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1 Planning Process

Section 1 provides a general introduction to hazard mitigation and an introduction to the Chatham County Multi-Jurisdictional Hazard Mitigation Plan. This section contains the following subsections:

- 1.1 Purpose and Need, Authority, and Statement of Problem
- 1.2 Methodology, Planning Process and Participation
- 1.3 Updates and Revisions to the Plan
- 1.4 Plan Organization
- 1.5 Hazard, Risk and Vulnerability Summary
- 1.6 Multi-Jurisdictional Participation and Special Considerations
- 1.7 Adoption, Implementation, Monitoring, and Evaluation
- 1.8 Community Data

Table 1-1 – Section 1 Summary of Updates

2020 Plan Section Number	2025 Plan Section and Description of Changes
Section 1 – Planning Process	**Section 1 – Planning Process**
1.1 Purpose and Need, Authority, and Statement of Problem	1.1 Purpose and Need, Authority, and Statement of Problem – This section was rewritten but preserves the existing intent.
1.2 Methodology, Planning Process, and Participation	1.2 Methodology, Planning Process, and Participation – This section continues to provide a full review of each planning step in the process as well as a summary of public involvement, stakeholder involvement, and outreach efforts. Meeting minutes are provided in Appendix B. Descriptions of the previous planning processes were removed, as they can be referenced if needed in the 2020 plan.
1.3 Updates and Revisions to the Plan	1.3 Updates and Revisions to the Plan – This section was updated to summarize changes made to each section, provide a review of changes in the hazard identification, and detail changes in action status for actions from the 2020 plan that have been completed or deleted.
1.4 Plan Organization	1.4 Plan Organization – This section was updated to reflect the reorganization of sections.
1.5 Hazard, Risk and Vulnerability Summary	1.5 Hazard, Risk and Vulnerability Summary – This section was revised with data from the new risk and vulnerability assessment. A summary of the Priority Risk Index results for each hazard is provided. Hazard profiles were revised, and new hazards were added.
1.6 Multi-Jurisdictional Participation and Special Considerations	1.6 Multi-Jurisdictional Participation and Special Considerations – This section was carried forward with new points of consideration added.
1.7 Adoption, Implementation, Monitoring, and Evaluation	1.7 Adoption, Implementation, Monitoring, and Evaluation – Minor edits were made to this section.
1.8 Community Data	1.8 Community Data – This section has been updated with more recent geographic, economic, housing, population, land use, and growth data.

1.1 PURPOSE AND NEED, AUTHORITY, AND STATEMENT OF PROBLEM

1.1.1 Purpose and Need

Hazards are a natural and inevitable part of our environment, but there is much we can do to minimize their impacts on our communities. Every community faces different hazards, has different resources available to combat problems, and has different interests that influence the solutions to those problems. There is no single solution for managing or mitigating the effects of hazards. Advance planning is one of the best ways to mitigate the impacts of hazards while taking into account the unique character of a community.

As defined by FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event. Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented.

The purpose of the 2025 Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan Update is to identify, assess, and develop a strategy to mitigate hazard risk to people and property within Chatham County. This plan documents progress on existing hazard mitigation planning efforts, updates the plan to reflect current conditions in the planning area including relevant hazards and vulnerabilities, increases public education and awareness about the plan and planning process, maintains grant eligibility for participating jurisdictions, maintains compliance with state and federal requirements for local hazard mitigation plans, and identifies and outlines strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency.

A well-prepared hazard mitigation plan ensures that all possible activities are reviewed and are documented for implementation so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with other goals and activities, preventing conflicts and potentially reducing the costs of implementing each individual activity. This plan provides a framework for all participating jurisdictions to work together on hazard mitigation planning and projects. It establishes the vision and guiding principles for reducing hazard risk and proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

1.1.2 Authority

To reduce the nation's natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) as an amendment to the Robert T. Stafford Act of 1974. The purpose of DMA 2000 was to invoke new and revitalized approaches to hazard mitigation planning. Section 322 of DMA 2000 emphasizes the need for state and local government entities to closely coordinate mitigation planning activities. It also makes the development, maintenance, and updating of a hazard mitigation plan a specific eligibility requirement for any local government applying for federal mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and various iterations of Pre-Disaster Mitigation programs, all of which are administered by the Federal Emergency Management Agency (FEMA) and authorized by Section 203 of the Stafford Act through the Pre-Disaster Mitigation program (PDM). Communities with an adopted and federally approved hazard mitigation plan thereby become qualified to receive available mitigation funds before and after the next disaster strikes.

The Georgia Emergency Management Act of 1981 authorizes local emergency management agencies to conduct emergency management activities for the County. The Chatham County Emergency Management Agency (CEMA) was authorized to develop and implement a plan for mitigation actions by Local

Government Resolution for Emergency Management executed by the Chatham County Commission and local municipalities on April 25, 2000.

This plan update was prepared in coordination with FEMA Region IV and the Georgia Emergency Management Agency (GEMA) to ensure that it meets all applicable federal and state planning requirements. A Local Mitigation Plan Review Tool, found in Appendix A, provides a summary of FEMA's current minimum standards of acceptability and notes the location within this plan where each planning requirement is met.

This plan was developed in a joint and cooperative manner by members of a Hazard Mitigation Planning Committee (HMPC) which included representatives of County, City, and Town departments, federal and state agencies, citizens, and other stakeholders. This plan will ensure that Chatham County and its incorporated municipalities remain eligible for federal disaster assistance including the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA) program, and other Pre-Disaster Mitigation grant programs that may become available.

This plan has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S.C. 5165, enacted under Section 104 of the Disaster Mitigation Act of 2000, (DMA 2000) Public Law 106-390 of October 30, 2000, as implemented at CFR 201.6 and 201.7 dated October 2007.

This document comprises a Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan for Chatham County. Just like the 2020 plan, this planning area includes all of Chatham County's incorporated municipalities and unincorporated areas. All participating jurisdictions are listed below:

- Chatham County
- City of Bloomingdale
- City of Garden City
- City of Pooler
- City of Port Wentworth
- City of Savannah
- Town of Thunderbolt
- City of Tybee Island
- Town of Vernonburg (included in the Unincorporated Chatham County elements)

The above participating jurisdictions have adopted this plan in accordance with standard local procedures to meet federal plan adoption requirements. Copies of adoption resolutions are provided in Section 5 Plan Implementation and Maintenance.

1.1.3 Statement of Problem

Each year in the United States, natural and human-caused hazards take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters because additional expenses incurred by insurance companies and non-governmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable and through hazard mitigation, much of the cost of repairing damage caused by these events can be reduced or even eliminated.

Chatham County previously developed a Pre-Disaster Multi-Jurisdictional Hazard Mitigation Plan in 2020 and has remained committed to hazard mitigation and the associated planning process, which enables regular review of the changing exposure, vulnerability, and risk in the planning area.

The focus of this plan update is on those hazards deemed "high" or "moderate" priority for the planning area, as determined through the risk and vulnerability assessments. Low priority hazards will continue to be evaluated but may not be prioritized for mitigation in the action plan.

Chatham County and its participating jurisdictions followed the planning process prescribed by the Federal Emergency Management Agency (FEMA), and this plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC). The HMPC led a risk assessment that identified and profiled hazards that pose a risk to the planning area, assessed the planning area's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The hazards profiled in this plan include:

- Communicable Disease
- Conflagration
- Cyberattack
- Dam Failure
- Drought
- Earthquake
- Erosion
- Extreme Heat
- Flood
- Hazardous Materials Incident
- Hostile Event
- Sea Level Rise
- Severe Weather (Thunderstorm Wind, Lightning, Hail)
- Severe Winter Weather
- Tornado
- Tropical Cyclone
- Tsunami
- Wildfire

1.2 METHODOLOGY, PLANNING PROCESS, AND PARTICIPATION

Requirement §201.6(b): An open public involvement process is essential to the development of an effective plan. To develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
Requirement §201.6(c)(1): The plan shall include the following:
1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

This section provides a review of the planning process followed for the development of the Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan. It consists of the following sub-sections:

- 1.2.1 Preparing the Plan
- 1.2.2 Hazard Mitigation Planning Committee
- 1.2.3 Involving the Public
- 1.2.4 Outreach Efforts
- 1.2.5 Involving Stakeholders

1.2.1 Preparing the Plan

The planning process for preparing the Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan was conducted between January and October 2025 and was based on DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

1) Planning Process;
2) Risk Assessment;
3) Mitigation Strategy; and
4) Plan Maintenance.

Into this process, the planning consultant integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA's HMGP; FMA; PDM; Community Rating System; Severe Repetitive Loss Program; and new flood control projects authorized by the U.S. Army Corps of Engineers.

Table 1-2 shows how the 10-step CRS planning process aligns with the four phases of hazard mitigation planning pursuant to the Disaster Mitigation Act of 2000.

Table 1-2 – Mitigation Planning and CRS 10-Step Process Reference Table

DMA Process	CRS Process
Phase I – Planning Process	
§201.6(c)(1)	Step 1. Organize to Prepare the Plan
§201.6(b)(1)	Step 2. Involve the Public
§201.6(b)(2) & (3)	Step 3. Coordinate
Phase II – Risk Assessment	
§201.6(c)(2)(i)	Step 4. Assess the Hazard
§201.6(c)(2)(ii) & (iii)	Step 5. Assess the Problem
Phase III – Mitigation Strategy	
§201.6(c)(3)(i)	Step 6. Set Goals
§201.6(c)(3)(ii)	Step 7. Review Possible Activities
§201.6(c)(3)(iii)	Step 8. Draft an Action Plan
Phase IV – Plan Maintenance	
§201.6(c)(5)	Step 9. Adopt the Plan
§201.6(c)(4)	Step 10. Implement, Evaluate and Revise the Plan

The process followed for the preparation of this plan, as outlined in Table 1-2 above, is as follows:

1.2.1.1 Phase I – Planning Process

Planning Step 1: Organize to Prepare the Plan

With the County's commitment to participate in the DMA planning process, community officials worked to establish the framework and organization for development of the plan. An initial meeting was held with key community representatives to discuss the organizational aspects of the plan development process. The Chatham County Emergency Management Deputy Director led the County's effort to reorganize and coordinate for the plan update. Consultants from AG Witt, LLC assisted the County through the planning process and preparation of the plan document.

Planning Step 2: Involve the Public

Public involvement and associated outreach efforts in the development of the plan was sought using various methods, as detailed in Section 1.2.3 and 1.2.4.

Planning Step 3: Coordinate

The HMPC formed for development of the 2020 Plan was reconvened for this plan update. More details on the HMPC are provided in Section 1.2.2. Stakeholder coordination was incorporated into the formation of the HMPC and was sought through additional outreach methods, detailed in Section 1.2.5.

Coordination with Other Community Planning Efforts and Hazard Mitigation Activities

In addition to stakeholder involvement, coordination with other community planning efforts was also seen as paramount to the success of this plan. Mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Chatham County and its participating jurisdictions use a variety of planning mechanisms, such as Comprehensive Plans, subdivision regulations, building codes, and ordinances to guide growth and development. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. As detailed in Table 1-3, the development of this plan incorporated information from existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

These and other documents were reviewed and considered, as appropriate, during the collection of data to support the planning process and plan development, including the hazard identification, vulnerability assessment, and capability assessment. Data from these sources was incorporated into the risk assessment and hazard vulnerability in Section 2 of the plan as appropriate. The data was also used in determining the capability of each jurisdiction to implement certain mitigation strategies. The Capability Assessment can be found in Section 4.

Table 1-3 – Summary of Existing Studies and Plans Reviewed

Resource Referenced	Influence in this Plan
Local Comprehensive Plans (2020 Chatham County - Savannah Comprehensive Plan 2040, 2021 City of Bloomingdale Comprehensive Plan, etc.)	The comprehensive plans for each community, where available, were referenced in the Community Data in Section 1.8 and in the community annexes. Data from comprehensive plans was referenced in the Capability Assessment in Section 4 and incorporated into Mitigation Action Plans where applicable in Section 3 and in Annexes A-H.
Local Ordinances (Flood Damage Prevention Ordinances, Subdivision Ordinances, Zoning Ordinances, etc.)	Local ordinances were referenced in the Capability Assessment in Section 4 and, where applicable for updates or enforcement, in Mitigation Action Plans in Section 3 and in Annexes A-H .
Chatham County and Incorporated Areas Flood Insurance Study (FIS), Revised 07/07/2018	The FIS report was referenced in the preparation of flood hazard profile in Section 2.5.6.
Chatham County Pre-Disaster Multi-Jurisdictional Hazard Mitigation Plan, 2020	The previous plan was referenced in compiling the Hazard Identification and Risk Assessment in Section 2 and in reporting on implementation status and developing the Mitigation Action Plans in Section 1.3.3 and Section 3, respectively.
Chatham County Floodplain Management Plan, 2024; City of Savannah Flood Mitigation Plan, 2021	The Chatham County and City of Savannah floodplain management plans were referenced in preparation of the flood hazard profiled in Section 2.5.6.
Chatham County Repetitive Loss Area Analysis, 2018; City of Savannah Repetitive Loss Area Analysis, 2021	The Chatham County and City of Savannah floodplain management plans were referenced in preparation of the flood hazard profiled in Section 2.5.6.

Resource Referenced	Influence in this Plan
Chatham County Community Wildfire Protection Plan, 2014 (CWPP)	The CWPP was referenced to develop the wildfire hazard profile in Section 2.5.13 and to prepare the Capability Assessment in Section 4.
Chatham County Emergency Operations Plan (EOP)	The EOP was referenced for the development of the Capability Assessment in Section 4.
Georgia Hazard Mitigation Strategy, 2024	The State Hazard Mitigation Strategy was used as a base for the hazard identification and was referenced in the development of hazard profiles in Section 2.
Hazard Risk Analysis Supplement to the Chatham County Joint Hazard Mitigation Plan, 2025	This report, developed by the University of Georgia under the direction of GEMA was utilized to address hazard risk for flood, tropical cyclone, and tornado hazards.
Southern Wildfire Risk Assessment Report	The report, developed and maintained by the Southern Group of State Foresters was utilized to develop the wildfire risk assessment.

1.2.1.2 Phase II – Risk Assessment

Planning Steps 4 and 5: Identify/Assess the Hazard and Assess the Problem

The HMPC completed a comprehensive effort to identify, document, and profile all hazards that have, or could have, an impact on the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. A draft of the risk and vulnerability assessment was made available on the plan website for the HMPC, stakeholders, and the public to review and comment. A more detailed description of the risk assessment process and the results are provided in Section 2 Hazard Identification & Risk Assessment.

The HMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk from vulnerability to hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. This information can be found in Section 4 Capability Assessment.

1.2.1.3 Phase III – Mitigation Strategy

Planning Steps 6 and 7: Set Goals and Review Possible Activities

The contractor facilitated brainstorming and discussion sessions with the HMPC that described the purpose and process of updating planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Section 3 Mitigation Strategy.

Planning Step 8: Draft an Action Plan

A complete first draft of the plan was prepared based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7. This draft was shared for HMPC, stakeholder, and public review and comment via the plan website. No public comments were received. HMPC and stakeholder comments, which were focused primarily on the hazard identification and risk assessment and the mitigation action plans, were integrated into the final draft for the Georgia Emergency Management Agency (GEMA) and FEMA Region IV to review and approve, contingent upon final adoption by the County and its participating jurisdictions.

1.2.1.4 Phase IV – Plan Maintenance

Planning Step 9: Adopt the Plan

To secure buy-in and officially implement the plan, the plan was reviewed and adopted by all participating jurisdictions. Resolutions are provided in Section 5.

