years. Flooding issues can be the result of many types of hazard events, including heavy rainfall and storm surge coming from coastal storms, hurricanes and thunderstorms. Adverse impacts may include structural damages, temporary backwater effects in sewers and drainage systems, and unsanitary conditions by deposition of materials during recession. Floods are classified as either coastal or riverine, and McIntosh County is vulnerable to both types. Coastal flooding is typically the result of storm surge from the sea. The storm surge is often coupled with astronomical tides and wind waves. Coastal flooding has the potential to cause severe flooding that not only dampens but destroys exposed structures. The storm surge is often the catalyst behind many of the deaths associated with coastal storms and hurricanes. Riverine flooding occurs from inland water bodies such as streams and rivers. Riverine flooding is often classified based on rate of onset, and is typically slow to build, peak, and recede – often allowing sufficient time for evacuations. Mitigation measures are designed to buttress structures, especially critical facilities, provide for more early warning measures, prepare better evacuation processes, and minimize the potential for water contamination.

Hailstorm

Hazard frequency data indicates that storm events that include hailstorms are increasing in occurrence. The community has reported damages to property; however, no crop damage has been reported. The committee developed mitigation measures aimed at public information and awareness measures.

Tornado

The potential for injury, loss of life, and property damage caused by a tornado event in McIntosh County and City of Darien is great. The threat of a tornado event can come from many of the other hazard events that impact the county, including hurricanes and thunderstorms. The two tornado events occurring in 2008 and 2009 in McIntosh County resulted in more than $12.5 million in property damage. The McIntosh County Emergency Management Agency has implemented the CodeRED Alert System and opened a new Emergency Operations Center. The Wiregrass 911 system also became operational. These successful endeavors facilitated the implementation of a CodeRED Weather Warning system, which delivers severe weather warnings affecting the area to telephones within seconds after being issued by the National Weather Service. It is important to still conduct a campaign to encourage all residents to use this system. The mitigation goals intend to educate the community on safety practices during an event, particularly to shelter in place, provide for quick public service response time, and buttress structures, especially critical facilities.

Wildfire

Potential wildfire situations are an extreme threat in McIntosh County and City of Darien. Much of the County is forest and woodlands, nearly half of the county is zoned Agriculture/Forestry. Large tracts of timberland are found in the western portion of the county. Recent drought conditions combined with the threat of lightning strikes from thunderstorms have created a serious potential hazard to the life and property of McIntosh County residents. The HMPUC have focused on continuing the previous successful efforts to reduce the impact of drought conditions on wildfire threats. Additional mitigation efforts are focused on public education, support fire rescue and suppression efforts, and develop and implement effective community ordinances and codes.

Windstorm

Historically, thunderstorms pose a great threat to life and property of McIntosh County. Thunderstorm winds occur frequently and have a great chance of affecting the county each year. Thunderstorm events pose the additional threat of lightning strikes, a wildfire danger. Specific mitigation measures identified by the HMPUC are designed to lessen the effects of wind damage in the future, as well as educate the public on storm preparation measures, and enhance the ability of local governments to recover quickly from a catastrophic event.

Mosquito Control

The mosquito hazard does not impact value of structures, but rather impacts people and the county and city budgets. Mosquito control activities are important to the public health, and responsibility for carrying out these programs rests with local governments. Because of the cost, it is important to emphasize public education and preventative measures.

Technological (Hazardous and Radiological)

This is a new hazard and action steps that may be applicable have been cross-referenced.

Pandemic / Emergent Infectious Disease

This is a new hazard and action steps that may be applicable have been cross-referenced.

D. Identification & Analysis of Range of Mitigation Options

a. Structural and Non-Structural Mitigation

Coastal Erosion

The HMPUC identified non-structural mitigation measures to ensure that the community adequately addresses relevant erosion issues, including adopting the new state model ordinance for erosion and sediment control and reviewing land use planning.

Coastal Storm/Hurricane

The HMPUC identified the full range of mitigation options, both structural and non-structural mitigation measures, to ensure that the community adequately addresses relevant coastal storm and hurricane issues. Structural actions include property protection measures retrofitting critical facilities to withstand storm winds and flooding and building stormwater retention facilities. Several non-structural measures were identified, including assessing stormwater runoff issues, participating in FEMA NFIP's Community Rating System, updating ordinances, expanding public education, protecting natural resources, and enhancing the ability of emergency services to respond to events.

Drought & Wildfire

One of the primary concerns with droughts was potentially destructive effects of drought-inflicted wildfires, so the mitigation measures are summarized together for these two hazards in this section.

The HMPUC identified structural and non-structural mitigation measures to reduce the threat of a wildfire event. Non-structural measures include better training and equipment as well as public education efforts. There is interest in expanding the FireWise Community Initiative. Structural measures propose adding or upgrading fire stations in underserved areas, such as Shellman and Sapelo Island, as well as adding more dry hydrants.

Extreme Heat

The HMPUC identified non-structural mitigation options to ensure that the community adequately addresses relevant extreme heat issues. Several non-structural measures were identified, including assessing the locations of vulnerable populations, supporting public education initiatives and developing a plan to identify shelters for vulnerable populations.

Flood

The HMPUC identified the full range of mitigation options, both structural and non-structural mitigation measures, to ensure that the community adequately addresses relevant flooding issues. Structural actions include property protection measures retrofitting critical facilities to withstand storm surges and

flooding and building stormwater retention facilities. Several non-structural measures were identified, including assessing stormwater runoff issues, updating ordinances, participating in FEMA NFIP's Community Rating System, expanding public education, protecting natural resources, and enhancing the ability of emergency services to respond to events.

Hailstorm

The HMPUC identified non-structural mitigation measures to ensure that the community addresses relevant hailstorm issues, focused on increasing public education safety measures.

Tornado

The HMPUC identified the full range of mitigation options, both structural and non-structural mitigation measures, to ensure that the community adequately addresses tornado issues. Structural actions include property protection measures retrofitting critical facilities to withstand strong winds. Several non-structural measures were identified including implementing a campaign for all residents to sign up for the CodeRED System and increasing the public education safety measures.

Windstorm

The HMPUC identified the full range of mitigation options, both structural and non-structural mitigation measures, to ensure that the community adequately addresses relevant wind storm issues. Structural actions include property protection measures retrofitting critical facilities to withstand storm winds. Non-structural measures include increasing the public education safety measures

Mosquito Control

The HMPUC identified non-structural mitigation measures to ensure that the community addresses this localized issue. The committee feels that public education and preventative measures, including improving stormwater management and ditch maintenance in the County will help to alleviate the problems and perhaps control costs.

Technological (Hazardous and Radiological)

This is a new hazard and mitigation measures that may be applicable have been cross-referenced.

Pandemic / Emergent Infectious Disease

This is a new hazard and mitigation measures that may be applicable have been cross-referenced.

b. *Existing Policies, Regulations, Ordinances, and Land Use*

Coastal Erosion

Current land use policies and building codes have been reviewed and erosion and sedimentation control statutes have been enacted. The committee recommends continued enforcement and further study into stormwater assessments. Both the City and County follow the state's 25-ft buffer rule.

Coastal Storm/Hurricane & Flood

These two hazards were related, so they were combined for this section. Current land use policies and building codes have been reviewed and measures have been implemented. FEMA Firm maps were mostly recently updated in August 2018 for McIntosh County using enhanced LIDAR technology and a refined model. The updated mapping and modeling is expected to yield more valuable elevation data for many of the proposed measures, including the flood hazard analysis. The new flood maps have been adopted by McIntosh County which contributes to McIntosh County's continued compliance with the NFIP requirements to participate in the FEMA's map modernization initiative. The maps will allow the County and the City to better identify floodplains and to regulate new construction in Special Flood Hazard Areas. Since the 2018 HMP update, McIntosh County has applied and now participates in the NFIP's Community Rating System and the City of Darien has applied to participate in the CRS program. The proposed measures correlate with those strategies published in the 2023 Joint Comprehensive Plan.

Drought

Suggested measures may result in modifications to current policies and the implementation of local ordinances to ensure suggested mitigation measures are initiated.

Extreme Heat

There are no specific regulations, ordinances, or land uses tied to extreme heat. Some policies in place include pre-season public information campaigns for extreme heat, including public education and distribution of brochures. The Division of Family and Children Services (DFCS) also distributes fans to those in need of special assistance during extreme heat conditions. The HMPUC is interested in expanding the public education program and providing additional support for programs to help those in need of special assistance, such as a "Helping Your Neighbors" program.

Hailstorm

Current land use policies and building codes have been reviewed. Recommendations can be made for roofing materials that do not require changes

to the building code.

Tornado

Current land use policies and building codes have been reviewed and several measures implemented. Further accomplishments include increasing the public awareness of storm safety procedures and implementing more effective tornado drills in the school system.

Wildfire

Current land use policies and building codes have been reviewed and several measures implemented. The Community Wildfire Protection Plan has been created which helps to address issues at the Wildland-Urban Interface. The HMPUC is interested in expanding the FireWise Community Initiative to further engage builders and planners.

Windstorm

Current land use policies and building codes have been reviewed and several measures implemented. A Public Awareness Campaign educated the community on the Project Impact Weather Radio Stations and safety procedures to follow during storm events.

Mosquito Control

There are no specific regulations, ordinances, or land uses tied directly to mosquito control. Some policies in place include public education events on mosquito source reduction techniques, and there is a mosquito fish stocking program. The HMPUC is interested in expanding the public education program, reinstituting the tire round-up events across the County and City, and developing a prevention and response plan to vector-borne diseases. Both the City and County could review ordinances and enhance code enforcement regarding property maintenance, as unattended items may become sources for standing water.

c. Community Values, Historic, and Special Considerations (STAPLEE)

Coastal Erosion

The proposed strategies hold no inherent risk for historic or special considerations in the community. These strategies will contribute to the community's sense of place as a coastal community and uphold the values expressed in the Comprehensive Plan Partial Updates for the city and the county; therefore, support is strong for the enactment of these measures. The STAPLEE criteria worksheet scores well for the erosion action steps. All other considerations apply affirmatively as many mitigation steps have been identified in the recently updated Partial Comprehensive Plan.

Coastal Storm/Hurricane

The proposed strategies hold no inherent risk for historic or special considerations in the community, but they do take into consideration the needs and location of vulnerable populations. The STAPLEE criteria worksheet scores well for the coastal storm and hurricane action steps. Shortcomings exist for the Technical section under the feasibility consideration; the Administrative section under the funding consideration; and Economic section for the costs of actions and outside funding will be required considerations. The Social, Political, Legal, and Environmental considerations are affirmative as many mitigation steps have been identified in the Comprehensive Plan Partial Updates for both McIntosh County and the City of Darien.

Drought

The proposed strategies hold no inherent risk for historic or special considerations in the community, but they do take into consideration the needs and location of vulnerable populations. STAPLEE criteria scores well for all measures. Local governments now have guidance from the state in the Coastal Regional Water Plan, so the Legal section is no longer a shortcoming.

Extreme Heat

Community values are reflected in the proposed measures. McIntosh County residents are quick to help needy neighbors and respond to emergency events. The STAPLEE criteria worksheet scores well for the extreme heat action steps.

Flood

Community values are reflected in the proposed measures. The coastal environment provides a sense of place, recreation, and a quality of life to McIntosh County residents. The proposed measures are intended to balance the natural ability of the environment to absorb flood waters with the safety measures needed to protect life and property. Special considerations include reinforcing critical facilities and those facilities that may lead to possible water contamination sources after floodwaters recede. The STAPLEE criteria worksheet scores well for the flooding action steps. Shortcomings exist for the Technical section under the feasibility consideration; the Administrative section under the funding consideration; and Economic section for the costs of actions and outside funding will be required considerations. The Social, Political, Legal, and Environmental considerations are affirmative as many mitigation steps have been identified in the recent Comprehensive Plan Partial Update.

Hailstorm; Tornado; Windstorm

These three hazards shared common goals and objectives and had many similar action steps. Community values are reflected in the proposed measures, as reflected in concerns expressed in Comprehensive Plan Partial Updates for both

McIntosh County and the City of Darien. Special considerations include reinforcing critical facilities, enhancing notification prior to an event, and providing for critical operations after an event. The STAPLEE criteria worksheet scores well for these action steps. Shortcomings exist for the Technical section under the feasibility consideration; the Administrative section under the funding consideration; and Economic section for the costs of actions and outside funding will be required considerations. The Social, Political, Legal, and Environmental considerations are affirmative as many mitigation steps have been identified in the Comprehensive Plans.

Wildfire

Community values are reflected in the proposed measures to keep the natural and rural feel of the County. The STAPLEE criteria worksheet scores well for the wildfire prevention action steps. Shortcomings exist for the Administrative section under the funding consideration; and Economic section for the costs of actions and outside funding will be required considerations. The Technical, Social, Political, Legal, and Environmental considerations are affirmative as many mitigation steps have been identified in the Comprehensive Plan Partial Updates for both McIntosh County and the City of Darien.

Mosquito Control

Community values are reflected in the proposed measures to control costs and protect residents from vector-borne diseases and lessen the environmental impacts of pesticide agents. The STAPLEE criteria worksheet scores well for the mosquito control action steps. Shortcomings exist under the Administrative section under the funding consideration.

d. Prioritization of Actions

To evaluate action step priorities, committee members used a planning tool prepared by FEMA known as STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria as a guide. Each mitigation strategy step was evaluated using STAPLEE criteria as the guiding principle to identify those steps best for McIntosh County and City of Darien. The STAPLEE criteria has 23 items, such as "benefit of action" and "cost of action" under the Economic criteria. Action steps were ranked as high priority, medium priority, or low priority based on the results of the STAPLEE. The HMPUC did not assign any of the action items as low priority. Past occurrences of disasters and historical trend data aided committee members in assigning priorities. The ranking is listed next each action step in Section III. General descriptions are provided above, and the detailed STAPLEE worksheet results are located in Appendix D.

E. Introduction to the Action Plan

The McIntosh County HMPUC analyzed the updated risk assessment data, and reviewed the implementation status of the 2018 goals, objectives and mitigation strategies. This update confirmed that McIntosh County experiences the greatest amount of damage from: (1) hazard events that create flooding issues, causing property damage, erosion, and water contamination, (2) hazard events that create high winds, causing destruction of property, and (3) hazard events that create wildfire issues. Committee members also chose to continue to address the other following natural hazards: (1) extreme heat, (2) drought, (3) hailstorms, and (4) mosquito control.

Goals and objective statements have been changed from the 2018 Plan to reflect the shift in focus to the updated hazards list and enhanced mitigation strategies. Unincorporated McIntosh County and the City of Darien have implemented many of the previously identified mitigation strategies. Additional mitigation actions have been added that contain those steps still felt to be relevant from the previously approved plan and new steps have been taken to create a safer community for all McIntosh County residents. The new strategies reflect the committee's concern for reinforcing critical facilities to withstand storm events, educating the community about protecting their families and property, and ensuring that the community can react, respond, and recover quickly from a disaster. The following goals and objectives are representative of what each jurisdiction wishes to accomplish.

THE GOALS AND OBJECTIVES DEVELOPED BY THE MCINTOSH COUNTY JOINT HMPUC ARE AS FOLLOWS:

Goal 1: *Minimize losses to existing and future structures, especially critical facilities, caused by flooding from coastal storms, hurricanes and excessive rainfall.*

Goal 2: *Minimize losses to existing and future structures, especially critical facilities, caused by strong winds and hail from coastal storms, hurricanes, tornadoes, windstorms, and hailstorms.*

Goal 3: *Minimize damage to structures and forests caused by wildfire, including during periods of drought, and technological hazards.*

Goal 4: *Minimize losses to structures and existing land caused by coastal erosion and erosion from coastal storms, hurricanes, and flood events.*

Goal 5: *Protect health and safety of residents in McIntosh County and City of Darien*

Objective 5.1: Protect life and health of residents before and after coastal storm and hurricane events.

Objective 5.2: Protect life and health of residents from force of tornadoes, hailstorms, and windstorms.

Objective 5.3: Reduce the threat of water contamination caused by contaminated wells and septic systems.

Objective 5.4: Reduce the risk of mosquito-borne illnesses and pandemics / emergent infectious diseases.

Objective 5.5: Protect residents, especially vulnerable populations, from the effects of extreme heat.

Objective 5.6: Conserve water during periods of drought to maintain supply.

Objective 5.7: Protect life and health of residents from threat of wildfire.

Objective 5.8: Minimize loss of life and property and other economic losses in McIntosh County and City of Darien due to Technological hazards (hazardous materials and radiological threats) and severe Pandemic Emergencies and Emergent Infectious Diseases. Note: Because these are manmade and not natural disasters (and therefore ineligible for FEMA funding), hazard mitigation strategies specific for these disasters are not included in the HMP.

SUMMARY OF NUMBERS OF ACTION STEPS BY GOAL AND OBJECTIVE, AND STATUS OF STEPS

Goal # (Objective)	Number of Action Steps	New	Ongoing	Deferred
1	19	2	16	1
2	3	0	2	1
3	14	3	11	0
4	3	1	1	1
5.1	8	0	8	0
5.2	11	4	6	1
5.3	10	0	10	0
5.4	6	0	6	0
5.5	8	0	7	1
5.6	3	0	3	0
5.7	2	0	2	0
Total	**87**	**10**	**72**	**5**

Goals, objectives and action steps detailed in this Plan are applicable to and will be implemented within all jurisdictions participating in this plan. Some action steps vary between jurisdictions. Section III identifies the completed and deleted mitigation actions in a separate table. Deferred action steps are noted in the Mitigation Action Step List. These are all listed to benchmark progress. If activities are deferred, an explanation will be provided describing the reasons for including the steps in the update. The committee chose to delete non-natural hazards from this update because they were no longer required for this planning process.

Local Public Information and Awareness Strategy

The HMPUC incorporates several methods of public information and awareness strategies regarding hazard mitigation. Regarding erosion issues, property owners are made aware of potential erosion problems with information given during the building permit process. All public information efforts are aimed at keeping the citizens of McIntosh County fully engaged in the implementation and periodic maintenance of this mitigation plan. A kick-off informational meeting was held to provide a general introduction of the planning process to the public. A public hearing was held. Information and awareness strategies for keeping residents informed include the distribution of informational brochures or pamphlets and posting of information to City and County websites and social media.

As funding is questionable in these times of tight government budgets and economic uncertainty, unconventional means should be identified whereby the need for funding can be reduced or eliminated. Local public information efforts provide many methods to reach a larger audience with effective strategies at little cost. Many publications are

available for free or can be made available via the county and/or agency websites. All public information efforts are aimed at keeping the citizens of McIntosh County fully engaged in the implementation and periodic maintenance of this mitigation plan. Many of these education and awareness tools are multi-hazard in nature and include the following: implementing a countywide crisis alert or notification system, distribution of informational brochures or pamphlets, and public and private sector briefings through newspaper articles and bulletins concerning general natural hazard dangers.

SECTION II – NATURAL HAZARDS

This section describes the Mitigation Goals and Objectives that are applicable to each natural hazard.

Natural Hazard I – Coastal Erosion

Mitigation Strategy for Coastal and Riverine Erosion –

Mitigation Goal #4:

Minimize losses to structures and existing land caused by coastal erosion and erosion from coastal storms, hurricanes, and flood events.

Natural Hazard II – Coastal Storm/Hurricane

Mitigation Strategy for Coastal Storms –

Mitigation Goal #1:

Minimize losses to existing and future structures, especially critical facilities, caused by flooding from coastal storms, flooding from excessive rainfall.

Mitigation Goal #2:

Minimize losses to existing and future structures, especially critical facilities, caused by strong winds and hail from coastal storms, hurricanes, tornadoes, windstorms, and hailstorms.

Mitigation Goal #4:

Minimize losses to structures and existing land caused by coastal erosion and erosion from coastal storms, hurricanes, and flood events.

Mitigation Goal #5, Objective #1:

Protect health and safety of residents in McIntosh County and City of Darien; protect life and health of residents before and after coastal storm and hurricane events.

Natural Hazard III – Drought

Mitigation Strategy for Drought -

Mitigation Goal #3:

Minimize damage to structures and forests caused by wildfire, including during periods of drought.