Planning Step 10: Implement, Evaluate, and Revise the Plan

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. Up to this point in the planning process, the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Section 5: Plan Implementation and Maintenance provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The Section also discusses incorporating the plan into existing planning mechanisms and how to continue public involvement.

1.2.2 Hazard Mitigation Planning Committee

As with the previous plan, this Hazard Mitigation Plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC). The Committee's representatives included representatives of County, City, and Town departments; local, regional, and state agencies; citizens; and other stakeholders.

To reconvene the planning committee, a letter was sent via email to all County, City, and Town Hazard Mitigation Planning Committee (HMPC) contacts from the previous planning effort. Where staffing changed, emails were sent to appropriate staff from each jurisdiction. Each community was asked to designate a primary and secondary contact for the HMPC. Communities were also asked to identify local stakeholder representatives to participate in the HMPC alongside the County, City, and Town officials in order to improve the integration of stakeholder input into the plan. Table 1-4 details the HMPC members and the agencies and jurisdictions they represented.

Table 1-4 – HMPC Members

Jurisdiction	Representative	Position/Agency
Chatham County	Randall Mathews	CEMA
Chatham County	Tiffany Arant	CEMA
Chatham County	Jackie Jackson	Resilience
Chatham County	Suzanne Cooler	Engineering
Chatham County	Anthony Stephens	Facilities Maintenance & Operations
Chatham County	Andrew Cree	Information and Communication Systems
Chatham County	William Wright	Public Works
Chatham County	James Vickers	Chatham Fire Department
Chatham County	Chuck Kearns	Chatham Emergency Services
Chatham County	Melanie Wilson	Metropolitan Planning Commission
Chatham County	Anna McQuarrie	Metropolitan Planning Commission
Chatham County	Erik Riner	Georgia Southern University
Chatham County	Meisha Thomas	Savannah State University
Chatham County	Justin Pratt	Savannah-Chatham County Public School System
Chatham County	Dustin Hetzel	Savannah Airport
Bloomingdale	Ferman Tyler	Bloomingdale Fire Department
Bloomingdale	Blair Jeffcoat	Bloomingdale Police Department
Garden City	Mike Dick	Garden City Fire Department
Pooler	Rachael Brown	Zoning Administrator

Jurisdiction	Representative	Position/Agency
Pooler	Nicole Johnson	Planning and Development
Port Wentworth	Morgan Halloran	Port Wentworth EMA
Savannah	Dave Donnelly	Savannah Emergency Preparedness
Thunderbolt	Sean Clayton	Thunderbolt Police Department
Thunderbolt	Odis Boyles	Thunderbolt Fire Department
Tybee Island	Patricia Sinel	Community Development Director
Tybee Island	Pete Gulbronson	Tybee Island Public Works
Tybee Island	Justin McMillan	Tybee Island Fire Department
Tybee Island	Alan Robertson	Coastal Resilience
Vernonburg	Laura Lawton	Mayor
GEMA	Michaela Schiesser	Region 5 Mitigation Planning Specialist
GEMA	Kimberly Cook	Hazard Mitigation Planning Supervisor

The DMA planning regulations and guidance stress that to satisfy multi-jurisdictional participation requirements, each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the planning area the risk differs from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

For the Chatham County HMPC, "participation" meant the following:

- Providing facilities for meetings;
- Attending and participating in the HMPC meetings;
- Collecting and providing requested data (as available);
- Providing information on local capability;
- Providing an update on previously adopted mitigation actions;
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts;
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan;
- Coordinating and participating in the public input process; and
- Coordinating the formal adoption of the plan by local governing bodies.

During the planning process, the HMPC members communicated through virtual and in-person meetings, email, and telephone conversations. This continued communication ensured that coordination was ongoing throughout the entire planning process despite the fact that not all HMPC members could be present at every meeting. Additionally, draft documents were distributed via a Teams project site so that the HMPC members could easily access and review them and provide comments.

The formal HMPC meetings followed the 10 CRS Planning Steps. These meetings were essential for facilitating discussion, gaining consensus, and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the Plan. The meeting dates, locations, and topics discussed are summarized in Table 1-5. More details on

each meeting, including agendas, minutes, and sign-in sheets for the HMPC meetings are included in Appendix B. Public meetings are summarized in Table 1-6.

In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency. For example, completing the capability assessment, reporting on the status of existing actions, or seeking approval of specific mitigation actions for their department or agency to undertake and include in their Mitigation Action Plan. These meetings were informal and are not documented here.

Table 1-5 – Summary of HMPC Meetings

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
HMPC Mtg. #1 – Project Kickoff	1) Overview of the HMP planning process 2) HMPC roles and responsibilities 3) Proposed Goals Discussion 4) Proposed Hazards Discussion	February 11, 2025	Chatham County Park and Recreation 101 John J, Scott Drive, Savannah, GA 31406
HMPC Mtg. #2	1) Finalize Mitigation Goals 2) Finalize Hazards for Assessment 3) Capability Assessment Workshop 4) Mitigation Actions Workshop	March 26, 2025	Chatham County Park and Recreation 101 John J, Scott Drive, Savannah, GA 31406
HMPC Mtg. #3	1) Mitigation Goals Refresher 2) Public Survey Summary Review 3) Risk Assessment Summary Review 4) Open Discussion for Additional Mitigation Actions 5) Draft Plan Review and Public Comment Period Planning	August 27, 2025	Coastal Georgia Botanical Gardens 2 Canebrake Road Savannah, GA 31419

1.2.3 Involving the Public

An important component of any mitigation planning process is public participation. Individual citizen and community-based input provide the entire planning team with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions by developing community "buy-in" from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation of the hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of any community's overall mitigation strategy aimed at making a home, neighborhood, school, business, or entire planning area safer from the potential effects of hazards.

Public involvement in the development of the plan was sought using various methods including open public meetings, a public participation survey, and by making copies of draft plan documents available for public review online.

All public meetings were advertised on the Chatham County website, which was shared on local community websites, and via social media outlets like Facebook and X (formerly known as Twitter). Copies of meeting announcements are provided in Appendix B. The public meetings held during the planning process are summarized in Table 1-6.

Table 1-6 – Summary of Public Meetings

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
Public Meeting	1) Mitigation Goals Overview 2) Public Survey Summary 3) Risk Assessment Summary 4) Public Comment Period Planning 5) Open Discussion	August 27, 2025	Coastal Georgia Botanical Gardens 2 Canebrake Road Savannah, GA 31419

1.2.4 Outreach Efforts

The HMPC agreed to employ a variety of public outreach methods including established public information mechanisms and resources within the community. Table 1-7 details public outreach efforts employed during the preparation of this plan.

Table 1-7 – Public Outreach Efforts

Location	Date	Event/Message
Savannah Convention Center	May 8, 2025	Chatham Emergency Management Agency (CEMA) held its 23rd Annual Hurricane Conference. Almost 400 people attended the event to share what they have learned, talk about past experiences, and explore better ways to help their communities during hurricanes and other disasters.
Public Survey Advertisements	May 13, 2025	The weblink to the public survey was advertised on the CEMA website and social media. An email was provided to the Hazard Mitigation Planning Committee asking them to advertise and share the link on their own jurisdiction's web and social media pages.
Online/Internet	May 13, 2025–May 30, 2025	An online public survey was open to provide community members an opportunity to share information about their preparedness and mitigation activities, hazards of concern, and personal disaster impacts.
Press Release	August 21, 2025	Public Meeting #1 announced

Public involvement activities for this plan update included press releases, social media outreach, a public survey, and the collection of public and stakeholder comments on the draft plan.

A public outreach survey was made available on May 13, 2025, and remained open for response until May 30, 2025. The public survey requested public input that provided insight into geographic location, living conditions, personal emergency preparedness, hazard concerns, and the identification of personal and public mitigation activities to lessen the risk and impact of future hazard events. The survey is shown in Appendix B. In total, 47 survey responses were received. Detailed survey results are provided in Appendix B.

The following is a list of high-level summary results and analysis derived from survey responses:

- 38% of respondents were from the City of Savannah, 21% were from unincorporated Chatham County, 15% were from Pooler, and 15% were from Tybee Island. The remainder were from Vernonburg, didn't provide a location, or didn't live in the county.
- 68% of respondents own their home and 72% live with family.
- 21% rely on non-motorized transportation (bicycles, skateboards, etc.), pedestrian, public and/or commercial transit.

- 64% expressed some concern over food, medical, housing, or transportation vulnerability.
- 80% utilize social media (and other sources) for emergency preparedness information.
- At least 98% of respondents have taken some emergency preparedness action.
- 23% acknowledged that the cost of emergency preparedness is a challenge or barrier for them.
- 60% or more noted that extreme heat, flooding, hurricanes, infrastructure failures, and severe weather events (thunderstorm, lightning, hail) were their biggest concerns for life safety and property damage.
- 47% have experienced injury, loss of life, or property damage from hazards impacting Chatham County.

At least 70% of respondents have performed some personal risk reduction activity. Public Survey results were presented to the HMPC during Meeting #3, which included discussion on updating mitigation strategies to address concerns and vulnerabilities provided by the community.

1.2.5 Involving Stakeholders

In addition to representatives of each participating jurisdiction, the Hazard Mitigation Planning Committee included a variety of stakeholders. Stakeholders on the HMPC included representatives from Savannah Airport, Savannah-Chatham County Public School System, the Metropolitan Planning Commission, Georgia Southern University, and others. Representatives from Georgia Emergency Management and Homeland Security (GEMA) were also invited to attend HMPC meetings. Input from additional stakeholders, including neighboring communities, was solicited through direct email invitations to the open public meetings and distribution of the public survey. However, if any additional stakeholders representing other agencies and organizations participated through the public survey, that information is unknown due to the anonymous nature of the survey. Documentation of outreach to stakeholders is provided in Appendix B.

1.3 UPDATES AND REVISIONS TO THE PLAN

1.3.1 Updates and Revisions by Section

This plan presents a complete update to the 2020 Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan. All jurisdictions that participated in the 2020 plan were also involved in this plan update. The previous plan was approved by FEMA on January 19, 2021. For this update, the 2020 plan was used as a base for incorporation of new data and an updated planning process. Changes by section are summarized as follows:

Section 1 has been updated to reflect the 2025 planning process. Portions of this section were re-written and/or condensed for clarity. Supporting documentation of the planning process was compiled separately in Appendix B to improve organization and readability. This section also presents data on mitigation actions from the 2020 plan that were completed or deleted as a way to report on implementation progress of the 2020 plan and separate these removed actions from those that the county and participating jurisdictions will be pursuing moving forward.

Section 2 includes risk and vulnerability data for each hazard in a single plan section. Updated data has been incorporated into each hazard profile. Communicable Disease, conflagration, and tsunami were added as new hazards. The Hurricane hazard name was changed to Tropical Cyclone to be inclusive of tropical storms and tropical depressions. The Terror Threat hazard was renamed to Hostile Events to more broadly cover acts of violence in the county; Cyberattack was separated from Hostile Events into its own hazard profile. New vulnerability analysis was performed based on updated parcel and Census data. Where still relevant, data from the 2020 was carried forward and incorporated into this section.

Section 3 presents the mitigation strategy, which discusses the plan goals and objectives, the categories of mitigation alternatives considered, and the process used to prioritize mitigation actions. This section also presents the mitigation action plan for countywide actions; jurisdiction-specific actions are provided with the jurisdictional profiles and risk assessments in Annex A-H. In keeping with the 2020 plan, all mitigation actions have been grouped based on the mitigation category they fall within. Existing mitigation actions have been updated with a current status and new mitigation actions have been identified Existing and new actions for each jurisdiction are presented together in single Mitigation Action Plan tables.

Section 4 presents a summary of the capability assessment conducted to gauge each jurisdiction's existing abilities and resources to implement mitigation activities.

Section 5 outlines the process for adoption, implementation, monitoring, and maintenance of the plan.

A table at the beginning of each section of this plan provides a more detailed description of the updates and revisions that were made.

1.3.2 Summary of Key Updates

This hazard mitigation plan update involved a comprehensive review and update of each section of the existing plan and an assessment of the success of the County and participating municipalities in evaluating, monitoring and implementing the mitigation strategy outlined in their existing plans. Only the information and data still valid from the existing plan was carried forward as applicable into this update. The following requirements were addressed during the development of this plan update:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Analyze and document risk to any jurisdictional assets outside Chatham County
- Review and analyze risks from high hazard potential dams outside Chatham County that would have cascading impacts within the county;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Table 1-8 provides a comparison of the hazards addressed in the 2024 Georgia Hazard Mitigation Strategy and the 2025 Chatham County plan and provides the final decision made by the HMPC as to which hazards should be included in the updated 2025 Chatham County Multi-Jurisdictional Plan.

Table 1-8 – Hazard Identification Summary

Hazard	Included in 2024 State GHMS?	Included in 2020 Chatham County HMP?	Included in 2025 Chatham County HMP Update?
Coastal Hazards (Storm Surge & Coastal Flooding)	Yes	Yes (addressed under Flood and Hurricane)	Yes (addressed under Flood and Tropical Cyclone)
Communicable Disease	No	No	Yes
Conflagration	No	No	Yes
Cyberattack	Yes	No	Yes
Dam Failure	Yes	Yes	Yes
Drought	Yes	Yes	Yes
Earthquake	Yes	Yes	Yes

Hazard	Included in 2024 State GHMS?	Included in 2020 Chatham County HMP?	Included in 2025 Chatham County HMP Update?
Erosion	No	Yes	Yes
Extreme Heat	Yes	Yes	Yes
Geologic Hazards (Sinkhole & Landslide)	Yes	No	No (Not a significant concern for the planning area)
Hazardous Materials Incident	No	Yes	Yes
Hurricane Wind	Yes	Yes (addressed under Hurricane and Severe Weather)	Yes (Tropical Cyclone)
Inland Flooding	Yes	Yes (Flood)	Yes (Flood)
Sea Level Rise	Yes (Coastal Hazards)	Yes	Yes
Severe Weather (Lightning & Hail)	Yes	Yes (includes Thunderstorm Wind)	Yes (includes Thunderstorm Wind)
Severe Winter Weather	Yes	Yes	Yes
Terror Threat	No	Yes	Yes (Hostile Event)
Tornado	Yes	Yes	Yes
Tsunami	Yes (Earthquake)	No	Yes
Wildfire	Yes	Yes	Yes
Wind	Yes	Yes (addressed under Hurricane and Severe Weather)	Yes (addressed under Tropical Cyclone and Severe Weather)

In addition to the specific changes in hazard analyses in Section 2.5, the following items were also addressed in this 2025 plan update:

- GIS and HAZUS were used, to the extent data allowed, to analyze the priority hazards as part of the vulnerability assessment.
- Assets at risk to identified hazards were identified by property type and values of properties based on parcel data and a critical facilities inventory provided by Chatham County.
- While no longer required the HMPC maintained the discussion on climate change and its projected effect on specific hazards was included in each hazard profile in the risk assessment.
- The discussion on growth and development trends was enhanced utilizing 2024 American Community Survey data.
- Enhanced public outreach and agency coordination efforts were conducted throughout the plan update process in order to meet the more rigorous requirements of the 2017 CRS Coordinator's Manual and its 2021 addendum, in addition to DMA requirements.

1.3.3 Mitigation Strategy Revisions

Progress on the mitigation strategy developed in the previous plan is also documented in this plan update. Table 1-9 details the status of mitigation actions from the previous plan. Table 1-10 on the following pages details all completed and deleted actions from the 2020 plan. More detail on the actions being carried forward is provided in Section 3: Mitigation Strategy.