Mitigation Goal #5, Objective #6:
Protect health and safety of residents in McIntosh County and City of Darien; Conserve water during periods of drought to maintain supply.

Natural Hazard IV – Extreme Heat

Mitigation Strategy for Extreme Heat –

Mitigation Goal #5, Objective #5:
Protect health and safety of residents in McIntosh County and City of Darien; Protect residents, especially vulnerable populations, from the effects of extreme heat

Natural Hazard V – Flood

Mitigation Strategy for Flooding –

Mitigation Goal #1:
Minimize losses to existing and future structures, especially critical facilities, caused by flooding from coastal storms, flooding from excessive rainfall.

Mitigation Goal #4:
Minimize losses to structures and existing land caused by coastal erosion and erosion from coastal storms, hurricanes, and flood events.

Mitigation Goal #5, Objective #3:
Protect health and safety of residents in McIntosh County and City of Darien; Reduce the threat of water contamination caused by contaminated wells and septic systems.

Natural Hazard VI – Hailstorm

Mitigation Strategy for Hailstorms –

Mitigation Goal #2:
Minimize losses to existing and future structures, especially critical facilities, caused by strong winds and hail from coastal storms, hurricanes, tornadoes, windstorms, and hailstorms.

Mitigation Goal #5, Objective #2:
Protect health and safety of residents in McIntosh County and City of Darien; Protect life and health of residents from force of tornadoes, hailstorms, and windstorms.

Natural Hazard VII – Tornado

Mitigation Strategy for Tornadoes –

Mitigation Goal #2:

Minimize losses to existing and future structures, especially critical facilities, caused by strong winds and hail from coastal storms, hurricanes, tornadoes, windstorms, and hailstorms.

Mitigation Goal #5, Objective #2:

Protect health and safety of residents in McIntosh County and City of Darien; Protect life and health of residents from force of tornadoes, hailstorms, and windstorms.

Natural Hazard VIII – Wildfire

Mitigation Strategy for Wildfires-

Mitigation Goal #3:

Minimize damage to structures and forests caused by wildfire, including during periods of drought.

Mitigation Goal #5, Objective #7:

Protect health and safety of residents in McIntosh County and City of Darien; Protect life and health of residents from threat of wildfire.

Natural Hazard IX – Windstorm

Mitigation Strategy for Windstorms -

Mitigation Goal #2:

Minimize losses to existing and future structures, especially critical facilities, caused by strong winds and hail from coastal storms, hurricanes, tornadoes, windstorms, and hailstorms.

Mitigation Goal #5, Objective #2:

Protect health and safety of residents in McIntosh County and City of Darien; Protect life and health of residents from force of tornadoes, hailstorms, and windstorms.

Natural Hazard X – Mosquito Control

Mitigation Strategy for Mosquito Control –

Mitigation Goal #5, Objective #4:

Protect health and safety of residents in McIntosh County and City of Darien; Reduce the risk of mosquito-borne illnesses.