Table 1-9 – Status of Previous Mitigation Actions

Jurisdiction	Completed	Deleted	Carried Forward
Chatham County	1	2	66
City of Bloomingdale	0	0	9
City of Garden City	14	0	6
City of Pooler	1	1	10
City of Port Wentworth	0	2	6
City of Savannah	2	0	15
Town of Thunderbolt	0	0	13
City of Tybee Island	3	0	14
Total	**21**	**5**	**139**

Note: The Town of Vernonburg was included under unincorporated Chatham County for this plan.

Table 1-10 – Completed and Deleted Actions from the 2020 Plan

Jurisdiction	Action #	Action Description	2025 Implementation Status	2025 Implementation Status Comments
County	PP-14	Protect generator at CNT Building through construction of housing and/or relocation.	Completed	
County	P-8	Harden critical facilities based on engineering study.	Deleted	
County	PP-8	Work with utility departments and companies to inspect and remove trees that, if damaged, would threaten utility infrastructure and critical facilities.	Deleted	
Garden City	P-1	Revise and adopt Garden City Local Design Manual and flood damage prevention ordinance to higher regulatory and design standards.	Completed	
Garden City	PP-1	Harden roof, windows, doors and rooftop units for critical facilities	Completed	
Garden City	PP-3	Upsize, install and/or raise generator at various critical facilities in the City	Completed	
Garden City	PP-6	Anchor HVAC units and Storage Tanks	Completed	
Garden City	PP-8	Elevate or dry floodproof components or systems vulnerable to flood damage	Completed	
Garden City	PP-9	Install sewer access covers for instances where elevation is not feasible or practical	Completed	
Garden City	PP-10	Seal exposed portions of well systems or raise the elevation of the well head to prevent infiltration of flood waters	Completed	
Garden City	SP-2	Raise all manholes city-wide within the 100-year floodplain	Completed	
Garden City	ES-1	Fixed site generators for critical facilities	Completed	
Garden City	ES-2	Portable generators for critical facilities	Completed	
Garden City	ES-3	Purchase and install generator quick connects and transfer switches for critical facilities	Completed	
Garden City	ES-4	Conduct hazardous materials training, response and recovery exercises	Completed	
Garden City	PEA-1	Increase public education and awareness utilizing an all-hazards approach in the City via various outreach methods (print, tv, radio, social media, etc.)	Completed	

Jurisdiction	Action #	Action Description	2025 Implementation Status	2025 Implementation Status Comments
Garden City	PEA-3	Provide outreach to vulnerable populations via various outreach methods (print, tv, radio, social media, etc.)	Completed	
Pooler	PP-1	Purchase and install bypass pumps	Completed	
Pooler	PP-4	Install safe room in critical facilities in the city's jurisdiction	Deleted	Deleted. Not feasible as other identified mitigation actions will more effectively address the need for this action.
Port Wentworth	PP-1	Elevate Lift Stations	Deleted	
Port Wentworth	ES-2	Portable generators for critical facilities	Deleted	
Savannah	P-1	Modify Flood Damage Prevention Ordinance (FDPO) to include LiMWA criteria.	Completed	
Savannah	PEA-3	Purchase a Ward's® Stormwater Floodplain Simulation System and cargo case.	Completed	
Tybee Island	PP-5	Purchase and install shutters for the guard house	Completed	
Tybee Island	PP-7	Anchor HVAC units and storage tanks	Completed	
Tybee Island	SP-2	Construct flood prevention barriers	Completed	

1.4 PLAN ORGANIZATION

The Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan is organized into the following sections:

- Section 1: Planning Process
- Section 2: Hazard Identification & Risk Assessment
- Section 3: Mitigation Strategy
- Section 4: Capability Assessment
- Section 5: Plan Implementation and Maintenance
- Annex A: Chatham County Unincorporated Areas*
- Annex B: City of Bloomingdale
- Annex C: City of Garden City
- Annex D: City of Pooler
- Annex E: City of Port Wentworth
- Annex F: City of Savannah
- Annex G: Town of Thunderbolt
- Annex H: City of Tybee Island
- Appendix A: Local Mitigation Plan Review Tool
- Appendix B: Planning Process Documentation
- Appendix C: Mitigation Alternatives
- Appendix D: References
- Appendix E: GMIS and HAZUS Report
- Appendix F: Southern Wildfire Risk Assessment Report

*For the purpose of this plan, Vernonburg participated as part of the unincorporated county. Data and risk analysis for the town is factored into this annex.

1.5 HAZARD, RISK, AND VULNERABILITY SUMMARY

The hazards addressed in this plan were chosen by the HMPC based on the previous plan, the current Georgia State Mitigation Strategy, and consideration of hazard frequency and potential severity of damage. Wherever possible, probability of future occurrences was based on historical occurrence data.

The conclusions drawn from each individual hazard profile and vulnerability assessment were used to prioritize all potential hazards to Chatham County using the Priority Risk Index (PRI). This method provides a standardized numeric value to each hazard for comparability. A higher PRI value indicates a hazard poses a higher risk to the community. The PRI is a weighted sum of values assigned across five categories: probability, impact, spatial extent, warning time, and duration. Each hazard is assigned a value between 1 and 4 for each category based on a defined set of criteria. Details on these values can be found in Section 2.3. Table 1-11 below summarizes the PRI results for the hazards addressed in this plan.

Table 1-11 – Summary of PRI Results

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Communicable Disease	Unlikely	Critical	Large	More than 24 hrs	More than 1 week	2.5
Conflagration	Unlikely	Critical	Moderate	Less than 6 hrs	Less than 24 hrs	2.4
Cyberattack	Unlikely	Catastrophic	Large	Less than 6 hrs	Less than 1 week	2.7
Dam Failure	Unlikely	Limited	Negligible	Less than 6 hrs	Less than 1 week	1.8
Drought	Likely	Limiteed	Large	More than 24 hrs	More than 1 week	2.8
Earthquake	Unlikely	Minor	Large	Less than 6 hrs	Less than 6 hrs	1.9

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Erosion	Likely	Limited	Small	More than 24 hrs	Less than 1 week	2.5
Extreme Heat	Highly Likely	Critical	Large	More than 24 hrs	Less than 1 week	3.3
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 1 week	3.3
Sea Level Rise	Likely	Critical	Moderate	More than 24 hrs	More than 1 week	2.9
Severe Weather (Hail)[1]	Highly Likely	Limited	Small	Less than 6 hrs	Less than 6 hrs	2.4
Severe Weather (Lightning)[1]	Highly Likely	Limited	Negligible	Less than 6 hrs	Less than 6 hrs	2.2
Severe Weather (Winds)[1]	Highly Likely	Critical	Large	Less than 6 hrs	Less than 6 hrs	3.1
Severe Winter Weather	Likely	Limited	Large	More than 24 hrs	Less than 1 week	2.7
Tornado	Likely	Critical	Small	Less than 6 hrs	Less than 6 hrs	2.7
Tropical Cyclone (Hurricane & Tropical Cyclone)	Likely	Catastrophic	Large	More than 24 hrs	Less than 1 week	3.3
Tsunami	Unlikely	Limited	Small	Less than 6 hrs	Less than 6 hrs	1.8
Wildfire	Likely	Critical	Moderate	Less than 6 hrs	Less than 1 week	3.1
Hazardous Materials	Likely	Critical	Moderate	Less than 6 hrs	Less than 24 hrs	3.0
Hostile Event	Unlikely	Catastrophic	Negligible	Less than 6 hrs	More than 1 week	2.5

1.6 MULTI-JURISDICTIONAL PARTICIPATION AND SPECIAL CONSIDERATIONS

This plan update includes unincorporated Chatham County as well as eight incorporated municipalities. To satisfy multi-jurisdictional participation requirements, each participating jurisdiction was required to perform the following tasks:

- Designate representatives for the HMPC to participate in mitigation planning meetings;
- Report on the status of existing mitigation projects; and
- Develop their local Mitigation Action Plan.

For this plan update, the Town of Vernonburg joined as a participant in the plan. However, due to Vernonburg's small size and limited capacity, they have participated in this plan update in a joint effort with the County. Therefore, the Mitigation Action Plan for Chatham County reflects actions for both the unincorporated areas and the Town of Vernonburg.

In developing the Chatham County Mitigation Action Plan, the County invited representatives of special interest groups to incorporate mitigation actions that will reduce the effects of hazards on vulnerable segments of the County's population. Foreseeable factors include early warning specifically directed to those groups to facilitate preparations for evacuation, identification of transportation system elements adapted to their needs, and preparation of shelters/reception areas for special needs. Stakeholders were also invited to participate in this process and have developed their own mitigation actions, such as protection and backup power generation for non-County-owned critical facilities.

To support each jurisdiction's evaluation of mitigation alternatives, Appendix C reviews a selection of actions considered within each mitigation category.

As a basis for each jurisdiction creating their own Mitigation Action Plan, jurisdiction-specific information was developed on current conditions, assets and exposure, risk and vulnerability, and capability. Current conditions information is provided in Section 1.8 Community Data, which has a countywide summary of geographic and demographic data. More specific data is presented for each jurisdiction in Annexes A-H. Asset and exposure data is detailed by jurisdiction in Section 2.4, with more details provided in the jurisdictional annexes. The risk assessment also provides jurisdictional specific vulnerability data, such as

repetitive loss counts for flood. At the end of each hazard profile for natural hazards, a hazard summary table provides a Priority Risk Index (PRI) rating by jurisdiction to note any variations in risk across the planning area. Where applicable, jurisdictional annexes also include more detailed hazard mapping and data.

The following jurisdictional specific considerations were identified in the 2025 plan and remain relevant to this planning effort:

- The City of Savannah has the highest concentration of families living below the poverty level as well as almost all of the historic properties within the County. It is therefore necessary to consider the financial ability of individuals to mitigate, evacuate or recover from an event. It is also necessary to limit mitigation of structures to activities that will not impact their historic designation. Additional details on vulnerability of historic structures to flood can be found in the City of Savannah's Flood Mitigation Plan.
- Garden City has several mobile home communities as well as a significant Hispanic population. Some hazard information and preparedness materials are available in Spanish, but there is a need to consider this special needs group when planning.
- Chatham County attracts more than six million tourists annually, which can present challenges with regard to informing the public, including visitors, about hazards and mitigation and preparedness measures.
- The Savannah State University campus straddles the Savannah-Chatham County boundary near the Wilmington River and includes more than 40 structures, several of which are in a Category 3 Storm Surge zone or lie near the 100-year flood plain. All three of the Georgia Institute of Technology Savannah buildings fall within the Category 4 storm surge risk zone and can be considered to be at risk from tornadoes or coastal storm winds. The Georgia Southern University (GSU) campus can be considered at risk from tornadoes or coastal storm winds. There are a total of 64 buildings on the GSU campus. The Savannah College of Art and Design has approximately 60 structures throughout the Savannah Historic District and other locations; SCAD facilities can be considered to face risks similar to the City of Savannah overall.

1.7 ADOPTION, IMPLEMENTATION, MONITORING, AND EVALUATION

Upon FEMA approval, this plan will be adopted by Chatham County and all participating jurisdictions by passing a resolution. The purpose of formally adopting this plan is to secure buy-in from all participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. Each participating jurisdiction (Chatham County, Bloomingdale, Garden City, Pooler, Port Wentworth, Savannah, Thunderbolt, Tybee Island, and Vernonburg) is responsible for plan implementation within their jurisdiction. Elected officials, officials appointed to head County, City, and Town departments, and community staff are charged with leading implementation of various activities in the plan. Each participating jurisdiction will need to decide which action(s) to undertake first based on the priority assigned to the actions in the planning process and the availability of funding and administrative support. Low or no-cost actions are often the easiest way to demonstrate progress toward successful plan implementation.

CEMA will be responsible for establishing an annual schedule to monitor, evaluate, and update this plan with the continued support of the HMPC. The HMPC's primary duty moving forward is to see the plan successfully carried out and report to each local governing body, CEMA, GEMA, and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and

promoting mitigation proposals, considering stakeholder concerns about mitigation, passing concerns on to appropriate entities, and posting relevant information on local websites (and others as appropriate).

More details on the procedures for plan adoption, implementation, monitoring, and evaluation are provided in Section 5.

1.8 COMMUNITY DATA

1.8.1 Overview of the Community

Chatham County is located in the U.S. state of Georgia on the state's Atlantic coast. The county seat and largest city is Savannah. One of the original counties of Georgia, Chatham County was created February 5, 1777, and is named after William Pitt, 1st Earl of Chatham. Chatham County is the northernmost of Georgia's coastal counties and is bounded by the Savannah River to the north and the Ogeechee River to the south.

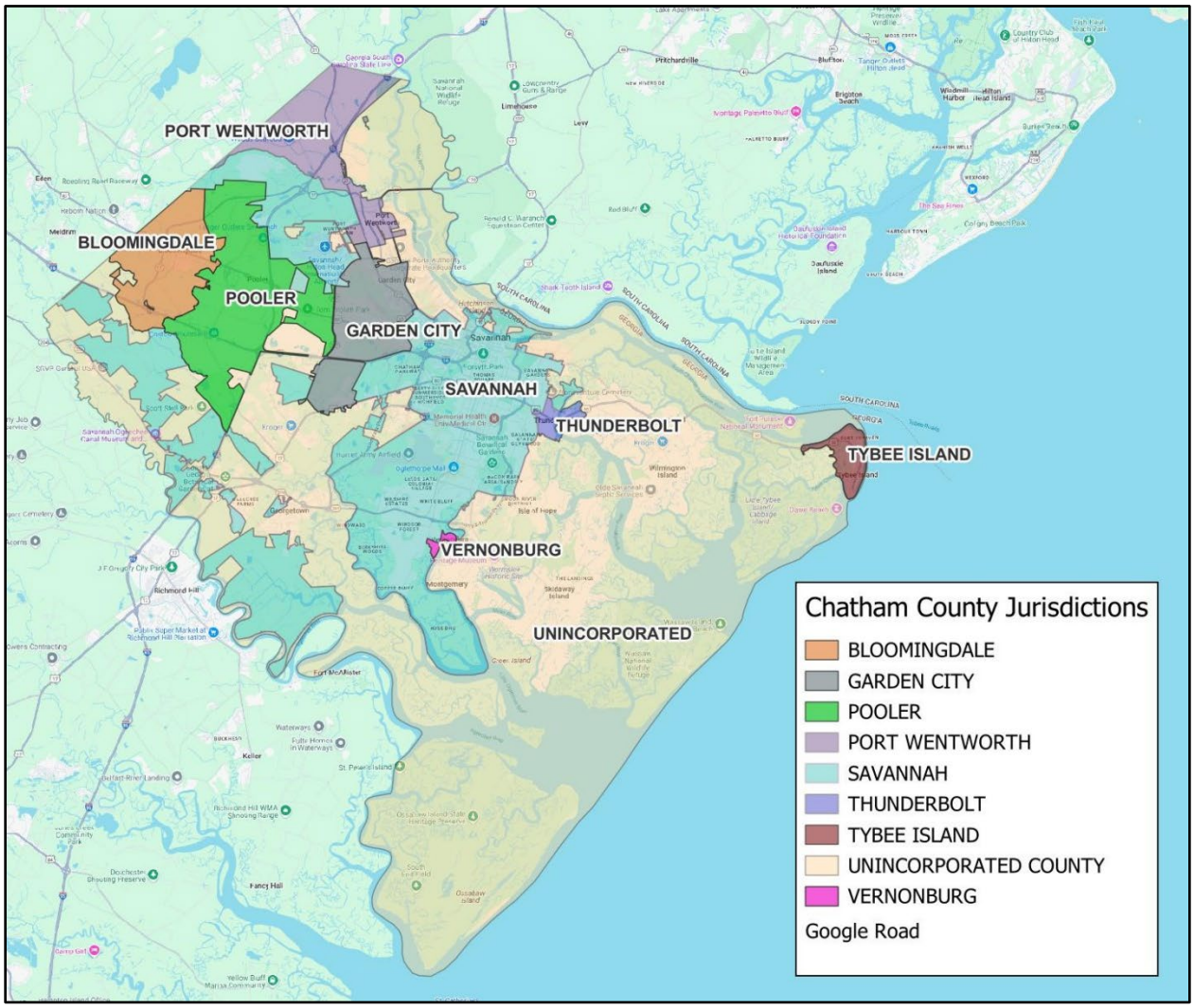
Chatham County has a total area of 629.97 square miles. It is important to note that the Chatham County – Savannah Metropolitan Planning Commission recognizes the county as having 522 square miles of land, marsh, and water (excluding open bodies of water), which is the area used for assessing risk and vulnerability in this plan. Of that, the County has 432.72 square miles of land area.[1] According to the U.S. Census Bureau estimates, the total population of Chatham County was 307,336 in 2024.[2] Therefore, the County's average population density is approximately 710 people per square mile of land area. Note that 2024 Census data was the most recent available at the time of this plan development.

The Location Map in Figure 1-1 reflects the boundaries of the County as well as the jurisdictions within the County.

[1] https://data.census.gov/profile?q=Chatham%20County,%20Georgia%20Stockbridge-Munsee. Retrieved 11-19-2024.

[2] https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html. Retrieved 11-19-2024.

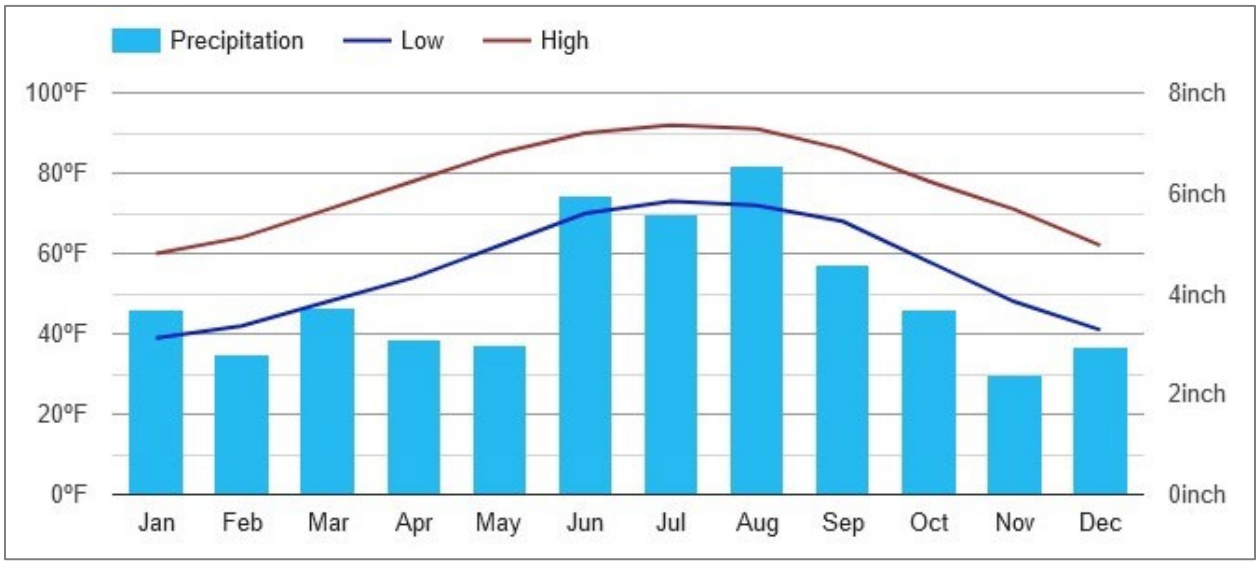
Figure 1-1 – Location Map



1.8.2 Geography and Climate

According to the Köppen climate classification system, Chatham County is classified as subtype Cfa (Humid Subtropical Climate) characterized by relatively high temperatures and evenly distributed precipitation throughout the year. The average temperature for the year is 67°F[3], which is up from 66.8°F in 2020. Figure 1-2 shows the average monthly precipitation totals based on average monthly temperature maximums and minimums from a weather station in Savannah, GA.

Figure 1-2 – Average Monthly Precipitation Chart



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average High in °F	60	64	71	78	85	90	95	97	86	78	71	62
Average Low in °F	39	42	48	54	62	70	73	72	68	58	48	41
Average precipitation in inches	3.69	2.79	3.73	3.07	2.98	5.95	5.60	6.56	4.58	3.69	2.37	2.95

Source: U.S. Climate Data Savannah-Hunter Army Airfield

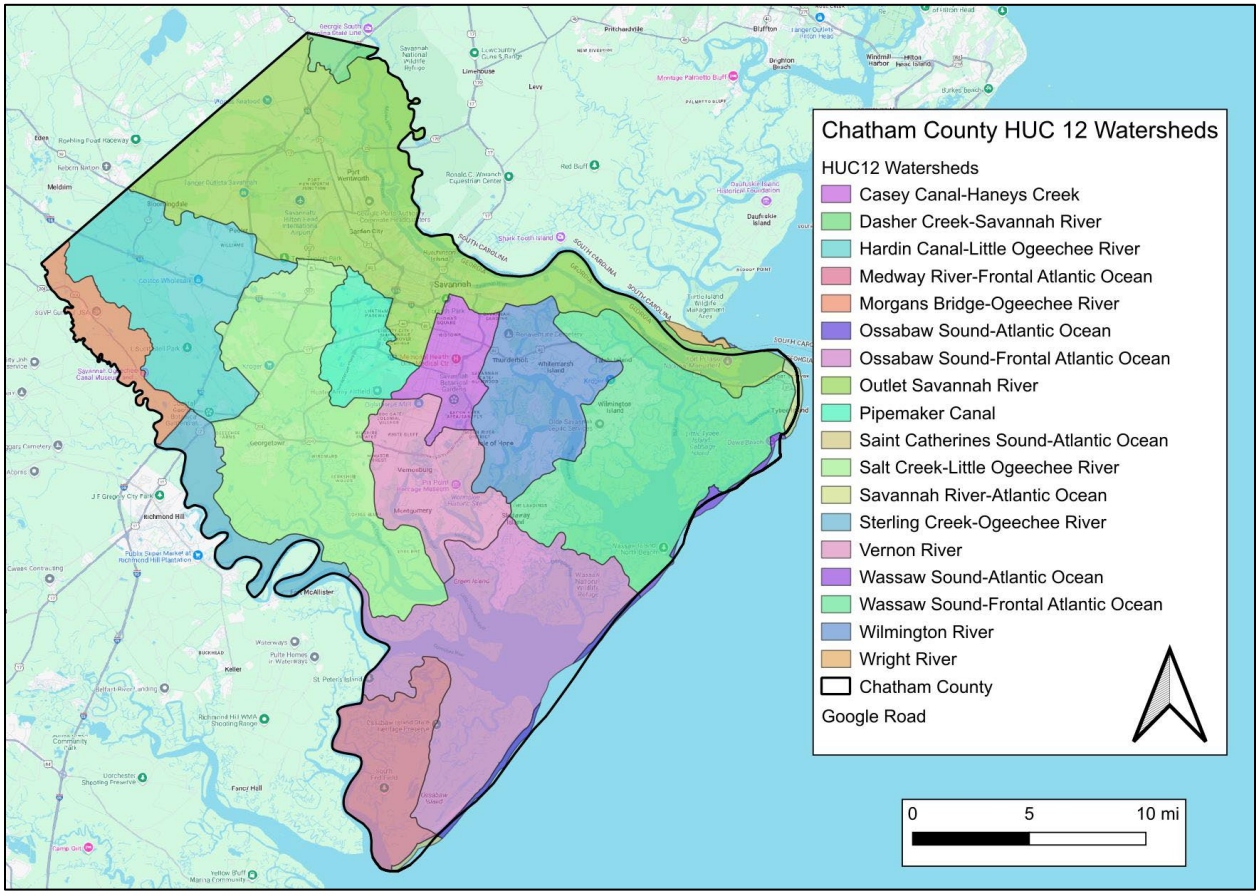
Portions of Chatham County lie within 18 different HUC 12 watersheds as summarized in Table 1-12 below. The HUC 12 Drainage Basin Map illustrates the HUC 12 drainage basins and drainage features in and around Chatham County. More information about the watersheds is available in the 2020 Chatham County Coastal Watershed Management Plan.

[3] https://en.climate-data.org/north-america/united-states-of-america/georgia-1014/

Table 1-12 – HUC 12 Watersheds

Name	Total Area (Sq Miles)	Inside Chatham County	Outside Chatham County	Drains into HUC	HUC 12 Number
Dasher Creek – Savannah River	87.86	**3.11**	84.75	Outlet Savannah River	030601090305
Wright River	42.28	**0.004**	42.27	Atlantic Ocean	030601090306
Outlet Savannah River	196.73	**109.31**	87.42	Atlantic Ocean	030601090307
Wilmington River	32.75	**32.75**	0.00	Wassaw Sound – Frontal Atlantic Ocean	030602040101
Wassaw Sound – Frontal Atlantic Ocean	69.90	**68.8**	1.10	Wassaw Sound – Atlantic Ocean	030602040102
Hardin Canal – Little Ogeechee River	74.75	**47.94**	26.81	Salt Creek – Little Ogeechee River	030602040201
Pipemakers Canal	14.41	**14.41**	0.00	Salt Creek – Little Ogeechee River	030602040202
Morgans Bridge – Ogeechee River	117.02	**13.7**	103.32	Sterling Creek – Ogeechee River	030602020605
Casey Canal – Haneys Creek	13.78	**13.78**	0.00	Vernon River	030602040302
Salt Creek – Little Ogeechee River	73.24	**73.24**	0.00	Ossabaw Sound – Frontal Atlantic Ocean	030602040203
Sterling Creek – Ogeechee River	67.43	**14.11**	53.32	Ossabaw Sound – Frontal Atlantic Ocean	030602040301
Vernon River	27.98	**27.98**	0.00	Ossabaw Sound – Frontal Atlantic Ocean	030602040303
Ossabaw Sound – Frontal Atlantic Ocean	86.63	**69.55**	17.08	Ossabaw Sound – Atlantic Ocean	030602040304
Medway River – Frontal Atlantic Ocean	96.61	**24.14**	72.47	Saint Catherines Sound – Atlantic Ocean	030602040502
Savannah River – Atlantic Ocean	0.73	**0.73**	0.00	Ocean	030601090309
Wassaw Sound – Atlantic Ocean	0.96	**0.96**	0.00	Ocean	030602040103
Ossabaw Sound – Atlantic Ocean	1.67	**1.67**	0.00	Ocean	030602040305
Saint Catherines Sound – Atlantic Ocean	0.35	**0.35**	0.00	Ocean	030602040503

Figure 1-3 – HUC 12 Watersheds, Chatham County



Source: SAGIS, Dataset updated January 5, 2022

1.8.3 Cultural, Historic, and Natural Resources

1.8.3.1 Cultural and Historic Resources

Cultural and historic resources are summarized in the community annexes for each of the jurisdictions within the County.

1.8.3.2 Parks, Preserves, and Conservation

Parks, preserves, and conservation are summarized in the community annexes for each of the jurisdictions within the County.

1.8.3.3 Natural Resources

Floodplains and Flood Zones

FEMA flood zone designations within Chatham County are identified in the figure below. The flood hazard areas shown are designated by the Federal Emergency Management Agency (FEMA) and include: Zone A (subject to inundation by the 1% annual-chance flood event with no base flood elevation (BFE) determined), Zone AE (subject to inundation by the 1% annual-chance flood event with BFE determined), Zone VE (subject to inundation by the 1% annual-chance flood event with additional hazards due to storm waves with BFE determined), and Zone X (Moderate Risk areas outside the 1% and inside the 0.2% annual-

chance floodplains (X500 zone) with no BFE or base flood depths determined and Minimal Risk areas outside the 0.2% annual chance floodplain).

Table 1-13 – Flood Zones, Chatham County

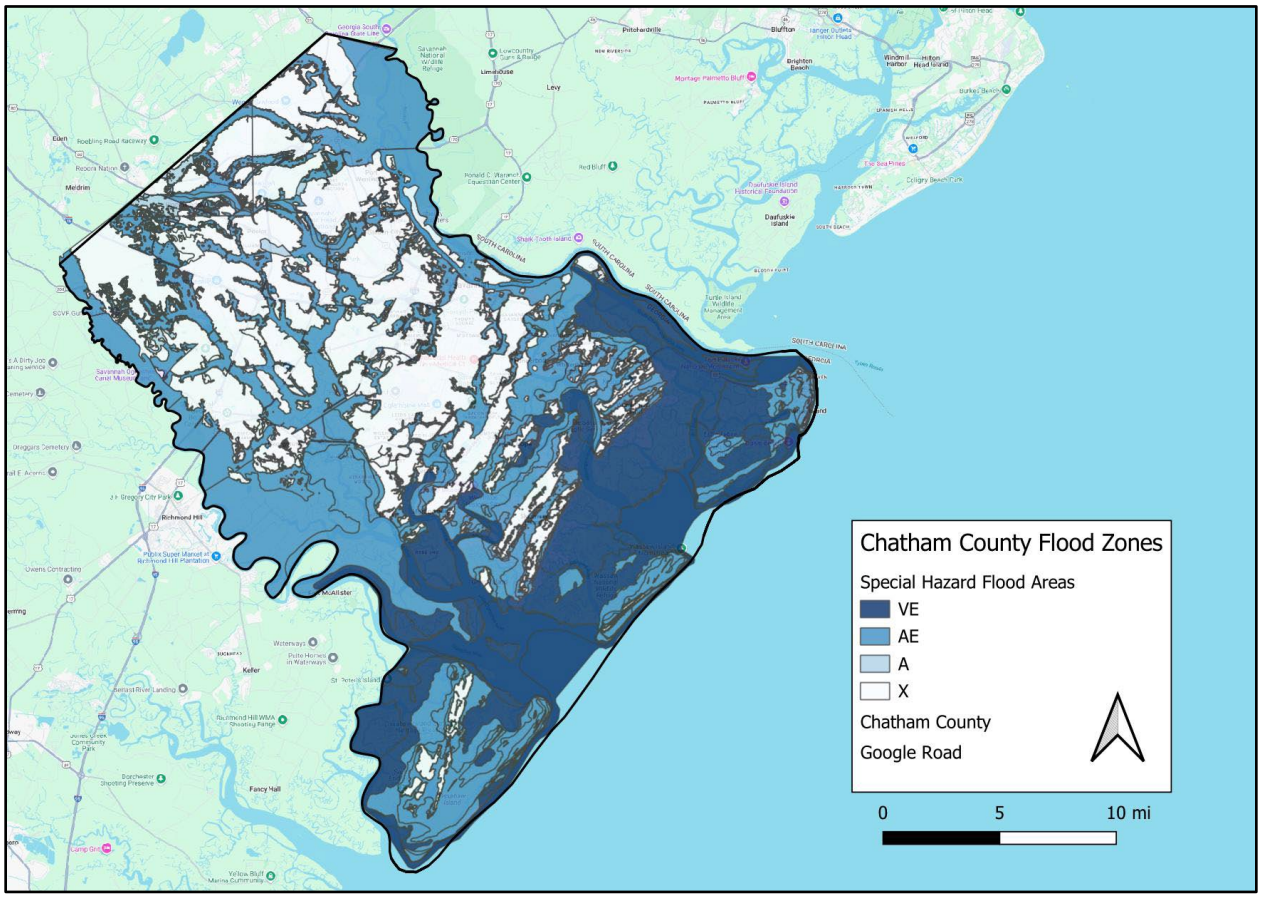
Flood Zone	Area (Acres)	Area (Square Miles)	Percent of County (%)
Outside of Flood Zones / Ocean	72,784	113.73	18.1
A	2,282	3.57	0.6
AE	128,336	200.53	31.8
VE	86,870	135.73	21.5
X500	21,022	32.85	5.2
X	91,886	143.57	22.8
TOTAL	**403,180**	**629.97**	**100.0**

Source: FEMA National Flood Hazard Layer, 2024

According to the 2024 FEMA data, 339.83 square miles of the County is located within a 100-year floodplain (Zone AE, A, and VE), which equals about 50.5 percent of the County. An additional 143.57 square miles are located within moderate or minimal flood hazard areas (22.8%). With over 50 percent of the County at high risk to flooding in the Special Flood Hazard Area (SFHA), Chatham County should seek ways to balance future development with strategies to preserve sensitive lands and natural drainage features.