SECTION III – MITIGATION ACTION STEP LIST

The mitigation action step list is presented in the table below. It is organized by Goal and Objective. The action steps are prioritized as "Medium" or "High" based on the results of the STAPLEE criteria worksheet. As a note, none of the action items were determined to be low priority. The table includes the status as "New," "Ongoing," or "Deferred." Other information includes: Responsible Agency, Anticipated Cost, Funding Sources, Jurisdiction, Timeframe, and Notes. The funding source for many of these action steps is through the "General Fund" which is the City's or County's primary operating fund. A few other funding sources include SPLOST (Special Purpose Local Option Sales Tax) and grants. Additionally, additional funding may be available or prioritized more because McIntosh County and the City of Darien have been designated as Community Disaster Resiliency Zone (CDRZ) communities (see footnote (b) in the Table below). Since many of the action steps are internal activities led by City and County staff, the Anticipated Cost is listed as "Staff Time." An approximate cost was listed when available, but in many cases, the cost was listed as "Variable" due to the uncertainty with the scale of the project that can be undertaken during the current planning period. The scale of the project will depend on availability of funding. Most action steps apply to both McIntosh County and the City of Darien. "County and City Administration" under Responsible Agency refers specifically to the County and City Managers and additional staff that they deem appropriate. Lastly, the "Notes" column describes why action steps were deferred as well as recent activities and future plans.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Previous Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #1: MINIMIZE LOSSES TO EXISTING AND FUTURE STRUCTURES, ESPECIALLY CRITICAL FACILITIES, CAUSED BY FLOODING FROM COASTAL STORMS, HURRICANES, AND FLOODING FROM EXCESSIVE RAINFALL. **HAZARDS: COASTAL STORM/HURRICANE & FLOOD[A]**										
1.1	Seek funding to construct stormwater retention facilities and improve storm drain and ditch capacity and conveyance to protect existing and new developments.	Medium	Ongoing (Previously listed as deferred)	County & City Administration	Variable, Depends on Project Scale	General Fund, SPLOST, Grants, FEMA BRIC	Both (City & County)	2025 and ongoing	Funding was not available to conduct. Text was revised and listed as deferred.	Elected to remove from deferred status and list this as an ongoing action step for the 2024 HMP. Text was revised.
1.2	Seek funding to hire engineer (external consultant) to evaluate effectiveness of present drainage systems, conduct watershed planning, study erosion control issues in the county including waterways and tributaries, make retrofit suggestions, and review stormwater management plans.	High	Ongoing (Previously listed as deferred)	County & City Administration	$200,000	General Fund, grants	Both (City & County)	2025 and ongoing	Funding was unavailable to conduct. Deferred. Text was revised.	Elected to remove from deferred status and list this as an ongoing action step for the 2024 HMP. Text was revised. County and City hired a 3rd-party Engineering firm. The County worked on the North Darien drainage ditch and the City conducted a large-scale drainage project (cleaning of main arteries).
1.3	Complete a stormwater drainage study for areas with regular flooding issues (work with Darien City Council's Committee for Drainage) and develop structural stormwater management project list (e.g., installing, re- routing, or increasing the capacity of storm drainage system)	High	Ongoing for County (Completed for the City)	County Administration	$120,000	General Fund, SPLOST, grants, FEMA BRIC	County	2025 and ongoing	Listed as new action in 2018 Plan.	City completed a drainage study in 2021 before they made improvements; listed as completed for the City. County will keep this as an ongoing step as a countywide drainage study has not yet been conducted. (The County did, however, conduct a drainage study at Shellman)
1.4	Identify critical facilities in flood zones and develop a plan to relocate or retrofit these facilities to withstand hazards. (Add these projects to Capital Improvements Plan.)	Medium	Ongoing (Previously listed as deferred)	County & City Administration, MEMA	Staff time, $75,000 for engineer	General Fund,	Both (City & County)	2025 and ongoing	Funding was unavailable to conduct. During Irma Lift Station near Skippers flooded. Deferred.	Elected to remove from deferred status and list this as an ongoing action step for the 2024 HMP. Text was revised.
1.5	Identify bridges and roads in flood zones and develop a plan to retrofit these structures to withstand hazards. (Add these projects to Capital Improvements Plan.)	Medium	Ongoing (Previously listed as deferred)	County & City Administration, MEMA, GDOT	Staff time, $75,000 for engineer	General Fund	Both (City & County)	2025 and ongoing	Funding was unavailable to conduct. State provides info on State Rte. bridges and County Rte. box Culverts	Elected to remove from deferred status and list this as an ongoing action step for the 2024 HMP. Text was revised. County has replaced some pipes on Steel Bridge and working on some engineering at Shellman (storm surge).
1.6	For future expansions to water and wastewater treatment plants, ensure that they are retrofitted to withstand flood hazard, as well as the collection and distribution systems	High	Deferred	County & City Administration, MEMA, Georgia EPD	Variable, Depends on Project Scale	General Fund, SPLOST, grants	Both (City & County)	2025 - 2026	No upgrades occurred at County level, and none planned for Foreseeable future, but keep in case if upgrades occur.	No upgrades are currently planned currently and/or for the foreseeable future. This will remain as an action step but deferred in case upgrades were to occur.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Previous Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
1.7	Update Water Resources Protection Ordinance to recommend use of Coastal Stormwater Supplement or 2016 Edition of the Georgia Stormwater Management Manual.	High	Ongoing for County (Completed for the City)	County & City Administration	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	City updated Water Resources Protection Ordinance w/this reference, and adopted a stormwater utility in 2022. County will keep this as an ongoing task.
1.8	Incorporate information about flood zones and risks into future land use planning and zoning determination.	High	Ongoing / Completed	County & City Administration	Staff time, $30,000	General Fund	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	Information was included in the 2023 Joint Comprehensive Plan (completed). Listed as ongoing in order to inform future plan updates and other relevant planning endeavors.
1.9	Participate in FEMA's NFIP Community Rating System	High	Ongoing / Completed	County & City Administration	Staff time, $90,000	General Fund, Grants	County	2025 and ongoing	Listed as new action in 2018 Plan.	County is part of FEMA's CRS Program (Class VII) and City has submitted an application. Listed as ongoing b/c the County and City will need to continue adhering to NFIP CRS Program requirements to maintain status.
1.10	Distribute flood protection brochures to the owners of flood-prone property.	High	Ongoing	County & City Administration	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	Listed as ongoing as this action step should be repeated to ensure education efforts are widespread.
1.11	Educate property owners regarding options for mitigating their properties from flooding through outreach activities	Medium	Ongoing	Environmental Health, UGA Extension, MEMA	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	Listed as ongoing as this action step should be repeated to ensure education efforts are widespread.
1.12	Expand public education and brochures on keeping storm drains and ditches clear of debris	High	Ongoing	Environmental Health, UGA Extension, MEMA	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	Listed as ongoing as this action step should be repeated to ensure education efforts are widespread.
1.13	Continue to maintain drainage ditches and cleaning culverts, catch basins, and drainage pipes.	High	Ongoing	County Road Department, City Public Works	Staff time, Variable, Depends on Additional Equipment Needs	General Fund	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	Ongoing task where complaints are addressed as they are received.
1.14	Purchase general heavy equipment and machinery for drainage system maintenance	High	New	County Road Department, City Public Works	Variable, depends on type /quantity of equipment purchased	General Fund; Grants	Both (City & County)	2025 and ongoing	N/A	County purchased a jet vac truck/ trailer (completed, but marked as ongoing as maintenance needs are ongoing and additional general heavy equipment / machine may be needed). City needs general heavy equipment/machine for drainage maintenance
1.15	Explore obtaining easements to access primary ditches for maintenance.	High	Ongoing	County & City Administration	Staff time	General Fund	Both (City & County)	2025 - 2026	Listed as new action in 2018 Plan.	Issue with ditches being on private property for accessibility.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Previous Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
1.16	Continue partnership between City and County to share maintenance equipment (e.g., allow the County to borrow the City's Jet Vac truck for catch basin and drainage pipe maintenance).	High	Ongoing	Public Works Department, County & City Administration	Staff time	General Fund	Both (City & County)	2025 and ongoing	Listed as new action in 2018 Plan.	
1.17	Install at least 10 quick connects on crucial Darien lift stations to allow for generator support during a power outage and on all lift stations if possible.	High	Ongoing	City Administration, Public Works	$80,000	General Fund, Grants	City	2025-2026	Listed as new action in 2018 Plan.	During Irma 33 of 37 lift stations lost power. City has replaced 1 quick connect.
1.18	Continue with floodplain modeling efforts in the County to define base flood elevations for areas classified as "A" Zone	Medium	Ongoing	U.S. Army Corps, Georgia EPD, FEMA, GEMA	Variable, Depends on Project Scale	Federal/ State funding	Both (City & County)	2025-2026	Listed as new action in 2018 Plan.	Flood Maps still contain areas without a defined BFE in the County ("A" Zone)
1.19	Purchase a safety boat to provide emergency services, water patrol, and transportation for island residents	High	New	County & City Administration	Variable, Depends on Project Scale	Federal/ State funding, grants	Both (City & County)	2025 and ongoing	N/A	Discussed at HMPUC Meeting #3 (10/22/24). Committee agreed this would be a useful for safety preparedness and emergency response for various hazards, including flooding, hurricanes, and wildfire among others.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Previous Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
Action #	**Action Step**	**Priority**	**Status**	**Responsible Agency**	**Anticipated Cost**	**Funding Sources[B]**	**Jurisdiction**	**Timeframe**	**Outdated Notes (from 2018 HMP)**	**Updated Notes (for 2024 HMP)**
GOAL #2: MINIMIZE LOSSES TO EXISTING AND FUTURE STRUCTURES, ESPECIALLY CRITICAL FACILITIES, CAUSED BY STRONG WINDS AND HAIL FROM COASTAL STORMS, HURRICANES, TORNADOES, WINDSTORMS, AND HAILSTORMS. **HAZARDS: COASTAL STORM/HURRICANE, HAILSTORM, TORNADO, & WINDSTORM**										
2.1	Seek funds to retrofit public buildings and critical facilities so they are more storm proof (e.g., reinforce windows, roofs, and doors; anchor roof-mounted HVAC units).	High	Ongoing (Previously listed as deferred)	MEMA, HMPUC	Staff time, Variable, Depends on Project Scale	General Fund, grants	Both (City & County)	2025-2026	Funding not available to conduct. Text revised to include public buildings.	Elected to remove from deferred status and list this as an ongoing action step for the 2024 HMP. Text was revised. Elevated HVAC constructed at Sapelo Community Center. Funding not available to storm proof other buildings and facilities.
2.2	Educate public about the different roofing materials and techniques to minimize wind and hail damage (e.g., structural bracing, shutters, laminated glass in window panes, and hail-resistant roof coverings or flashing.)	Medium	Ongoing (Previously listed as deferred)	MEMA, Building Inspector	Staff time, $5,000	General Fund	Both (City & County)	2025-2026	Not completed, but desired to keep.	Still incomplete but desired. Elected to remove from deferred status and list this as an ongoing action step for the 2024 HMP. Text was revised.
2.3	For future expansions to critical facilities, ensure that they are retrofitted to withstand wind hazard.	High	Deferred	County & City Administration, MEMA, Building Inspector	Variable, Depends on Project Scale	General Fund, SPLOST, grants	Both (City & County)	2018-2020	Revised	This remains a desired but deferred action step.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #3: MINIMIZE DAMAGE TO STRUCTURES AND FORESTS CAUSED BY WILDFIRE, INCLUDING DURING PERIODS OF DROUGHT, AND TECHNOLOGICAL HAZARDS. **HAZARDS: WILDFIRE, DROUGHT & TECHNOLOGICAL**										
3.1	Continue to seek funds to install more dry hydrants.	High	Ongoing	County, City, MEMA	$15,000	General Fund, grants	Both (City & County)	2025 and ongoing	Dry hydrants were installed (especially in critical areas), but needs to continue.	Same status as in the 2018 Plan update.
3.2	Continue to seek state and federal grants to acquire additional fire equipment.	Medium	Ongoing	Fire & EMS Departments, MEMA	$300,000	Grants	Both (City & County)	2025 and ongoing	Ongoing process. Recently got a 50/50 grant to get new PPE (personal protective equipment). With SPLOST, purchased 3 fire tankers	Ongoing. No additional updates since 2018 Plan update.
3.3	Continue to seek grants to train firefighters on tactics and equipment.	Medium	Ongoing	Fire & EMS Departments, Georgia Forestry, MEMA	Staff time	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing step. They had some free trainings Offered.	Same status as in the 2018 Plan update.
3.4	Continue to improve wildland fire training at the local fire department level.	Medium	Ongoing	Fire & EMS Departments, Georgia Forestry	$5,000	Grants	Both (City & County)	2025 and ongoing	This is an ongoing step.	Same status as in the 2018 Plan update.
3.5	Investigate implementing impact fees to cover fire service costs associated with new development.	Medium	Ongoing (Formerly listed as Deferred	County Administration, MEMA	Staff time, $15,000	General Fund	County	2025-2026	Do not currently have impact fees but wish to keep this step.	Same status as in the 2018 Plan update.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
3.6	Apply for grant funding to hire a paid fire department.	Medium	New	County, MEMA	Staff time, $10,000 (variable depending on grant complexity)	General fund, grants	County	2025-2026	N/A	This is a new action step.
3.7	Seek grants for HAZMAT Equipment and Training for appropriate staff.	Medium	New	County, City, MEMA	Variable, depends on type of equipment and training scope	General fund, grants	Both (City & County)	2025 and ongoing	N/A	This is a new action step. It is directly applicable for wildfire prevention to prevent potential spread of fires that might be caused by hazardous (flammable) materials/wastes and also applicable for cleanup of spills caused by other hazards.
3.8	Retrofit shelters at Fire Stations for emergency personnel	Medium	New	County, City, MEMA	Variable, depends on level of retrofits	General fund, grants	Both (City & County)	2025 and ongoing	N/A	This is a new action step. Tied into Responder Housing to have better facilities during hazards except hurricanes (when evacuate)
3.9	Support Community Wildfire Protection Plan and implement strategies recommended in the revised Plan.	High	Ongoing	County & City Administration, Georgia Forestry, Fire Department	Staff time	General Fund	Both (City & County)	2025-2025	Listed online as "in progress" and in the 2018 plan as New.	Grant application has been submitted and the Wildfire Plan is in the process of being updated.
3.10	Sponsor a FireWise Community Initiative workshop/event to continue to engage developers, planners, EMS, and government officials within the county about FireWise concepts to protect new buildings and infrastructure.	High	Ongoing (Formerly listed as Deferred	County & City Administration, Georgia Forestry, MEMA, Fire & EMS Departments	Staff time, $10,000	General Fund, grants	Both (City & County)	2025 and ongoing	Belvedere Island Plantation is one (Townsend)	Sapelo Island has been designated as a Firewise community. This is an ongoing action step for rest of County/City.
3.11	Plan and develop building and zoning requirements for an urban interface to protect new buildings and infrastructure.	High	Ongoing	County & City Administration, Georgia Forestry, MEMA	Staff time	General Fund	Both (City & County)	2025 and ongoing	Belvedere Island Plantation is a FireWise Community (Townsend)	County has completed some of the zoning portions but not building requirements. City is about to have overhaul of zoning.
3.12	Seek funding for more public awareness events	Medium	Ongoing	MEMA, Georgia Forestry	Staff time, $15,000	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing activity	Same status as in the 2018 Plan update.
3.13	Work with 4-H to provide public awareness opportunities	High	Ongoing	MEMA, UGA Extension, Georgia Forestry	Staff time, $10,000	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing activity.	Same status as in the 2018 Plan update.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
3.14	Broadcast public education videos on local cable stations	High	Ongoing	MEMA, UGA Extension	Staff time, $10,000	General Fund, grants	Both (City & County)	2018 and ongoing	This is an ongoing activity.	Same status as in the 2018 Plan update.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #4: MINIMIZE LOSSES TO STRUCTURES AND EXISTING LAND CAUSED BY COASTAL EROSION AND EROSION FROM COASTAL STORMS, HURRICANES, AND FLOOD EVENTS. **HAZARDS: COASTAL EROSION, COASTAL STORM/HURRICANE, & FLOOD**										
4.1	Evaluate the County's and City's land use pattern as reflected in their Comprehensive Plans and encourage consistency with riparian buffer protection using Best Management Practices (BMPs), and similar measures.	Medium	Ongoing	County & City Administration	Staff time, $15,000	General Fund	Both (City & County)	2025 and ongoing	Completed through updated ordinances being consistent with comp. plans, but this action step should keep going.	Same status as in the 2018 Plan update.
4.2	Update ordinance to adopt the new (2016) state model ordinance – "Model Soil Erosion, Sedimentation, and Pollution Control Ordinance."	Medium	Deferred	County Administration	Staff time, $5,000	General Fund	County	2025 and ongoing	Listed as new.	County has not adopted an Ordinance. Not a requirement because the County is not a local issuing authority (LIA). City was previously an LIA but is no longer and does not plan to re-apply for program authority at this time. Both County and City wish to keep this listed as deferred.
4.3	Develop and implement an erosion management plan.	Medium	New	County, City, MEMA	Staff time, $10,000	General Fund	Both (City & County)	2025 and ongoing	N/A	Objective is to identify critical areas in need of stabilization.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #1: PROTECT LIFE AND HEALTH OF RESIDENTS BEFORE AND AFTER COASTAL STORM AND HURRICANE EVENTS.** **HAZARDS: COASTAL STORM/HURRICANE**										
5.1.1	Provide more Storm Preparedness information to community through City/County website, brochures, and outreach events (e.g., evacuation procedures, emergency kits, securing debris and personal Items).	High	Ongoing	MEMA, HMPUC, UGA Extension, Health Department	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing activity. They distribute brochures, but details were enhanced	Same status as in the 2018 Plan update.
5.1.2	Conduct campaign to encourage all residents to sign up for CodeRED system (to receive information about storms and other natural hazards; power outages, water advisories and other emergency-related information).	High	Ongoing	MEMA, 911 Director	Staff time, $5,000	General Fund, GEMA, grants	Both (City & County)	2025 and ongoing	Listed as a new action step.	New for 2018; now listed as ongoing. This has been completed but listed as ongoing to keep it as an action step. The County actively promotes CodeRED through County/City platforms (social media, websites, etc.) and assists Citizens with sign-up help if needed. Citizens can opt to receive messages from CodeRED in English or Spanish. County proactively sends out information before hurricane season starts.
5.1.3	For residents without transportation, develop a new plan for evacuation and communicate it appropriately	High	Ongoing	MEMA, HMPUC	Staff time	General Fund	Both (City & County)	2018	Listed as new. Buses during Hurricane Matthew were not effective, but Irma went smoother	New for 2018; now listed as ongoing.
5.1.4	Educate public about proper disposal of hazardous waste products that have the potential to contaminate water sources after a disaster.	Medium	Ongoing	Environmental Health, UGA Extension, MEMA, Georgia EPD	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Nothing completed, but desired to keep. Listed as deferred.	Previously listed as deferred; now listed as ongoing.
5.1.5	Plan for a coordinated effort after storm events to ensure water supply is safe.	High	Ongoing	MEMA, Environmental Health, HMPUC, Georgia EPD	Staff time	General Fund, grants	Both (City & County)	2025-2026	Not completed, keep as action step. Listed as deferred.	Previously listed as deferred; now listed as ongoing.
5.1.6	Seek funding to install back- up generators at well sites, lift stations, and sewer treatment plant.	High	Ongoing	MEMA, Water Department, County & City Administration	Staff time	General Fund, grants	Both (City & County)	2025-2026	Listed as new.	Previously listed as new; now listed as ongoing. Generators are not AT the facilities, but did add for some county/city facilities.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
5.1.7	Develop post-disaster communication plan (e.g., drinking water availability and safety, and sharing resources).	High	Ongoing	County & City Administration	Staff time	General Fund	Both (City & County)	2025-2025	Things went smoothly during Irma between City & County, but there was some mis-communication with the public. Listed as new.	Previously listed as new; now listed as ongoing.
5.1.8	Coordinate critical needs shelters and logistics ahead of hazards (and emergency declaration by State). This is particularly needed for vulnerable and underserved communities that rely on shelters in times of emergencies.	High	Ongoing	County & City Administration	Staff time	General Fund	Both (City & County)	2018	This was an issue during Irma that could be improved. Listed as new.	Previously listed as new; now listed as ongoing. Recently entered into a contract with Dodge County, Critical Needs Transportation (CNT) shelter