Natural and Beneficial Floodplain Functions: Under natural conditions, a flood causes little or no damage in floodplains. Nature ensures that floodplain flora and fauna can survive the more frequent inundations, and the vegetation stabilizes soils during flooding. Natural floodplains in the County include wetland areas and low-lying land along the major rivers in and around the unincorporated County including the Ogeechee River, Little Ogeechee River, Vernon River, Wilmington River, South Channel of the Savannah River, and the Atlantic Ocean. Natural floodplains reduce damage by allowing flood waters to spread out over large areas, aiding infiltration into the ground, reducing flow rates, and acting as a flood storage area to reduce downstream peaks.

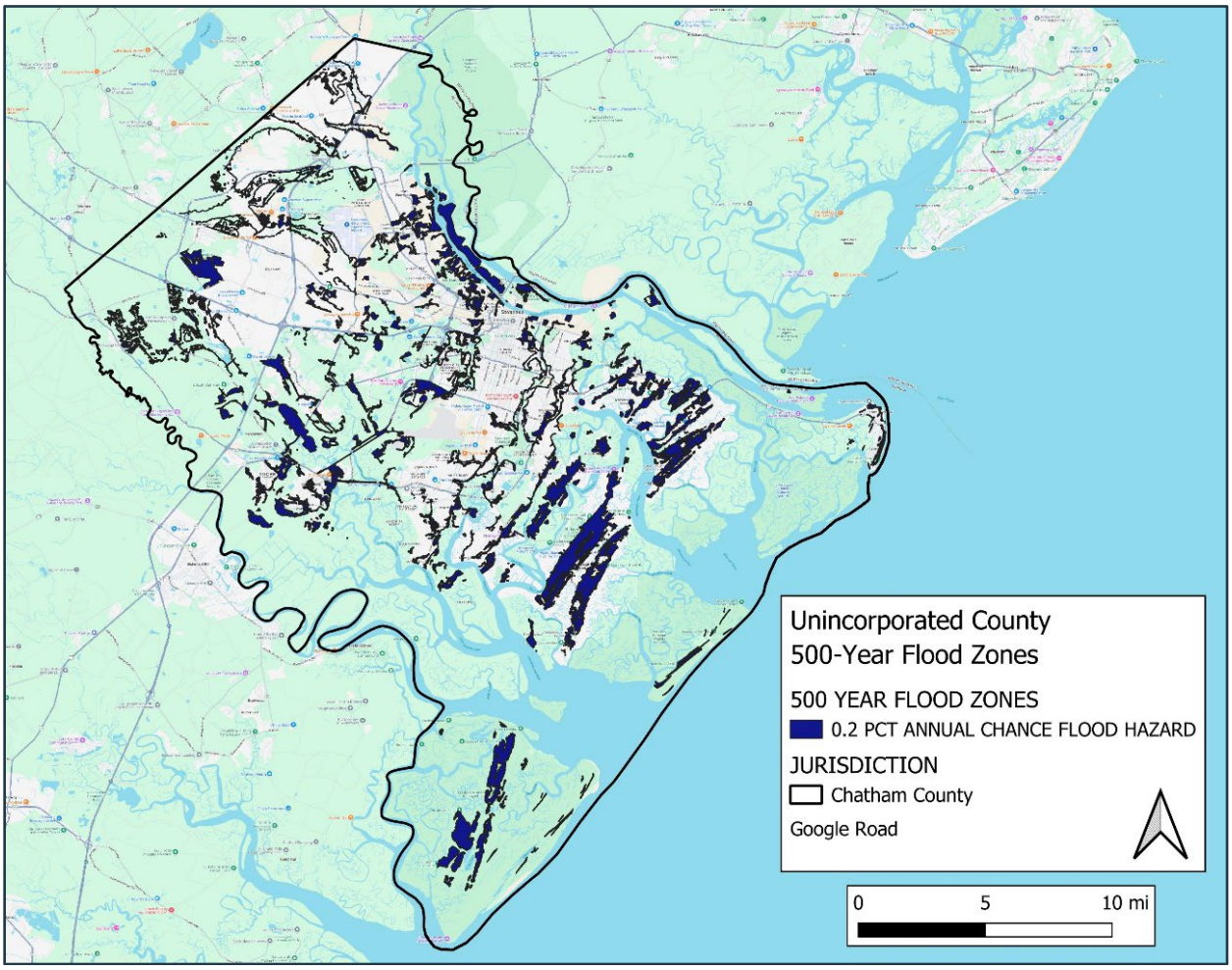
Figure 1-4 – FEMA Flood Zone Map, Chatham County



Source: FEMA National Flood Hazard Layer, 2024

A 500-year flood zone, also known as the X500 zone, represents areas with a 0.2% probability of flooding in any given year. While less likely to flood than areas within the 100-year floodplain, these zones can still experience significant flooding during extreme events. The X500 zone for Chatham County is depicted in the map below and represented in Table 1-13 above.

Figure 1-5 – FEMA X500 Zone Map, Chatham County



Source: FEMA National Flood Hazard Layer, 2024

Wetlands

Wetlands benefit the ecosystem by storing, changing, and transmitting surface water and groundwater. Through these processes pollution is removed, nutrients are recycled, groundwater is recharged, and biodiversity is enhanced. Wetland composition varies extensively, with seven distinct categories for classification: Estuarine and Marine Deepwater, Estuarine and Marine Wetland, Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond, Lake, and Riverine. Based on data from the National Wetlands Inventory (NWI), wetlands throughout the County are summarized in Table 1-14. As a note, 515,721 acres (805.82 square miles) of Estuarine and Marine Deepwater areas were omitted from the profile because they are open and tidal areas that are not usually factored into the area of the county or its municipalities.

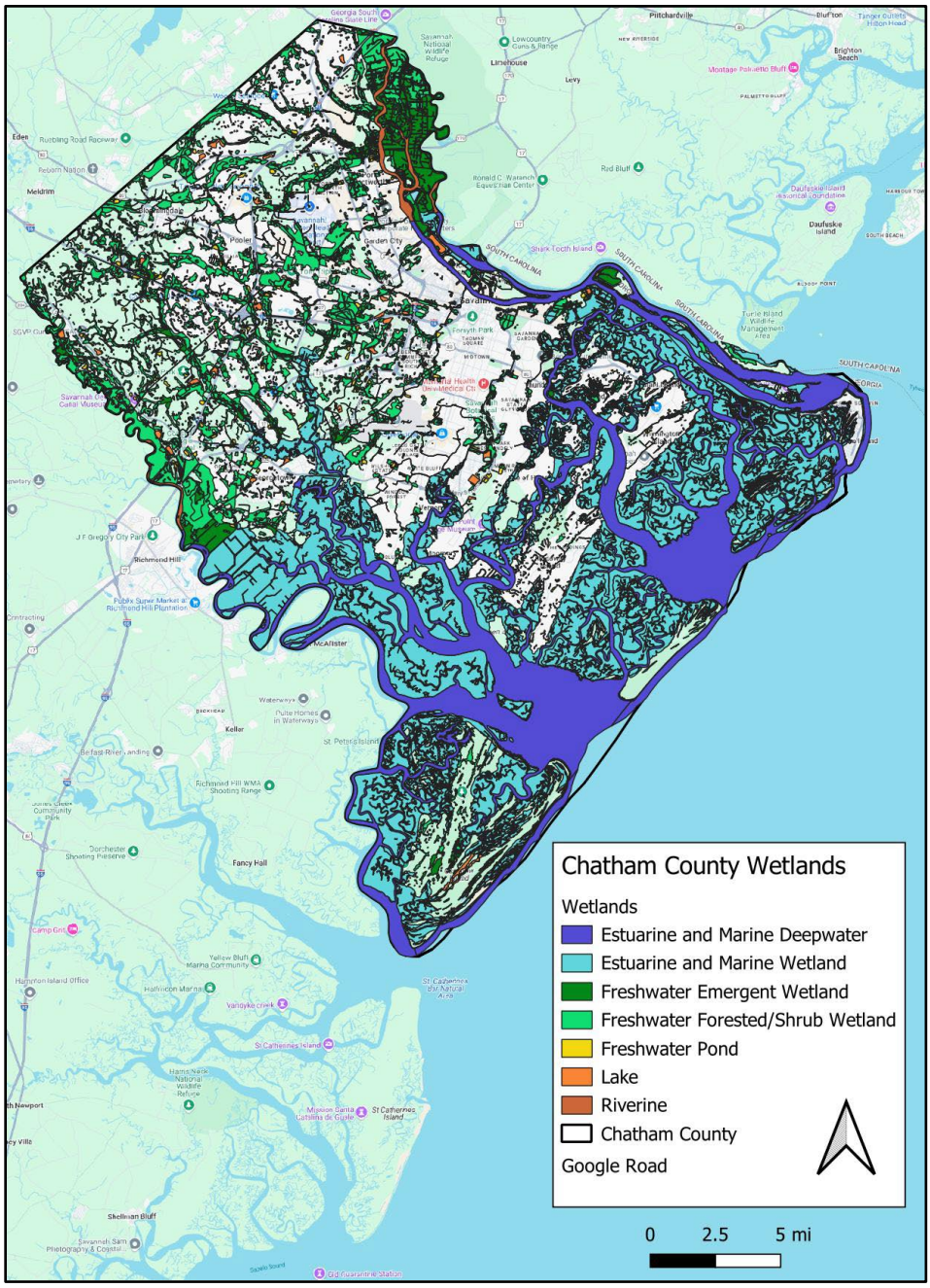
Table 1-14 – Wetland Types, Chatham County

Wetland Type	Area (Acres)	Area (Sq. Miles)	Percent of County
Non-Wetland	255,243.54	398.82	63.3
Estuarine and Marine Deepwater	1,809.65	2.83	0.4
Estuarine and Marine Wetland	90,286.17	141.07	22.4
Freshwater Emergent Wetland	9,171.63	14.33	2.3

Wetland Type	Area (Acres)	Area (Sq. Miles)	Percent of County
Freshwater Forested/Shrub Wetland	38,199.86	59.68	9.5
Freshwater Pond	2,754.57	4.30	0.7
Lake	1,162.94	1.82	0.3
Riverine	4,523.03	7.07	1.1
TOTAL	**403,180.8**	**629.97**	**100.00**

Source: National Wetlands Inventory, 2022; SAGIS, 2025

Figure 1-6 – Wetlands Map, Chatham County



Source: National Wetlands Inventory, 2022; SAGIS, 2025

Estuarine and Marine Deepwater

Estuarine and marine deepwater classifications, as defined by the Cowardin classification system, are distinguished by their location and water chemistry. Marine deepwater is part of the Marine System, which is exposed to the open ocean and extends from the outer edge of the continental shelf shoreward. Estuarine deepwater, part of the Estuarine System, is partially enclosed by land and has a mixture of fresh and saltwater.

Estuarine and Marine Wetland

Estuarine and marine wetlands are classified within a broader hierarchical system that includes five main systems: marine, estuarine, riverine, lacustrine, and palustrine. These classifications are based on factors like salinity, water type, vegetation, and geological features. Within the marine and estuarine systems, further subdivisions exist, such as subsystems (subtidal and intertidal) and classes (e.g., rock bottom, unconsolidated bottom, aquatic bed).

Freshwater Emergent Wetland

Freshwater emergent wetlands are classified within the Palustrine System by the U.S. Fish and Wildlife Service (USFWS) as part of their National Wetlands Inventory (NWI). This system categorizes wetlands based on their landscape position, vegetation cover, and hydrologic regime. Within the Palustrine System, emergent wetlands are further defined by their vegetation (grasses, sedges, forbs) and whether the vegetation is persistent (remaining until the next growing season) or non-persistent.

Freshwater Forested/Shrub Wetland

Freshwater forested/shrub wetlands are also classified using the Cowardin System. The system identifies wetlands based on their dominant vegetation (trees or shrubs), soil type, and hydrology.

Freshwater Pond

Within the Palustrine system, ponds are often categorized as Lacustrine or Palustrine. Specifically, ponds may be classified as emergent, scrub-shrub, or forested, depending on the dominant vegetation.

Lake

Lacustrine wetlands are defined as wetlands associated with lakes and large ponds. They are characterized by the water level of the lake influencing the water table of the adjacent wetland, and they often occur along lake shores.

Riverine

Riverine wetlands are characterized by flowing fresh water and are found within channels, including rivers, streams, and other watercourses. They are further categorized based on their position in the watershed and hydrologic regime into tidal, lower perennial, upper perennial, and nonperennial subsystems.

Ground Cover

The maps below provide an overview of the natural and developed surfaces across the planning area, including vegetation, impervious surfaces, water bodies, and barren land. This information is essential for understanding how different land cover types influence hazard vulnerability, such as flood risk, wildfire potential, and erosion. Identifying these patterns helps inform targeted mitigation strategies and land use planning efforts.