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #2: PROTECT LIFE AND HEALTH OF RESIDENTS FROM FORCE OF HAILSTORMS, TORNADOES, AND WINDSTORMS.** **HAZARDS: HAILSTORM, TORNADO, & WINDSTORM**										
5.2.1	Increase public awareness of Safe Rooms and where to go for tornadoes and hailstorms	High	Ongoing	MEMA	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Not completed, need to know where to go for tornadoes. Listed as deferred.	Previously listed as deferred; now listed as ongoing.
5.2.2	Educate public on tornado awareness and safety tips by posting on City/County website, distributing information to children at schools, and conducting drills at schools.	High	Ongoing	MEMA, 911 Director	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Not completed, need an education system for tornado awareness. Listed as deferred.	Previously listed as deferred; now listed as ongoing.
5.2.3	Educate public on safety procedures to follow during hail events	Medium	Ongoing	MEMA	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Not completed, desired to keep. Listed as deferred.	Previously listed as deferred; now listed as ongoing.
5.2.4	Continue to enhance County's communication equipment with repeaters to enable capacity to notify all public safety staff and add multiple tower sites.	High	Ongoing	MEMA, County Administration	Variable, Depends on Project Scale	General Fund, grants	County	2025-2026	Listed as deferred.	Previously listed as deferred; now listed as ongoing. County has completed some actions have been completed but still need improvements/ongoing
5.2.5	Conduct campaign to encourage all residents to sign up for CodeRED system (to receive information about storms and other natural hazards; power outages, water advisories and other emergency-related information).	High	Ongoing	MEMA, 911 Director	Staff time, $5,000	General Fund, GEMA, grants	Both (City & County)	2025 and ongoing	Listed as a new action step.	New for 2018; now listed as ongoing. This has been completed but listed as ongoing to keep it as an action step. The County actively promotes CodeRED through County/City platforms such as (social media, websites, etc.) and assists Citizens with sign-up help if needed. Citizens can opt to receive messages from CodeRED in English or Spanish. County proactively sends out information before hurricane season starts.

5.2.6	Set up local radio station broadcasts during extreme events to alert citizens to imminent danger.	Medium	Deferred	MEMA	Staff time, $10,000	General Fund	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as deferred. Glynn County has a radio station but doesn't reach McIntosh County). 91.5- radio station license in Darien (stations in Glynn, license is in McIntosh.
5.2.7	Purchase National Oceanic and Atmospheric Administration (NOAA) weather radios	Medium	Ongoing	MEMA, 911 Director	Staff time, $5,000	General Fund, GEMA, grants	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing. Text revised to list radios need purchased.
5.2.8	Add lighting alert systems at County Parks.	Medium	New	County, MEMA	Variable, Depends on Project Scale	General Fund, grants	County	2025 and ongoing	N/A	
5.2.9	Update already standing critical and municipal facilities to be shelter compatible	Medium	New	County, City, MEMA	Variable, Depends on Project Scale	General Fund, grants	County	2025 and ongoing	N/A	Most needed during hailstorm, windstorm & tornado hazards. Also applicable to wildfire, floods, and coastal storms (non-hurricane events only).
5.2.10	Enhance design of planned gymnasium at County Recreation Complex to be shelter compatible, or create a new shelter for responders and/or residents.	Medium	New	County, City, MEMA	Variable, Depends on Project Scale	General Fund, grants	County	2025 and ongoing	N/A	This is applicable for all hazards except Hurricanes.
5.2.11	Add or enhance responder housing at existing critical facilities for all hazards.	Medium	New	County, City, MEMA	Variable, Depends on Project Scale	General Fund, grants	County	2025 and ongoing	N/A	This is applicable for all hazards.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #3: REDUCE THE THREAT OF WATER CONTAMINATION CAUSED BY CONTAMINATED WELLS AND SEPTIC SYSTEMS.** **HAZARDS: FLOOD**										
5.3.1	Continue inventory of all septic and well systems in McIntosh County in WelSTROM and with the Coastal Health District.	Medium	Ongoing	Environmental Health, County Administration, Georgia EPD	Staff time	General Fund	County	2025-2026	Worked on septic tank inventory, but still ongoing. They update locations in WelSTROM and with Coastal Health District. They are supposed to be doing wells too.	Same status as in the 2018 Plan update.
5.3.2	Continue to repair and replace malfunctioning septic systems.	Medium	Ongoing	Environmental Health, County Administration, Georgia EPD	Staff time, $15,000	General Fund	County	2025 and ongoing		Same status as in the 2018 Plan update
5.3.3	Combine public education about importance of wellhead protection with enforcement measures	Medium	Ongoing	Environmental Health, Georgia EPD	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing educational activity.	Same status as in the 2018 Plan update
5.3.4	Educate the public about the importance of routine septic system maintenance.	Medium	Ongoing	Environmental Health, UGA Extension, Georgia EPD	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing.
5.3.5	Perform annual public in- services on well decontamination techniques	Medium	Ongoing	Environmental Health	Staff time, $5,000	General Fund, grants	County	2025 and ongoing	This is an ongoing educational activity.	Same status as in the 2018 Plan update.
5.3.6	Distribute brochures on well decontamination methods	Medium	Ongoing	Environmental Health	Staff time, $5,000	General Fund, grants	County	2025 and ongoing	This is an ongoing activity.	Same status as in the 2018 Plan update.
5.3.7	Educate public on local resources available for testing water quality	Medium	Ongoing	Environmental Health, MEMA, UGA Extension, GA EPD	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Completed, but should remain as an ongoing activity.	Same status as in the 2018 Plan update.
5.3.8	Provide brochures on Environmental Health issues with localized information	Medium	Ongoing	Environmental Health, MEMA	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing activity.	Same status as in the 2018 Plan update.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
5.3.9	Continue to seek grant funding to implement a Wellhead Protection Program (individual systems)	Medium	Ongoing	MEMA, Environmental Health, Georgia EPD	Staff time, $25,000	General Fund, grants	Both (City & County)	2025-2026	Unsuccessful, but should continue seeking funds. Listed as deferred.	Previously listed as new; now listed as ongoing.
5.3.10	Continue to investigate all opportunities for conservation of protected animal and plant habitats, achievement of water quality standards and management of water resources, conservation of freshwater and saltwater marshlands, and protection of aquifer recharge areas.	High	Ongoing	County & City Administration, Environmental Health, Georgia EPD, Georgia DNR	Staff time	General Fund	Both (City & County)	2018 and ongoing	This is an ongoing exercise. They adopted some more stringent ordinances related to these items. Done to ensure compliance with NFIP.	Same status as in the 2018 Plan update.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #4: REDUCE THE RISK OF MOSQUITO-BORNE ILLNESSES AND PANDEMICS / EMERGENT INFECTIOUS DISEASES.** **HAZARDS: MOSQUITO CONTROL & PANDEMICS / EMERGENT INFECTIOUS DISEASES**										
5.4.1	Reinstitute tire round-up events in Darien and McIntosh County by partnering with "Keep McIntosh Beautiful"	Ongoing	Ongoing	County & City Administration	Staff time, $15,000	General Fund, grants	Both (City & County)	20124 and ongoing	Action step updated to reinstitute event and develop new Partnership. Listed as new.	Previously listed as new; now listed as ongoing. City has a grant for tire collection (BRACE).County is reapplying for a countywide tire grant (EPD Star grant).
5.4.2	Educate public on mosquito source reduction techniques; yard containers, tires, etc. that hold water, account for a large portion of the summer mosquito population in many urban areas.	High	Ongoing	Environmental Health, MEMA	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Public education events have been held, but this activity should keep going	Same status as in the 2018 Plan update.
5.4.3	Continue support for mosquito fish stocking programs.	Medium	Ongoing	County & City Administration	Variable, Depends on Project Scale	General Fund	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing. (County sprays for entire County, applies larvicide & tests.)
5.4.4	Work with the Health Department to develop a plan for vector-borne disease prevention and response.	Medium	Ongoing	Environmental Health, MEMA	Staff time	General Fund	Both (City & County)	2025 and ongoing		Previously listed as new; now listed as ongoing.
5.4.5	Work with the Health Department to educate the public on how to avoid and prevent mosquito bites.	Medium	Ongoing	Environmental Health, MEMA, County & City Administration	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing		Previously listed as new; now listed as ongoing.
5.4.6	Develop plan for preventative actions to control mosquitoes.	High	Ongoing	Environmental Health, MEMA	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing		Previously listed as new; now listed as ongoing.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #5: PROTECT RESIDENTS, ESPECIALLY VULNERABLE POPULATIONS, FROM THE EFFECTS OF EXTREME HEAT.** **HAZARDS: EXTREME HEAT**										
5.5.1	Conduct pre-season public information campaigns	High	Ongoing	MEMA, Division Family & Children Services (DFCS), Health Department	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	This is an ongoing activity.	Same status as in the 2018 Plan update.
5.5.2	Publish a special section with emergency information on extreme heat. Localize the information by including the phone numbers of local emergency services offices, the American Red Cross, shelters, and hospitals.	Medium	Ongoing	MEMA, DFCS	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	DFCS has information in the newspaper. This is an ongoing activity.	Same status as in the 2018 Plan update.
5.5.3	Expand public education and brochures on the dangers of sunburn, heat exhaustion, heat stroke, and other possible conditions caused by excessive heat.	Medium	Ongoing	Health Department, DFCS, MEMA	Staff time, $5,000	General Fund, grants	Both (City & County)	2025 and ongoing	County Health Department distributes Brochures addressing heat but could be expanded. Listed as new.	Previously listed as new; now listed as ongoing.
5.5.4	Issue advisory and warnings	High	Ongoing	MEMA	Staff time	General Fund	Both (City & County)	2025 and ongoing	Advisories and warnings are issued through local radio station, but this should be ongoing.	Same status as in the 2018 Plan update.
5.5.5	Identify location of vulnerable populations	High	Ongoing	DFCS, Health Department, MEMA	Staff time	General Fund	Both (City & County)	2025-2026	Funding was not available to conduct. Listed as deferred.	Previously listed as deferred; now listed as ongoing as this is a new FEMA requirement and not optional.
5.5.6	Develop a plan that identifies shelters for those in need to have respite from extreme heat and organize outreach to vulnerable populations.	High	Ongoing	DFCS, Health Department, MEMA	Staff time	General Fund	Both (City & County)	2025-2026	Listed as new.	Previously listed as deferred; now listed as ongoing.
5.5.7	Support a "Helping Your Neighbors" program through local schools and non-profit agencies to encourage people to help those who require special assistance such as elderly people, infants or people with disabilities during severe weather conditions through gifts of box fans, etc.).	High	Ongoing	DFCS, Red Cross, MEMA	Staff time, $10,000	General Fund	Both (City & County)	2025 and ongoing	This is done through DFCS, and they do fans. Red Cross does blankets for cold weather.	Same status as in the 2018 Plan update.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
5.5.8	Seek funding to develop an "Are you OK" Program through 911 Program to do daily check-ins with program participants (those who sign up). Includes addition of staff and transportation to shelter if needed.	Medium	New	Health Department, DFCS, MEMA	Staff time, $10,000 for grant application; variable for other program addition costs	General Fund, grants	Both (City & County	2025 and ongoing	N/A	Most applicable for heat hazards (for vulnerable populations such as the elderly and medically frail) but also applicable for emergency response and assistance during other hazards. (Check to see if citizens need transportation to shelter, etc.).