Figure 1-7 – Land Cover Map, Chatham County

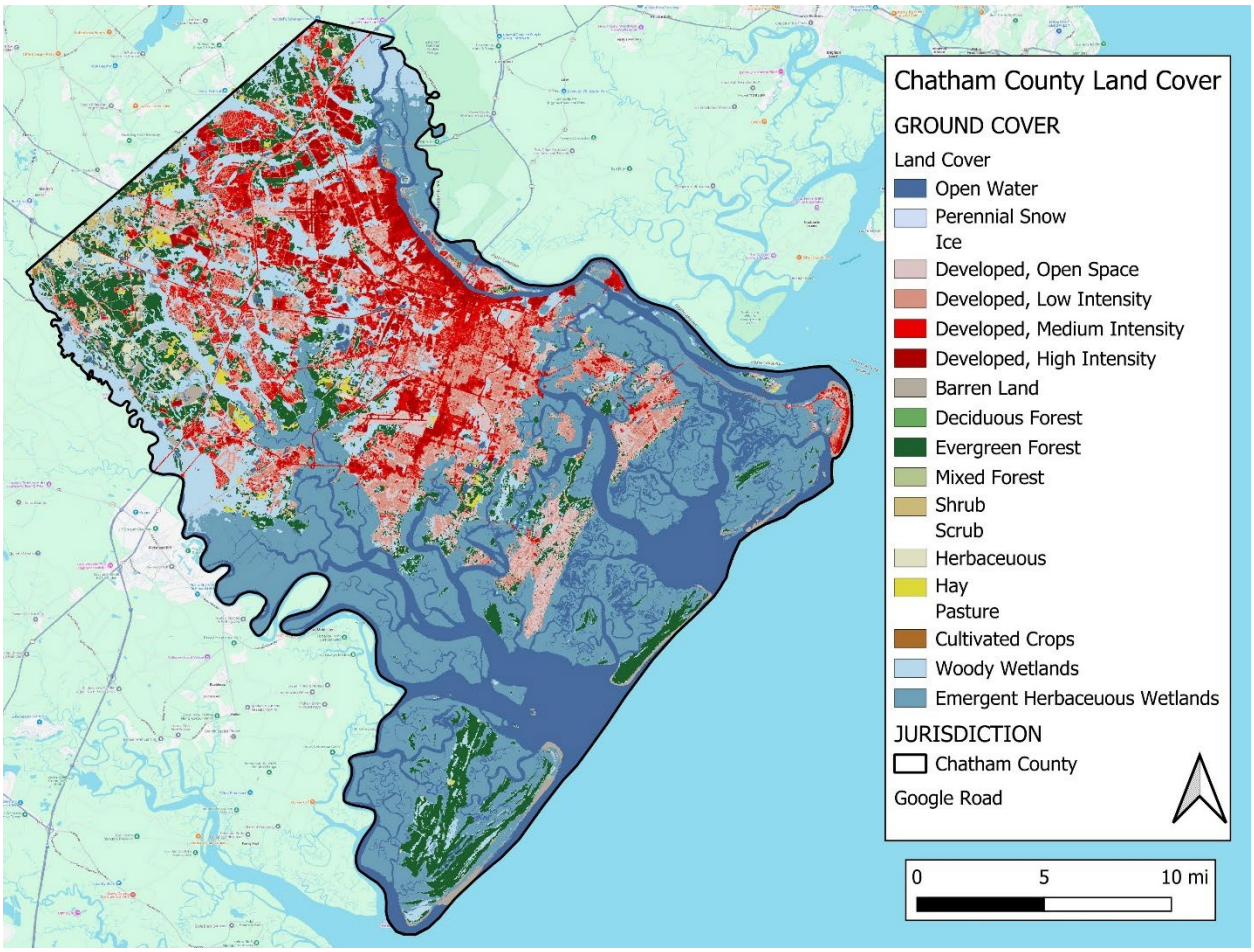
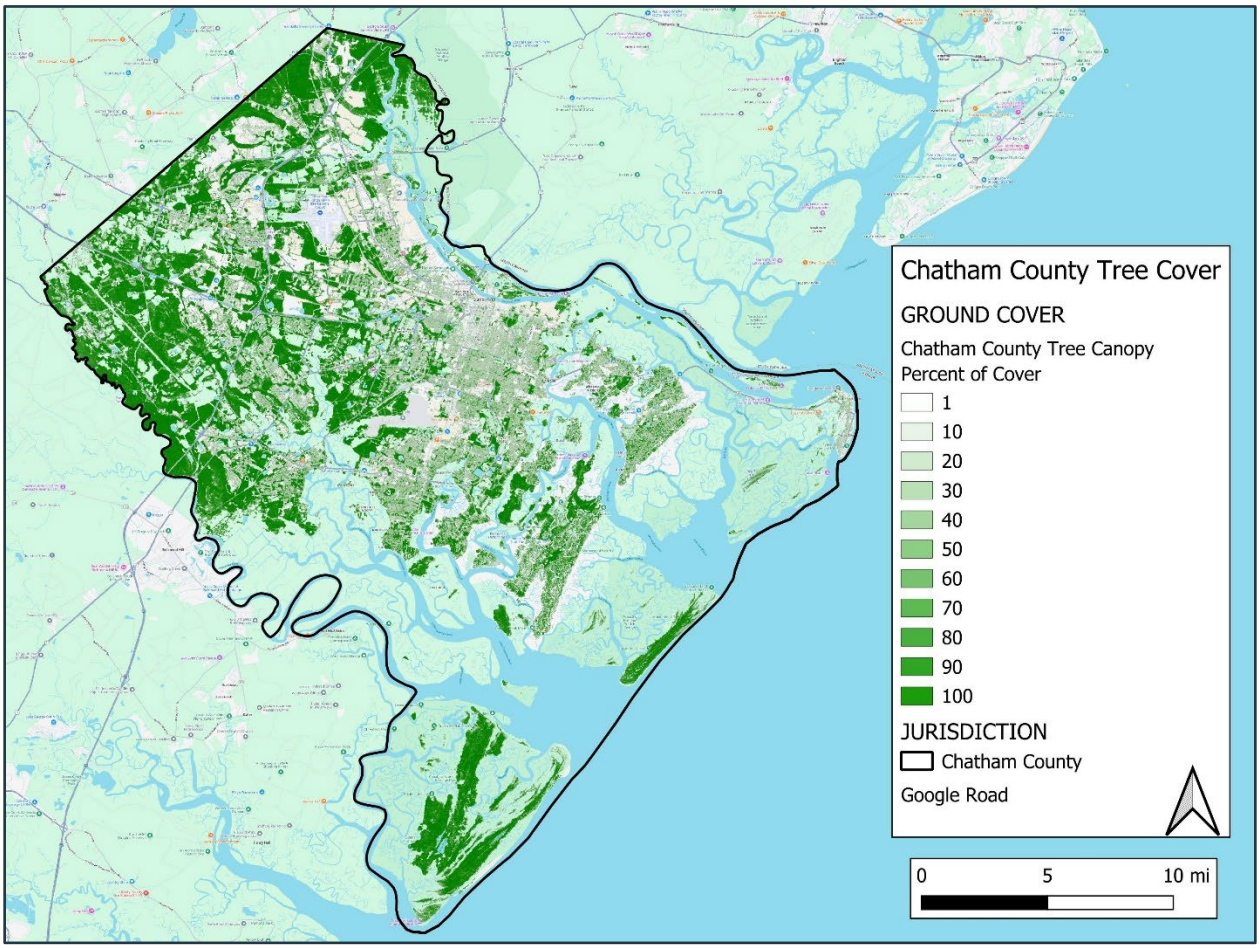


Figure 1-8 – Tree Cover Map, Chatham County



Threatened and Endangered Species

The U.S. Fish and Wildlife Service maintains a regular listing of threatened species, endangered species, species of concern, and candidate species for counties across the United States. Chatham County has thirteen species that are listed with the U.S. Fish and Wildlife Services. The table below shows the species identified as threatened, endangered, or other classifications for Chatham County.

Table 1-15 – Threatened and Endangered Species

Group	Common Name	Scientific Name	Federal Status
Mammals	West Indian Manatee	*Trichechus manatus*	Threatened
Mammals	North Atlantic Right Whale	*Eubalaena glacialis*	Endangered
Mammals	Humpback Whale	*Megaptera novaeangliae*	Endangered/Protected
Birds	Piping Plover	*Charadrius melodus*	Endangered/Threatened
Birds	Red Knot	*Calidris canutus rufa*	Threatened
Birds	Red-cockaded Woodpecker	*Picoides borealis*	Endangered
Birds	Wood Stork	*Myteria americana*	Threatened
Reptiles	Eastern Indigo Snake	*Dymarchon corais couperi*	Threatened
Reptiles	Gopher Tortoise	*Gopherus polypheus*	Candidate
Reptiles	Green Sea Turtle	*Chelonia mydas*	Threatened
Reptiles	Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered

Group	Common Name	Scientific Name	Federal Status
Reptiles	Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
Reptiles	Hawksbill Turtle	*Eretmochelys imbricata*	Endangered
Fish	Shortnose Sturgeon	*Acipenser brevirostrum*	Endangered
Fish	Atlantic Sturgeon	*Acipenser oxyrinchus*	Endangered
Fish	Oceanic Whitetip Shark	*Carcharhinus longimanus*	Threatened
Fish	Giant Manta Ray	*Mobula birostris*	Threatened
Amphibians	Frosted Flatwoods Salamander	*Ambystoma cingulatum*	Threatened
Flowering Plants	Pondberry	*Lindera melissifolia*	Endangered

Source: U.S. Fish & Wildlife Service, Environmental Conservation Online System

1.8.4 History

Permanent European settlement came to the Chatham County – Savannah region in 1733 when the British settled the Colony of Georgia to buffer their northern colonies from the Spanish in Florida. James Edward Oglethorpe founded Savannah as the seat of the thirteenth English colony near a Creek Indian village called Yamacraw. Oglethorpe forged friendly relations with the Indians which enabled him to establish a successful town 18 miles inland from the Atlantic Ocean. Oglethorpe devised a colonial settlement plan that set it apart from other cities in the New World.

The nucleus of the plan was the ward. Each ward had a name and was a part of a larger integrated regional land system that included town commons, gardens, farms, estates, agricultural villages, and fortified outposts. The plan informed the architecture, resulting in a dense urban pattern of townhouses and carriage houses in the old town and an increasingly suburban pattern as development advanced into the former farm lots. Modern-day street patterns closely follow the old land divisions between farm lots.

Savannah's regional plan with its town lots and squares, garden lots, and farm lots formed a blueprint for growth that is evident in the street patterns even today. Major boulevards, such as 37th Street, Victory Drive, Bull Street, and Waters Avenue, follow the former divisions between the farm lots.

Beyond the farms were agricultural villages, such as Hampstead and Highgate (now occupied by Hunter Army Airfield) and private estates on the water such as Wormsloe and Beaulieu. The plan was completed by fortified farming villages such as those at Thunderbolt and Modena on Skidaway Island.

The outlying settlements were connected to the City of Savannah by waterways and colonial road systems. These colonial roads followed the high ground (usually the ridges of old barrier island dune structures). Early development naturally occurred along these routes including the Western Road (Louisville Road), the White Bluff Road (an extension of Bull Street), the Great Ogeechee Road (Southern Road), Wheaton Street (to Thunderbolt and the ferry to Skidaway Island), and the Augusta or River Road. Plantations were established along the Savannah and Ogeechee Rivers and on the islands such as Ossabaw, Skidaway, and Wassaw.

After the Civil War, street railroads, also known as streetcars, encouraged suburban and river resort development. With the arrival of the automobile, many of these summer resorts became year-round residential suburbs, and palm-lined causeways connected these communities to the mainland. Street railroads enabled urban expansion into the former farm lots where larger lots and deeper setbacks were the norm and are today desirable residential neighborhoods.

Industrial development replaced the Savannah River plantations in the Twentieth Century. Like the Nineteenth Century canals and railroads, industries spurred the development of industrial worker communities like Woodville and West Savannah. Prior to World War II, the Savannah urban area was bounded roughly by DeRenne Avenue on the South, Pennsylvania Avenue on the East, and Lathrop Avenue and Laurel Grove Cemetery on the West. Outside of several smaller municipalities, the remaining areas were rural in character, dominated by dairy farms, timber, and truck farming.

Since World War II, automobile-related mobility enabled urban expansion and suburbanization, which spread across the County. With exception of the estates of Wormsloe, Beaulieu, Grove Point, Oakland, Lebanon, and Wassaw and Ossabaw islands, there is little rural landscape left in Chatham County.

1.8.5 Economy

1.8.5.1 Wages and Employment

Per the 2019-2023 American Community Survey 5-Year Estimates, the median household income for Chatham County is $69,575, which is over 7.06 percent lower than the state's median household income of $74,664[4] (there is no income data for the unincorporated County).

An estimated 14.3 percent (41,100) of the population is considered to be living below the poverty level. 21 percent (12,882) of people living in poverty are under 18 years of age, and 9.8 percent (4,679) are 65 years and over.[5]

The table below shows employment and unemployment rates along with industry employment by major classification for the entire County.[6]

Table 1-16 – Employment and Occupation Statistics for Chatham County, GA

Employment Status	Count	Percentage (%)
In labor force	155,115	64.0
Employed	142,917	58.9
Unemployed	8,611	3.6
Armed Forces	3,587	1.5
Not in labor force	87,341	36.0
Occupation	**Count**	**Percentage (%)**
Management, business, science, and arts	54,681	38.3
Service	27,973	19.6
Sales and office	29,626	20.7
Natural resources, construction, and maintenance	8,915	6.2
Production, transportation, and material moving	21,722	15.2

Source: U.S. Census Bureau, American Community Survey 2019-2023 5-Year Estimates

[4] https://www.census.gov/quickfacts/fact/table/chathamcountygeorgia,GA,US/IPE120223#IPE120223. Retrieved 06-05-2025.
[5] https://data.census.gov/table/ACSST5Y2023.S1701?q=chatham+county+poverty+status. Retrieved 06-05-2025.
[6] https://data.census.gov/table/ACSDP5Y2023.DP03?q=chatham+county+employment. Retrieved 06-05-2025.

Major industry sectors in Chatham County include management, business, science, and arts (38.3%); service (19.6%); sales and office (20.7%); natural resources, construction, and maintenance (6.2%); and production, transportation, and material moving (15.2%).

Major employers having greater than 100 employees within or around Chatham County are listed in the tables below along with an estimate of the number of employees. These tables summarize the major employers that employ a large percentage of Chatham County's community, divided into Non-Manufacturing, Education/Government/Public Service, and Manufacturing. For the purposes of this report, major employers are defined as employing 100 or more persons. Major employer data was obtained from the Savannah Area Chamber for 2025.[7] The following information is not an exhaustive list.

Table 1-17 – Major (100+) Non-Manufacturing Employers

Company	Product/Service	Number of Employees
St. Joseph's Candler	Hospital	4,963
Memorial University Medical Center	Hospital	4,300
Walmart	Retail	2,900-5,000
Colonial Group	Energy, Chemicals, Logistics	2,249
East Georgia Regional Medical Center	Hospital	1,134
Optim Health System	Healthcare	1,027
Walmart Distribution Center	Distribution	1,000
McDonalds	Restaurant	1,000-2,000
Target Distribution Center	Distribution	837
Goodwill Industries of the Coastal Empire	Adult Vocational Rehabilitation	685
The Landings Club	Private Membership Club	675
Kroger	Retail Food	565-1,300
Publix	Retail Food	525-1,200
Dollar Tree	Distribution	600
SouthCoast Health	Healthcare	592
Wayne Memorial Hospital	Hospital	525
UTC Overseas	Logistics Solutions	500-1,000
Spirit Construction Services	General Contractors	500-1,000
Georgia Regional Hospital	Hospital	500-1,000
Chick-Fil-A	Restaurant	500-1,000
Webstraurant Distribution Center	Distribution	471
Effingham County Hospital Authority	Hospital	450
Southern Company	Electric & Natural Gas Utility	396
Hugo Boss Distribution Center	Distribution	380
25 other businesses	Various	250-499

Source: Savannah Area Chamber, 2025

Table 1-18 – Major (100+) Education/Government/Public Service Employers

Company	Product/Service	Number of Employees
Ft. Stewart/Hunter Army Airfield	Civilian Personnel on Bases	6,579
Svannah-Chatham County Board of Education	Public Schools	5,650
Georgia Southern University	Education	2,707
Chatham County	Government	2,345

[7] https://www.savannahchamber.com/economic-development/major-employers/. Retrieved 06-06-2025.