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #6: CONSERVE WATER DURING PERIODS OF DROUGHT TO MAINTAIN SUPPLY.** **HAZARDS: DROUGHT**										
5.6.1	During a drought, run an education campaign suggesting ways that individuals can conserve water and energy in their homes and their workplaces.	Medium	Ongoing	Environmental Health, UGA Extension, MEMA	Staff time, $10,000	General Fund, grants	Both (City & County)	2025-2026	Funding was not available to conduct. Text was revised. Listed as deferred.	Previously listed as deferred; now listed as ongoing.
5.6.2	Implement water conservation measures and instructions during periods of drought (e.g., rotating water usage on alternating days east/west of Hwy 17).	Medium	Ongoing	County & City Administration, MEMA	Staff time, $5,000	General Fund	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing.
5.6.3	Cooperative Extension and Local Ag Agent to educate farmers about steps they can take to conserve water and establish alternative water supplies for their crops.	Medium	Ongoing	UGA Cooperative Extension	Staff Time, $10,000	General Fund	County	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing.

Action #	Action Step	Priority	Status	Responsible Agency	Anticipated Cost	Funding Sources[B]	Jurisdiction	Timeframe	Outdated Notes (from 2018 HMP)	Updated Notes (for 2024 HMP)
GOAL #5: PROTECT HEALTH AND SAFETY OF RESIDENTS IN MCINTOSH COUNTY AND CITY OF DARIEN. **OBJECTIVE #7: PROTECT THE LIFE AND HEALTH OF RESIDENTS FROM THREAT OF WILDFIRE.** **HAZARDS: WILDFIRE**										
5.7.1	Issue air quality warnings when there are wildfires in the area.	High	Ongoing	MEMA	Staff time	General Fund	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing.
5.7.2	Identify evacuation routes and provide that information to the public in the event that a wildfire occurs.	High	Ongoing	MEMA	Staff time	General Fund	Both (City & County)	2025 and ongoing	Listed as new.	Previously listed as new; now listed as ongoing.

A/ The category "Coastal Storm/Hurricane & Flood" also includes beach-related hazards such as rip tides, undertows, and rip current.

B/ It is important to note that the Georgia Conservancy has the ability to support FEMA Community Disaster Resiliency Zone (CDRZ) communities to help at-risk and under-resourced communities build local climate and disaster resilience. The Georgia Conservancy can also connect CDRZ communities with additional tools, funding, and resources; CDRZ communities have priority status when applying for certain grant funds, such as FEMA BRIC. Because McIntosh County and Darien have a CDRZ designated census tract, this means additional funding could be available for implementing hazard mitigation activities that are identified as part of the HMP update and/or for other projects that may benefit the community and improve disaster resiliency. Representatives of the Georgia Conservancy participated on the HMPUC.

A. How the local jurisdictions considered reducing risks and vulnerabilities to Future Buildings and Infrastructure and identified appropriate actions in the action plan

The following steps were considered to reduce risks and vulnerabilities for New buildings and infrastructure:

- For those planned near waterways, they will be subjected to mitigation steps if enacted.
- They will also be subject to stronger building requirements to withstand wind and flood conditions, as well as receive stronger building recommendations to withstand hailstorm conditions.
- They may be subject to Wildland-Urban Interface requirements to reduce destruction of property by wildfire.

B. How the local jurisdictions considered reducing risks and vulnerabilities to Existing Buildings and Infrastructure and identified appropriate actions in the action plan.

The following steps were considered to reduce risks and vulnerabilities for Existing buildings and infrastructure:

- Those adjacent to river corridors will be impacted by changes in stormwater run-off plans and drainage systems, if enacted. These measures should provide a measure of relief from the flooding issues causing erosion problems.
- They will also be included in recommendations to retrofit to withstand wind and flood damage, as well as hailstorm damage.
- They will be included in recommendations to retrofit to comply with Wildland-Urban Interface requirements to reduce destruction of property by wildfire.

C. Special Multi-Jurisdictional Strategies and Considerations.

Multi-jurisdictional strategies and considerations are identified for each hazard, and ones with similar approaches are grouped together.

Coastal Erosion

Both McIntosh County and City of Darien are affected by coastal erosion, but the vulnerability is greater for the County. The River Corridor Protection Act requires a 100-foot buffer of natural vegetation along both sides of any protected river. Additionally, the Georgia Erosion and Sedimentation Act does not allow for any land-disturbing activity within 25 feet of the banks of any State waters. The Coastal Georgia Regional Development Center prepared a Regional River Corridor Protection Plan that describes the applicability of the River Corridor Protection Act to the local governments within the Coastal RDC jurisdiction. McIntosh County adopted a Regional River Corridor Protection Plan for the Altamaha River. The City also contains a protected river corridor that extends 2.5 miles along Cathead Creek and the Darien River to the west and southwest of the City's downtown. The City has recently adopted a Water Resources Protection Ordinance, consistent with the Part V Environmental Planning Criteria, which addresses the protected river corridor, wetlands,

and groundwater recharge areas.

Drought

All areas of McIntosh County could potentially be affected by drought conditions, particularly the seafood industry and agriculture interests. The committee's greatest concern is potential for the threat of wildfire from dry conditions.

Extreme Heat

Vulnerability to extreme heat does not contrast much between jurisdictions. Excessive heat does not have particular impacts in any one geographical section of the county. The most vulnerable individuals to this hazard are the very old and the young, as well as low-wealth individuals. Extreme heat events may potentially impact 20% of the residential population and 10% of the agricultural assets in McIntosh County. The impact to residents is increased for the City of Darien to 37%.

Flood

Vulnerability to flooding is greater for the County than the City of Darien. Using the Existing FEMA flood maps (DFIRM), flooding vulnerability for the County is estimated at 39% of all county structures ("improved buildings"), and the City is only 4%. These percentages decreased dramatically from the previous plan, especially for the City. Preliminary FEMA flood maps (DFIRM), if approved, will reduce the County's vulnerability to 33% of structures ("improved buildings"). The update is based on improved LIDAR and modeling inputs. There is also more vulnerability in the County than the City for sea level rise. Sea level rise of 3-feet will impact 20% of "improved buildings" in the County versus 4% in the City.

A concern within McIntosh County and City of Darien, related to flooding, is evacuation of residents during storm events. Many of the residential areas are accessed by county roads that would quickly be flooded during storm surge or flooding events. Some areas of the County would have limited access by Emergency Services personnel during and after a flooding event.

Coastal Storm/Hurricane; Hailstorm; Thunderstorm; Tornado

Vulnerability to these hazards do not contrast between jurisdictions. All structures and critical facilities within McIntosh County and City of Darien could be damaged by these hazards. Vulnerable populations are located in the City of Darien as well as in unincorporated areas of the county. Alerting and protecting all residents of impending high winds and potential storm and flood conditions is a county-wide concern. The scale of the impacts varies for each of these hazards and their respective storm intensity.

Wildfire

Most of the wildfire danger is in the County, but as lightning strikes can cause a wildfire in any location, any mitigation steps taken related to wildfire should be undertaken on a

countywide basis and include the City of Darien. The Wildland-Urban Interface from a fire management perspective is commonly defined as an area where structures and other human development meet or intermingles with undeveloped wildland or vegetative fuels. These conditions exist and are more common throughout the County.

The Georgia Forestry Commission recently updated McIntosh County's Fire Wildfire Risk Assessment. This assessment will include enhanced mapping, strategies and detailed mitigation action steps. Detailed jurisdictional information and mitigation efforts are addressed in the Community Wildfire Protection Plan.

Mosquito Control

Mosquito control has an impact on the economy of all of McIntosh County. Mosquito control activities are important to the public health and impact tourism and businesses. Many commercial and industrial concerns are located along the waterfront and are impacted during the mosquito season. An aerial spray can cost the city and the county up to $60,000 each spray, which makes this financially burdensome, so this has not been done since 2012.

D. Completed and Deleted Action Steps from Previous Plan

Completed: The table below summarized the Action Steps that have been completed since the last plan and which hazard they were associated with. Some steps have notes provided in italics. In addition to the steps listed in this table, all of the steps in the Mitigation Action Step List with the status "Ongoing" were completed since the last update. The "Ongoing" action steps remained on the active mitigation action step list because the HMPUC considered them important to continue implementing.

Action Step	Hazard	Notes
Construct new fire station in Shellman.	Wildfire	
Upgrade fire station on Sapelo Island.	Wildfire	
Based on experiences learned from Hurricane Matthew, develop new plan to ensure safe resident return after an evacuation.	Coastal Storm/Hurricane & Flood	Completed-GEMA handles re-entry permits
Implement CERT program to assist emergency personnel with recovery efforts- plan and develop volunteer program ahead of typical storm seasons using COADs and VOADs (Community/ Volunteer Organizations Active in Disaster).	Coastal Storm/Hurricane & Flood	Completed in Disaster Recovery Plan

Deleted: The table below summarized the Action Steps that have been deleted since the last plan and which hazard they were associated with. Most of these steps have notes provided in italics as to why they were deleted. In some cases, they were substantially edited into a new action step to be more specific and direct.

Deleted Action Step	Hazard(s)	Notes
Investigate retrofits to wastewater treatment plant to reduce inadequate treatment during flood conditions.	Coastal Storm/Hurricane & Flood	This is duplicative with 1.6-so this was deleted

E. Unchanged Action Steps

The HMPUC reviewed each action step from the 2018 HMP Update and decided whether it should be deleted or deferred to this HMP Update. The most common reason for deferring was due to cost or lack of resources to implement during the previous period. The STAPLEE worksheet, in Appendix D, scores well for these action steps. This proves that these are all still valid and effective mitigation action steps to pursue. Many still have shortcomings in the Economic and Administrative sections as they pertain to funding allocations, cost of action, and outside funding source required. All other considerations apply affirmatively as many mitigation steps have been identified in the Comprehensive Plans for both McIntosh County and the City of Darien.

There were no additional action steps that the HMPUC looked into that were not included in the 2018 HMP Update. The HMPUC chose to implement every new action step that was proposed.

CHAPTER 4 – EXECUTING THE PLAN

SUMMARY OF UPDATES TO CHAPTER 4

Chapter 4 Section	Updates to Section
I. Action Plan Implementation	General text edits based on current conditions and schedules; elaborated on how HMP is incorporated into other plans.
II. Monitoring, Evaluating, Updating	Text edits based on previous experiences; a specific midpoint progress meeting with approach was outlined for Year 2027; subheadings were added to this section; continued public involvement was also added.

SECTION I – ACTION PLAN IMPLEMENTATION

Administrative Actions

The hazard mitigation planning process was overseen by the McIntosh County Emergency Management Agency. Facilitation of the planning process was conducted by Goodwyn Mills Cawood (GMC). The McIntosh County Board of Commissioners authorized the submission of this plan to GEMA for review and approval. After GEMA approval, the McIntosh County Commissioners and City of Darien formally adopted this plan on XXX and submitted to FEMA for their approval.

Authority and Responsibility

The City of Darien and unincorporated McIntosh County were included in this planning process. Participation from each jurisdiction was solicited and received by the McIntosh County Emergency Management Agency. As a result, a truly multi-jurisdictional plan was created for all of McIntosh County with ideas and viewpoints of all participants included. The McIntosh County Emergency Management Agency is the overall implementing agency for projects such as Hazard Mitigation. McIntosh County and the City of Darien have authorized the MEMA to act, in a prudent manner, on their behalf.

After formal adoption of the McIntosh County Joint Hazard Mitigation Plan, the County Commissioners and City Council members will keep in consideration the proposed mitigation action steps and oversee the implementation of said tasks using branches of city and county government when appropriate.

The parties responsible for the various mitigation action steps, as assigned by this Plan, the County Commission, or City Council, will provide a project status report and will include which implementation processes worked well, any difficulties encountered, how

coordination efforts were proceeding, and which strategies should be revised. This planning process identified that the HMPUC will provide regular review and update of the Plan every five years. At the direction of the MEMA Director, the McIntosh County HMPUC members will be invited at least once during the midpoint of the planning period (2027) to convene in order to discuss the progress and whether any action or edits are required to the mitigation action steps or the plan itself. HMPUC members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

The County Commission and City Council will review recommendations of the committee at the midpoint evaluation. County Commissioners and City Council members will evaluate and update the Plan to ensure mitigation action steps are being established and that existing programs are utilizing the guidance provided by the Hazard Mitigation Plan. The MEMA Director will then forward any changes to GEMA's Hazard Mitigation Planning Specialist.

Prioritization

Members of the McIntosh County HMPUC prioritized the identified mitigation actions based on what would be perceived as most beneficial to the community. A list of mitigation goals, objectives and related action items was compiled from the input of the planning committee, as well as from others within the community. Several criteria were established to assist committee members in the prioritization of these suggested mitigation actions. Criteria included perceived cost benefit or cost effectiveness, availability of potential funding sources, overall feasibility, measurable milestones, multiple objectives, and both public and political support for the proposed actions. Through this prioritization process, several projects emerged as being a greater priority than others. Some of the projects involved expending considerable amounts of funds to initiate the required actions. The determination of the cost benefit analysis (such as the FEMA B/CA model) of a project will be implemented at time of project application or funding request. Other projects allowed the community to pursue completion of the project using potential grant funding. Still others required no significant financial commitment by the community.

Incorporation of Local Hazard Mitigation Plan into Other Plans

The 2013 HMP Update was also used in the County's application for the NFIP Community Rating System, which is a part of the County's Floodplain Management Program and the 2018 HMP was used in the City's Community Rating System application. The 2018 HMP Update was incorporated into City and County plans as they reviewed their respective Capital Improvement Plans and annual budgets. It has also been incorporated into sections of the McIntosh County Local Emergency Operations Plan (LEOP). In the time since the 2018 HMP Update was drafted there have been several major City and County plans that were developed that incorporated the 2018 HMP. These include the following:

- 2024 Joint Hazard Mitigation Plan for McIntosh County and City of Darien (i.e., this Plan)

- 2024 Language Access Plan
- 2023 Joint Comprehensive Plan of McIntosh Count and City of Darien
- 2022 Regional Plan of Coastal Georgia
- 2019 Disaster Recovery and Redevelopment Plan (DRRP)
- 2019 State of Georgia Hazard Mitigation Strategy

Information from the 2024 HMP Update will be incorporated into the plans above during their respective future updates and information from these plans, where appropriate, has similarly been used in this HMP update and/or to make informed decisions. For example:

- The final 2018 HMP Update was available on the County's website for review during the 2023 comprehensive plan update process, so the information was available for incorporation into the Joint County and City Comprehensive Plan.
- Multiple members of the HMPUC also helped to update the Comprehensive Plan, so they were able to include ideas, information, and outcomes developed during the planning process for the 2024 HMP Update.
- For the 2023 McIntosh County Comprehensive Plan, HMPUC members served on the Steering Committee and Stakeholder Committee. In the 2023 Comprehensive Plan, there is a chapter on Coastal Vulnerability and Resilience; a section about vulnerable populations; and a section about which were items added to and discussed within the 2018 HMP Update. This new chapter was a recommendation of the 2017 Regional Plan of Coastal Georgia, to promote integrating hazard mitigation into updates to the local comprehensive plans.
- A Disaster Recovery and Redevelopment Plan (DRRP) was developed for McIntosh County in 2019 and the 2018 Comprehensive Plans were available for review to incorporate in the DRRP. When the DRRP is updated, the 2023 Joint Comprehensive Plan will be available.
- In a few instances, for multi-jurisdictional items, the McIntosh County EMA Director will also coordinate with the appropriate City agency personnel in order to execute multi-jurisdictional steps. The EMA Director will also coordinate the midpoint evaluation meeting in 2027 with HMPUC members from both McIntosh County and the City of Darien to ensure steps are being taken by each jurisdiction to implement the HMP Update and associated mitigation action steps.