Company	Product/Service	Number of Employees
Savannah College of Art & Design	Education	2,280
City of Savannah	Government	2,254
Effingham County Board of Education	Public Schools	2,203
YMCA of Coastal Georgia	Civic Association	1,751
Georgia Ports Authority	Seaport Terminal Operations	1,750
Bulloch County Board of Education	Public Schools	1,724
Liberty County Board of Education	Public Schools	1,446
Bryan County Board of Education	Public Schools	1,431

Source: Savannah Area Chamber, 2025

Table 1-19 – Major (100+) Manufacturing Employers

Company	Product/Service	Number of Employees
Gulfstream Aerospace Corporation	Jet aircraft, aerospace equipment	13,115
SNF	Chemicals	1,706
Hyundai Motor Group Metaplant America	Electric vehicles	1,119
Georgia-Pacific Savannah River Mill	Paper products	1,030
JCB	Construction equipment	982
Rayonier Advanced Materials	Forest products	851
International Paper	Paper products, bleached pulp	750
Great Dane Trailers	Refrigerated trailers	487
Briggs & Stratton	Small engines	451
Edwards Interiors Aerospace	Aerospace parts/furnishings	375
SACK	Heavy commercial/industrial construction	369
Daniel Defense	Outdoor and sporting goods	350
Georgia Transformers	Transformers	350
DS Smith	Mill, lumber, wood products	325
AJIN Georgia	Automotive parts	300
Sewon	Automotive parts	300
Howmet Aerospace	Engine and turbine components	296
Brassler USA	Dental instruments	250-499
Derst Baking Co.	Baked goods	250-499
U.S. Sugar	Sugar	250-499
Mitsubishi Power	Turbines	250-499
SECO Ecoplastic	Automotive parts	232
MacAljon Affiliates	Industrial contracting	210
Cardinal Glass	High-end architectural glass	171
Great Southern Wood Preserving	Treated lumber	163
Orafol, USA	Industrial tapes	146
Interfor	Wood products	140
Johnson Matthey Process Technologies	Catalyst production	150-249
Roger Wood Foods Inc.	Smoked sausage, meats	100-249
Kraton	Chemicals	100-249
BASF Catalysts	Catalysts	100-249
Delta Metals	Sheet metal	100-249
Nine Line Apparel	Apparel	100-249
Owens Corning	Building materials	100-249
Precision Machine	Aerospace	100-249
Standard Concrete Products, Inc.	Concrete	100-249

Company	Product/Service	Number of Employees
10 other manufacturers	Various	100-249

Source: Savannah Area Chamber, 2025

1.8.6 Housing

According to the 2019-2023 ACS 5-Year Estimates,[8] there are 135,983 housing units in Chatham County, of which 87.7 percent (119,241) are occupied. Approximately 56.3 percent (67,117) of occupied units are owner-occupied (43.7% / 52,124 occupied by renters). A high percentage of renters is an indicator of higher pre- and post-disaster vulnerability because, according to Cutter, et al. (2003), renters often do not have the financial resources of homeowners, are more transient, are less likely to have information about or access to recovery aid following a disaster and are more likely to require temporary shelter following a disaster. Therefore, higher rates of home rentals in the County may indicate that residents are not able to implement certain types of mitigation in their homes.

Median home value in Chatham County is $273,300. Of the County's owner-occupied housing units, 63.9 percent (42,916) have a mortgage. Most householders (84.3 percent / 100,547) have lived in their current homes since the year 2000 or later; 14.6 percent (17,451) moved in between 2000 and 2009, 25.7 percent (30,588) moved in between 2010 and 2017, 29.3 percent (34,917) moved in between 2018 and 2020, and 14.8 percent (17,591) moved in 2021 or later. 7.3 percent (8,745) of occupied housing units have no vehicle available to them, which suggests these residents may have difficulty in the event of an evacuation.

The majority (61.4% / 83,530) of housing units in the County are detached single family homes. However, 3.3 percent (4,513) of units are mobile homes which can be more vulnerable to certain hazards, such as tornadoes and windstorms, especially if they aren't secured with tie downs.

The County's housing stock is aging, with the majority (68.3% / 92,823) of all housing built before 2000. Table 1-20 details housing age in the County.

Table 1-20 – Housing Age, Chatham County

Year Structure Built	Percent of Total Housing Units	Number of Structures
2020 or later	1.6%	2,204
2010 to 2019	13.1%	17,855
2000 to 2009	17.0%	23,101
1980 to 1999	24.6%	33,454
1960 to 1979	20.0%	27,254
1940 to 1959	14.0%	19,169
1939 or earlier	9.5%	12,946

Source: U.S. Census Bureau, American Community Survey 2019-2023 5-Year Estimates

Age can indicate the potential vulnerability of a structure to certain hazards. For example, Chatham County first entered the National Flood Insurance Program in 1980. Therefore, based on housing age estimates, at least 43.5 percent of housing in the County was built before any floodplain development restrictions were required.

[8] https://data.census.gov/table/ACSDP1Y2023.DP04?q=chatham+county+selected+housing+characteristics. Retrieved 06-09-2025.

1.8.7 Population

According to the U.S. Census Bureau, the County had an estimated population of 307,336 residents in 2024 and a population of 295,291 at the time of the 2020 U.S. Census (4.1% increase from 2020-2024). As of 2024, Savannah's population density was 710 persons per square mile. Table 1-21 provides demographic data from the 2019-2023 ACS 5-Year Estimates.[9]

Table 1-21 – Chatham County Demographic Profile Data, 2023

Demographic	Chatham County
Gender/Age	
Male	143,462
Female	154,681
Under 5 Years	17,495
65 Years and Over	48,814
Race/Ethnicity (One Race)	
White	142,225
Black or African American	117,507
American Indian/Alaska Native	770
Asian	8,596
Two or More Races	18,559
Hispanic or Latino[1]	23,945
Education	
High School Graduate or Higher, age 25+ years	186,383
Bachelor's Degree or Higher, age 25+ years	75,082

Source: U.S. Census Bureau, 2019-2023 American Community Survey 5-Year Estimates
[1]Hispanics may be of any race so they are also included in applicable race categories.

1.8.8 Land Use

Land use data was obtained from SAGIS. It was updated on January 18, 2024, which is a more recent data set than the 2020 update of the Chatham County–Savannah Comprehensive Plan 2040 (Comp Plan). Land use data in this plan may be compared to the Comp Plan as part of a comprehensive planning program that guides Chatham County's and Savannah's collective growth and development decisions over the next 20 years. The Comp Plan serves both participating communities as a general statement of intent to promote local goals related to economic development, land use, transportation, housing, quality of life, and other related topics.

1.8.8.1 Existing Land Use

The County includes a total area of 334,153 acres (522 square miles) as calculated from GIS data. Existing land use is based on countywide zoning data provided through SAGIS. It is summarized in Table 1-22.

Table 1-22 – Existing Land Use, Chatham County

Land Use/Zoning	Area (Acres)	Area (Square Miles)
Agricultural	4,466.700	6.98
Beach Business District	92.873	0.15
Business	3,433.388	5.36
Commercial	775.916	1.21
Conditional – South End Overlay	39.663	0.06

[9] https://data.census.gov/table/ACSDP1Y2023.DP05?q=chatham+county+population. Retrieved 06-09-2025.

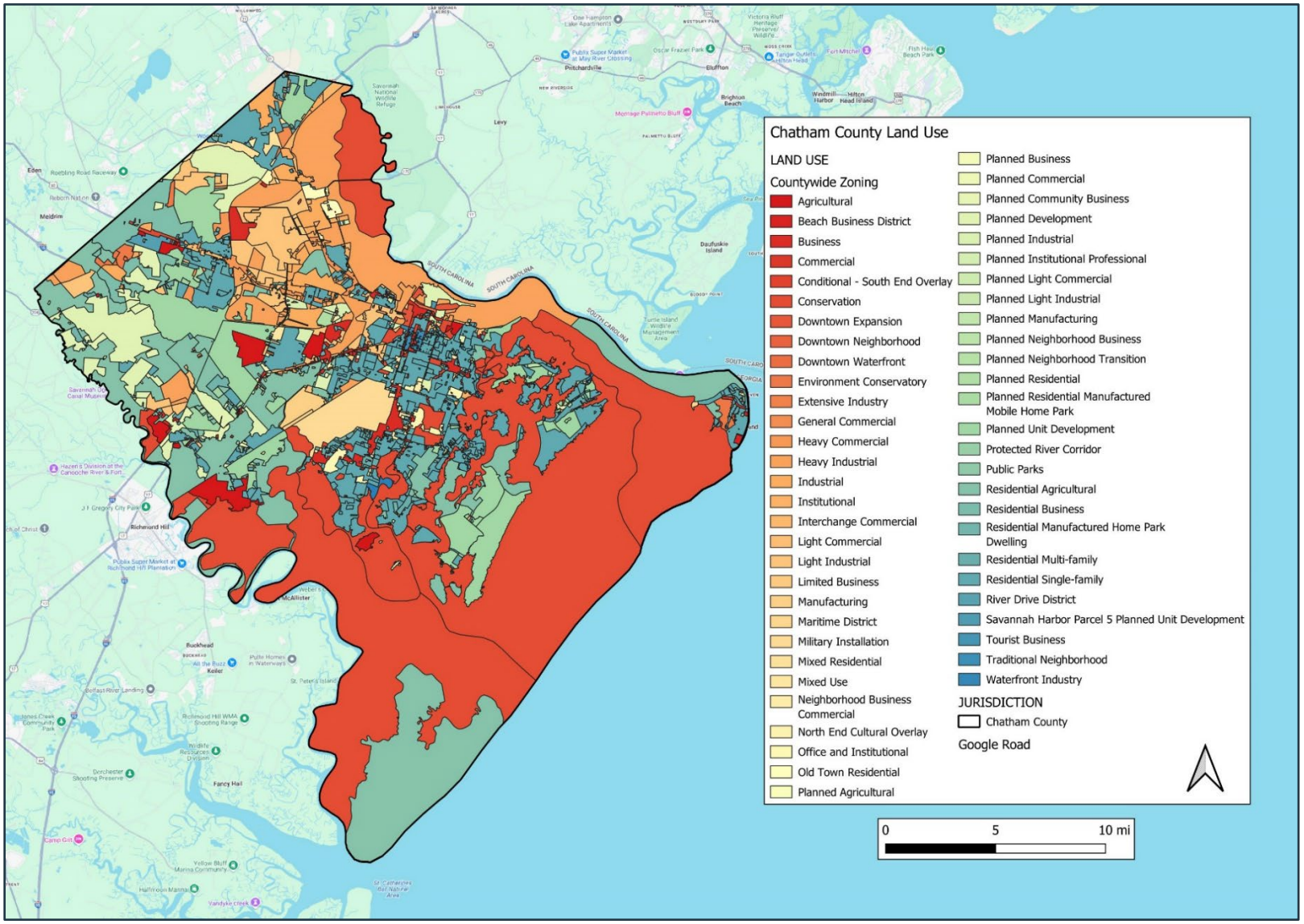
Land Use/Zoning	Area (Acres)	Area (Square Miles)
Conservation	131,263.402	205.10
Downtown Expansion	513.987	0.80
Downtown Neighborhood	45.496	0.07
Residential Single-Family	36,407.269	56.89
Downtown Waterfront	89.027	0.14
Environment Conservatory	484.621	0.76
Extensive Industry	684.837	1.07
General Commercial	753.149	1.18
Heavy Commercial	1,859.706	2.91
Heavy Industrial	21,624.101	33.79
Industrial	6,048.115	9.45
Institutional	232.611	0.36
Interchange Commercial	587.537	0.92
Light Commercial	409.271	0.64
Light Industrial	11,258.007	17.59
Limited Business	37.499	0.06
Residential Manufactured Home Park/Dwelling	861.382	1.35
Manufacturing	1,434.881	2.24
Maritime District	48.651	0.08
Military Installation	4,873.484	7.61
Mixed Residential	908.182	1.42
Mixed Use	176.204	0.28
Residential Multi-Family	3,465.864	5.42
Neighborhood Business/Commercial	767.131	1.20
Neighborhood Marina	0.406	0.0006
North End Cultural Overlay	28.012	0.04
Office and Institutional	1,611.512	2.52
Old Town Residential	724.174	1.13
Planned Agricultural	30.620	0.05
Planned Business	1,002.852	1.57
Planned Commercial	118.403	0.19
Planned Development	14,371.650	22.46
Planned Industrial	914.939	1.43
Planned Institutional Professional	45.195	0.07
Planned Light Commercial	2.538	0.004
Planned Light Industrial	56.759	0.09
Planned Manufacturing	27.114	0.04
Planned Unit Development	22,965.693	35.88
Planned Residential	353.707	0.55
Planned Neighborhood Business	133.924	0.21
Planned Residential Manufactured/Mobile Home Park	16.445	0.03
Protected River Corridor	27.885	0.04
Public Parks	22.858	0.04
Residential Agricultural	51,670.363	80.73

Land Use/Zoning	Area (Acres)	Area (Square Miles)
Residential Business	1.281	0.00
River Drive District	45.169	0.07
Savannah Harbor Parcel 5 Planned Unit Development	42.189	0.07
Tourist Business	94.127	0.15
Traditional Neighborhood	384.755	0.60
Waterfront Industry	71.084	0.11
TOTAL	**328,406.609**	**513.14**

Source: SAGIS – Zoning, 2024

An existing land use map for zoning is included below for Chatham County, as taken from the SAGIS map viewer for Chatham County.

Figure 1-9 – Existing Land Use and Zoning Map, Chatham County

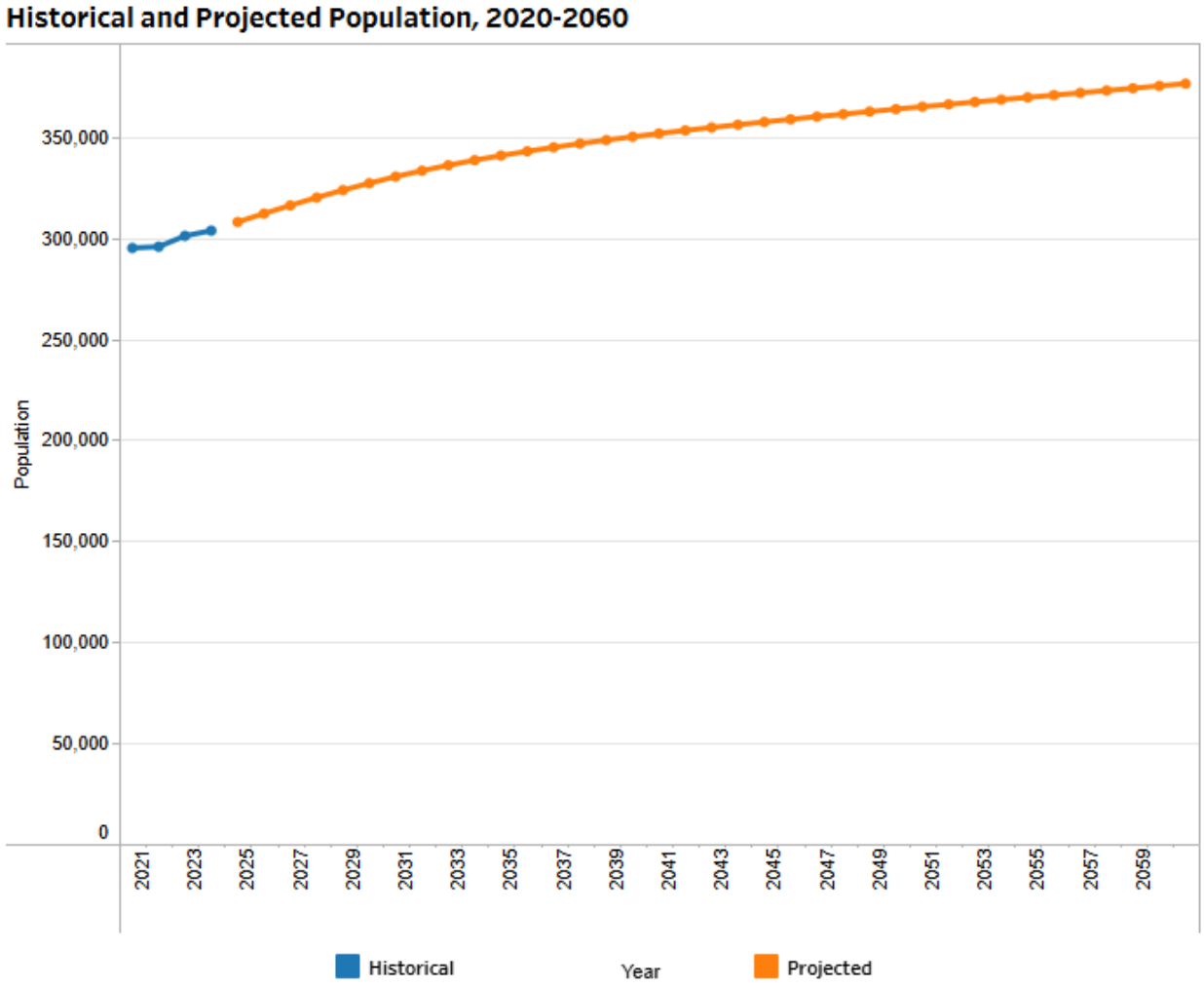


Source: SAGIS – Zoning, 2024

1.8.9 Growth and Development Trends

According to the Georgia Governor's Office of Planning and Budget (GOPB), Chatham County is projected to reach a population of 376,419 by 2060, which represents a 22.2 percent increase from the 2024 population. The population projections from the GOPB estimate the annual growth for the County to be on average about 0.8% through 2060.[10]

Table 1-23 – Population Projections for Chatham County 2020-2060



Source: Georgia Governor's Office of Planning and Budget, 2025

1.8.10 Education

The total school enrollment from kindergarten to 12th grade in Chatham County was 45,810 students in 2023.[11] Nursery school and preschool enrollment was 2,851. The Savannah-Chatham County Public System District is the only public school district in the county and serves nearly 36,000 students (35,781 students in 2023/2024) across 60 schools, including a virtual academy and alternative learning

[10] https://opb.georgia.gov/census-data/population-projections. Retrieved 06-09-2025.
[11] https://data.census.gov/table/ACSST1Y2023.S1401?q=Chatham+County,+Georgia+education. Retrieved 06-24-2025.

environments.[12] At least 24 private schools operate within the county, as well. The list of all schools in the county with locations and respective enrollment numbers is included in Table 1-24 below.