SECTION II – MONITORING, EVALUATION, UPDATING

Monitoring & Evaluation

As determined by this planning process, the desire of the McIntosh County HMPUC is to review the plan and evaluate the status of the mitigation action steps at least once during the midpoint of the planning period (2025-2030), which would occur during year 2027. At the direction of the MEMA Director, the McIntosh County HMPUC members will be invited to convene in order to discuss the progress and whether any action or edits are

required to the mitigation action steps or the plan itself. The meeting notice will also be posted on the County, City, and EMA websites and to social media to invite the public and anyone new that had not been involved in the 2024 HMP Update process. The method of evaluation will consist of utilizing a checklist to determine what mitigation actions were undertaken, the completion date of these actions, the cost associated with each completed action, and whether actions were deemed to be successful. This method was successful in the past; therefore, scheduling a midpoint progress meeting will again provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of this hazard mitigation plan.

The MEMA Director will ensure the results of the evaluation(s) are reported to the McIntosh County Board of Commissioners, the Mayor and City Council of the City of Darien, as well as to any agencies or organizations having an interest in the hazard mitigation activities identified in the plan.

Updating

Per the requirements set forth in the Disaster Mitigation Act of 2000, McIntosh County is required to update and revise the plan every five years. Toward the end of the current planning period (2025-2030), the HMPUC will reconvene to work on the revision process and HMP Update. The revision process will include a firm schedule and timeline, and identify any agencies or organizations participating in the plan revision. The HMPUC will review the mitigation goals, objectives and action items to determine their relevance to changing situations in the county, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The HMPUC will also review the risk assessment portion of the plan to determine if this information should be updated or modified, given any new available data.

No later than the conclusion of the five-year period following initial approval of the plan, the MEMA Director shall submit a revised Hazard Mitigation Plan to the Georgia Emergency Management Agency and the Federal Emergency Management Agency for their review and coordination. The MEMA Director will ensure the revised plan is presented to the McIntosh County Board of Commissioners for formal adoption. In addition, all holders of the HMP Update will be notified of affected changes.

Public Involvement

McIntosh County is dedicated to involving the public directly in review and revision of the Hazard Mitigation Plan Update. During this recent plan revision process, the HMPUC was re-established and the public was invited to volunteer for the HMPUC and participate in the planning process at the initial kickoff meeting through 1) public notices placed on the McIntosh County EMA Facebook page and City/County websites and 2) posting of a paper flier in key locations throughout the public (including locations accessible to underserved / socially vulnerable community members who may not have access to social media or online resources). The draft HMP Update was posted on both the McIntosh County and City of

Darien websites while it was under review with GEMA and while it was being revised; the public was given the opportunity to comment on the HMP Update. After approved by GEMA, the public was invited to provide comments at a public hearing at the XXX County Commission meeting and City Council meeting on XXX. There were no comments by the public at these meetings, so the 2024 HMP Update was adopted unanimously by the McIntosh County Board of Commissioners and Darien City Council and approved to be submitted to FEMA for approval. After the plan is approved, the public will also be invited to the midpoint evaluation meeting, in 2027, in which the MEMA Director and HMPUC will discuss progress and whether any action or edits are required to the mitigation action steps or the plan itself. In about five years, the public will be invited again to participate in the HMP Update process. During each of these steps, the public is offered a forum in which they can express concerns, opinions, or ideas about the Plan, as well discuss the maintenance and future updates to this Plan.

MEMA will continue to maintain documentation for all efforts of continued public involvement. This documentation will include newspaper clippings reflecting the advertised public hearing notice, sign-in sheets, meeting minutes, etc. All relevant information will be forwarded to GEMA and FEMA as a product of the proposed plan revision.

The approved 2024 HMP Update will be available to each committee member and for public review upon request. A hard copy will be available at the Ida Hilton Public Library (Darien, GA), Hog Hammock Public Library (Sapelo Island, GA), and McIntosh Emergency Operations Center; an electronic copy will also be accessible via McIntosh County's website, the City of Darien's website, and the McIntosh County Emergency Management Agency's website.

CHAPTER 5 – CONCLUSION

SECTION I – SUMMARY

As a result of initiating the hazard mitigation planning process, McIntosh County officials have obtained a great deal of information and knowledge regarding the County's disaster history, the presence of natural hazards, the likelihood of each of these hazards occurring within the county, and the potential impacts and challenges these hazards present to the community.

The general planning process began with the identification of hazards that have occurred within McIntosh County over the past 68 years for most hazards and 176 years for others. This was followed with data collection of critical facilities within the community and updating the previous inventory. Assessments were then made to determine the vulnerability of the community to various hazards, and to determine hazard-specific losses. After evaluation of potential losses within the community, mitigation goals, objectives, and related action items were then prioritized and used to formulate a hazard mitigation action plan.

The planning process included the review of accomplished mitigations strategies. The HMPUC, being formally tasked by the McIntosh County Board of Commissioners, prepared the review. A public meeting as part of the first HMPCU planning meeting was conducted at the onset of the project, providing McIntosh County citizens with the opportunity to participate in, comment on, and offer suggestions concerning disaster mitigation actions within the community. The public also had an opportunity to comment on the draft version of the 2024 HMP Update, which was posted online during the GEMA review process. Once approved by GEMA, the plan was presented to the McIntosh County Board of Commissioners and City of Darien for approval, and the public had an additional opportunity for comment at a public hearing held during that meeting. Following County and City approval, the plan will be submitted to FEMA for final approval.

The Committee found it difficult to predict the geographic threat and resulting impact of some natural disasters as compared to others. Tornadoes and related severe weather strike randomly, usually affecting a small, localized area. On the other hand, natural disasters such as coastal storms/hurricanes and drought can blanket the entire county, affecting all businesses, public facilities, and residents.

Recognizing this challenge, the McIntosh County HMPUC identified both general and specific measures to aid in the mitigation of natural hazards most likely to impact McIntosh County. These measures include, but are not limited to, the protection of public facilities and infrastructure, progressive government policies, and the proactive use of codes and regulations. In many instances, the implementation of one mitigation action step will

effectively mitigate several hazards at once.

The mission of the McIntosh County Pre-Disaster Mitigation Planning Committee was: *to make our community less vulnerable to the effects of all hazards by identifying risks and community vulnerability, developing wise mitigation strategies and seeking hazard mitigation grant funding to implement chosen strategies to preserve the integrity of the community for future generations.*

The Committee feels that this plan, when implemented, will help to make all of McIntosh County a safer place to live and work for all its citizens.

SECTION II – REFERENCES

Numerous sources were utilized to ensure the most complete planning document could be assembled. In an effort to ensure that all data sources consulted are cited, references are listed in the following format: 1) Publications, 2) Web Sites, 3) Other Sources.

Publications:

- FEMA Pre-Disaster Mitigation How-to Guides #1, 2, 3, 4, 5, 6, 7, 8, & 9 (FEMA)
- GEMA Supplements to FEMA Pre-Disaster Mitigation How-to Guides (GEMA)
- 2024 McIntosh County Hazard Risk Analyses (HAZUS modeling results), Coastal Regional Commission
- 2024 Joint Hazard Mitigation Plan for McIntosh County and City of Darien (i.e., this Plan)
- 2024 Language Access Plan
- 2023 Joint Comprehensive Plan of McIntosh Count and City of Darien
- 2023 NOAA State of the Science Fact Sheet – Atlantic Hurricanes and Climate Change
- 2023 NOAA State of the Science Fact Sheet – Tornadoes, Climate Variability, and Climate Change
- 2022 Regional Plan of Coastal Georgia
- 2021 NOAA State of the Science Fact Sheet – Fire Weather
- 2021 NOAA State of the Science Fact Sheet – How Changing Climate Affects Extreme Events
- 2019 Disaster Recovery and Redevelopment Plan (DRRP)
- 2019 State of Georgia Hazard Mitigation Strategy
- 2018 McIntosh County Community Wildfire Protection Plan
- 2017 Regional Plan of Coastal Georgia
- 2008 Georgia Hazard Mitigation Strategy Standard and Enhanced

- Georgia Coast 2030: Population Projections for the 10-County Coastal Region, 2006
- Land Use Planning for Hazard Mitigation, Community Report for McIntosh County and City of Darien, 2013, Georgia Department of Community Affairs
- 2014 State of Georgia Hazard Mitigation Strategy
- The Georgia County Guide 2009
- USGS Droughts in Georgia
- Georgia Wildfires of 2007 Summary of Facts and Costs of Recovery
- National Assessment of Shoreline Change: Part 2, USGS

Websites:

- FEMA (www.fema.gov)
- GEMA (www.gema.state.ga.us)
- NOAA, National Centers for Environmental Information (NCEI), Storm Event Database (www.ncdc.noaa.gov)
- NOAA, Historical Hurricane Tracks (https://coast.noaa.gov/hurricanes/)
- NOAA, Geophysical Fluid Dynamics Laboratory (https://www.gfdl.noaa.gov/global-warming-and-hurricanes/)
- Georgia Governor's Office of Planning and Budget, Population Projections (https://opb.georgia.gov/population-projections)
- https://data.census.gov/table/ACSST5Y2022.S1701?g=050XX00US13191
- University of Nebraska-Lincoln, U.S. Drought Monitor (http://drought.unl.edu/MonitoringTools/USDroughtMonitor.aspx)
- Tax Digest Consolidated Summaries, Georgia Department of Revenue (https://dor.georgia.gov/tax-digest-consolidated-summaries)
- Georgia Coastal Hazards Portal (http://gchp.skio.uga.edu/)
- Southern Group of State Foresters, Wildfire Risk Assessment Portal (https://www.southernwildfirerisk.com/)
- National Public Radio (https://www.npr.org/2024/10/08/nx-s1-5143320/hurricanes-climate-change)

Other Sources:

- McIntosh County Tax Assessor
- Center for Disease Control
- NOAA, National Hurricane Center
- Georgia DNR, Coastal Resources Division
- Georgia DNR, Environmental Protection Division
- Georgia Forestry Commission
- U.S. Census Bureau (& American Community Survey)
- United States Department of Agriculture, Drought Information
- Southeast Regional Climatic Center
- National Drought Mitigation Center, US Drought Impacts
- United States Geological Survey, Office of Surface Water
- NOAA, Office of Hydrology