Additionally, Chatham County has several public and private higher education facilities and colleges, which can be seen in Table 1-24. One of the largest colleges in the county is Savannah College of Art and Design with 16,218 students across its three locations—Savannah being the largest campus of the three. Other notable post-secondary schools include Savannah Technical College, which is consistently named a top Georgia technical college, and Georgia Southern University—Armstrong Campus, which has been named one of America's best universities. Students living within Chatham County regularly commute to other colleges nearby or temporarily move away to attend college, as well. [13]

Table 1-24 – Chatham County Schools

School Name	Location	School Type	Grades	2023/2024 Enrollment
Benedictine Military School	Savannah	Private School	9-12	400
Bethesda Home For Boys School	Savannah	Private School	6-12	61
Blessed Sacrament School	Savannah	Private School	PreK-8	452
Butler Christian Academy	Savannah	Private School	PreK-12	130
Calvary Day School	Savannah	Private School	PreK-12	1,300
Chatham Academy	Savannah	Private School	K-12	76
Coastal Harbor Treatment Center	Savannah	Private School	Ages 4-17	N/A
The Habersham School - Habersham Hall	Savannah	Private School	PreK-12	192
Hancock Day School	Savannah	Private School	PreK-8	450
Matthew Reardon Center for Autism	Savannah	Private School	Ages 5-22	33
Memorial Day School	Savannah	Private School	PreK-12	N/A
Ramah Junior Academy	Savannah	Private School	K-8	36
Rambam Day School	Savannah	Private School	PreK-8	54
Savannah Adventist Christian School	Pooler	Private School	PreK-8	79
Savannah Christian Preparatory School	Savannah	Private School	PreK-12	1,400
Savannah Country Day School	Savannah	Private School	NS-12	1,066
Savannah Honor Academy	Savannah	Private School	K-5	23
Saint Peter the Apostle Catholic School	Savannah	Private School	PreK-8	N/A
St. Andrew's School	Savannah	Private School	PreK-12	535
St. James Catholic School	Savannah	Private School	PreK-8	400
St. Vincent's Academy	Savannah	Private School	9-12	300
Urban Christian Academy	Savannah	Private School	NS-12	N/A
Veritas Academy	Savannah	Private School	PreK-12	192
Georgia Southern University - Armstrong Campus	Savannah	Public Post-Secondary	N/A	4,621

[12] https://www.sccpss.com/district/welcome-to-savannah. Retrieved 06-24-2025.
[13] https://seda.org/resources-and-data/data-center/education/. Retrieved 06-25-2025.

School Name	Location	School Type	Grades	2023/2024 Enrollment
Columbia College - Hunter Army Airfield	Savannah	Private Post-Secondary	N/A	600
Empire Beauty School	Savannah	Private Post-Secondary	N/A	94
Savannah College of Art and Design	Savannah	Private Post-Secondary	N/A	16,218
Savannah State University	Savannah	Public Post-Secondary	N/A	2,926
Savannah Technical College	Savannah	Public Post-Secondary	N/A	3,642
South University	Savannah	Private Post-Secondary	N/A	9,955
Strayer University	Savannah	Private Post-Secondary	N/A	354
Oatland Island Wildlife Center	Savannah	Education Center	PreK	N/A
Massie Heritage Center	Savannah	Education Center	N/A	N/A
Bloomingdale Elementary	Bloomingdale	Public School	K-5	331
Brock Elementary	Savannah	Public School	K-5	516
Butler Elementary	Savannah	Public School	K-5	466
Coastal Empire Montessori	Savannah	Public Charter School	K-5	209
Gadsden Elementary	Savannah	Public School	K-5	469
Garden City Elementary	Garden City	Public School	K-5	580
Gould Elementary	Garden City	Public School	K-5	887
Haven Elementary	Savannah	Public School	K-5	377
Heard Elementary	Savannah	Public School	K-5	664
Hodge Elementary	Savannah	Public School	K-5	388
May Howard Elementary	Savannah	Public School	K-5	565
Humanities at Juliette Gordon Low Elementary	Savannah	Public School	K-5	666
Marshpoint Elementary	Savannah	Public School	K-5	645
Pooler Elementary	Pooler	Public School	K-5	357
Pulaski School	Savannah	Public School	K-8	576
J.G. Smith Elementary	Savannah	Public School	K-5	468
Southwest Elementary	Savannah	Public School	K-5	729
Andrea B. Williams Elementary	Savannah	Public School	K-5	456
Tybee Island Maritime Academy	Tybee Island	Public Charter School	K-8	425
West Chatham Elementary	Pooler	Public School	K-5	809
White Bluff Elementary	Savannah	Public School	K-5	660
Windsor Forest Elementary	Savannah	Public School	K-5	451
Susie King Taylor Community School	Savannah	Public Charter School	K-8	430
Early Learning Center at Henderson E. Formey, Jr.	Savannah	Public Charter School	K-8	212
Ellis Montessori Academy	Savannah	Public School	PreK-K	428
Georgetown School	Savannah	Public School	K-8	525

School Name	Location	School Type	Grades	2023/2024 Enrollment
Godley Station School	Savannah	Public School	K-8	1,133
Garrison School for the Arts	Savannah	Public School	K-8	776
Hesse School	Savannah	Public School	K-8	995
Isle of Hope School	Savannah	Public School	K-8	613
New Hampstead School	Savannah	Public School	K-8	848
Rice Creek School	Savannah	Public School	K-8	1,167
Savannah Classical Academy	Port Wentworth	Public Charter School	K-12	481
Coastal Middle	Savannah	Public Charter School	6-8	512
Derenne Middle	Savannah	Public School	6-8	496
Hubert Middle	Savannah	Public School	6-8	420
Mercer Middle	Savannah	Public School	6-8	404
Myers Middle	Savannah	Public School	6-8	452
Oglethorpe Charter Middle	Savannah	Public Charter School	6-8	622
Southwest Middle	Savannah	Public Charter School	6-8	712
STEM Academy at Bartlett Middle	Savannah	Public School	6-8	697
West Chatham Middle	Savannah	Public School	6-8	943
Beach High	Pooler	Public School	9-12	904
Groves High	Savannah	Public School	9-12	1,064
Islands High	Garden City	Public School	9-12	814
Jenkins High	Savannah	Public School	9-12	1,179
Johnson High	Savannah	Public School	9-12	797
Liberal Studies Savannah High	Thunderbolt	Public School	9-12	639
New Hampstead High	Savannah	Public School	9-12	1,487
Savannah Arts Academy	Savannah	Public School	9-12	853
Savannah Early College High	Savannah	Public School	9-12	145
Windsor Forest High	Savannah	Public School	9-12	1,007
Woodville Tompkins High	Savannah	Public School	9-12	706
Building Bridges High School Academy / 21st Century Learning Centers	Savannah	Alternative Public School	9-12	N/A
Building Bridges Middle School Academy	Savannah	Alternative Public School	6-8	N/A
WINGS Elementary Alternative Learning	Savannah	Alternative Public School	K-5	N/A
Savannah-Chatham E-Learning Academy	Savannah	Virtual Public School	1-12	532

Source: GOSA (https://gaawards.gosa.ga.gov/analytics/saw.dll?dashboard); Niche (https://www.niche.com/k12/search/best-schools/m/savannah-area/); SCCPSS (https://app.powerbi.com/view?r=eyJrIjoiMWM5N2NkYjAtMTY2NS00YjMwLTlhYTEtNWUyMGVkZGRjYWNlIiwidCI6IjQwMDlkYThjLWQzMGEtNGY5OC1hNWJkLTc4YTZjMGEyNWE1MyIsImMiOjF9)

2 Hazard Identification & Risk Assessment

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.
Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

44 CFR Subsection D §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. Plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

(B): An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; and

(C): Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

This section describes the Hazard Identification and Risk Assessment process for the development of the Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan. It describes how the County met Step 4: Assess the Hazard, and Step 5: Assess the Problem from the 10-step planning process.

Table 2-1 – Section 2 Summary of Updates

2020 Plan Section Number	2025 Plan Section and Description of Changes
Section 2 – Local Hazard Identification and Risk	**Section 2 – Hazard Identification & Risk Assessment**
2.1 Overview	2.1 Overview – This section describes the risk assessment process and subsections.
2.2 Hazard Identification	2.2 Hazard Identification – This section was updated to reflect the 2019 State HMP, updated disaster declaration information and historical occurrence records, and new decisions made by the HMPC during this plan update. Hazards not included in the State plan and not relevant to the planning area were removed from discussion.
2.3 Risk Assessment Methodology and Assumptions	2.3 Risk Assessment Methodology and Assumptions – This section summarizes of the overall risk assessment methodology. Information on hazard-specific risk assessment methodology and data sources was incorporated into the applicable hazard profiles.

2020 Plan Section Number	2025 Plan Section and Description of Changes
2.4 Asset Inventory	2.4 Asset Inventory – The asset inventory was updated based on 2025 Chatham County parcel data and critical facility lists provided by CEMA and GEMA.
2.5 Hazard Profiles, Analysis, and Vulnerability	2.5 Hazard Profiles, Analysis, and Vulnerability – This section integrates updated information on existing hazard risk and vulnerability (hazards identified in the 2020 plan; it also includes profiles, analysis, and vulnerability for hazards added in 2025.
2.6 Conclusions on Hazard Vulnerability	2.5 Conclusions on Hazard Vulnerability – This section was updated to present updated risk assessment findings using the Priority Risk Index in order to classify each hazard as either High, Moderate, or Low Risk so that it may be prioritized for mitigation.

2.1 OVERVIEW

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

This hazard risk assessment covers all of Chatham County, including the unincorporated County and all incorporated jurisdictions participating in this plan.

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of the potential risk to natural hazards in the county and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:

Data collected through this process has been incorporated into the following sections of this plan:

- **Section 2.2**: **Hazard Identification** identifies the natural and human-caused hazards that threaten the planning area.
- **Section 2.3: Risk Assessment Methodology and Assumptions**
- **Section 2.4: Asset Inventory** details the population, buildings, and critical facilities at risk within the planning area.
- **Section 2.5**: **Hazard Profiles, Analysis, and Vulnerability** discusses the threat to the planning area, describes previous occurrences of hazard events and the likelihood of future occurrences, and assesses the planning area's exposure to each hazard profiled; considering assets at risk, critical facilities, and future development trends.
- **Section 2.6: Conclusions on Hazard Risk** summarizes the results of the Priority Risk Index and defines each hazard as a Low-, Moderate-, or High-Risk hazard.

2.2 HAZARD IDENTIFICATION

To identify hazards relevant to the planning area, the HMPC began with a review of the list of hazards identified in the 2024 State Hazard Mitigation Plan and the 2020 Chatham County Multi-Jurisdictional Pre-

Disaster Hazard Mitigation Plan as listed in Table 1-8 – Hazard Identification Summary. The HMPC used these lists to identify a full range of hazards for potential inclusion in this plan update and to ensure consistency across these planning efforts. -The HMPC evaluated the list of hazards using existing hazard data, past disaster declarations, local knowledge, and information from the 2024 State Plan and the 2020 Chatham County Plan to determine the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage.

One key resource in this effort was the National Oceanic and Atmospheric Administration's National Center for Environmental Information (NCEI), which has been tracking various types of weather events since 1950. Their Storm Events Database contains an archive by county of destructive storm or weather data and information which includes local, intense and damaging events. NCEI receives storm data from the National Weather Service (NWS), which compiles their information from a variety of sources, including but not limited to county, state and federal emergency management officials; local law enforcement officials; SkyWarn spotters; NWS damage surveys; newspaper clipping services; the insurance industry and the general public, among others. Reports can include multiple events within one episode. Records for Chatham County include reporting from all jurisdictions within the county. The purpose of including all records is to reflect that incidents occurring in one jurisdiction may also impact another. For the purpose of summarizing incident impacts in this plan, records have been combined if listed both coastal and inland county zones, and countywide events (such as tropical cyclones) on the same date have been combined. The NCEI database contains 738 records of hazard events that occurred in Chatham County in the 25-year period from 1999 through 2024. Table 2-2 summarizes these events.

Table 2-2 – NCEI & Committee Member Severe Weather Data for Chatham County, 1999 – 2024

Type	# of Events	Property Damage	Crop Damage	Deaths	Injuries
Coastal Flood	22	$40,000	$0	0	0
Drought	22	$0	$0	0	0
Excessive Heat	7	$0	$0	0	0
Flash Flood	45	$7,365,000	$0	0	0
Flood	1	$2,000	$0	0	0
Frost/Freeze	2	$0	$0	0	0
Funnel Cloud	6	$0	$0	0	0
Hail	99	$10,500	$0	0	0
Heat	5	$0	$0	0	0
Heavy Rain	3	$0	$0	0	0
Heavy Snow	2	$0	$0	0	0
High Surf	6	$17,500	$0	0	0
High Wind	7	$31,000	$0	0	0
Hurricane	4	$39,376,000	$0	4[2]	1
Ice Storm	1	$0	$0	0	0
Lightning	41	$4,688,500	$0	2	16
Rip Current	56	$1,000	$0	7	14
Storm Surge/Tide	4	$5,000,000	$0	0	0
Strong Wind	18	$76,500	$0	0	0
Thunderstorm Wind	357	$607,300	$1,000	2	14
Tornado	13	$3,600,000	$0	0	6
Tropical Storm	14	$14,000	$0	0	0
Tropical Depression	2	$0	$0	0	0
Waterspout	1	$0	$0	0	0
Total:	**738**	**$60,829,300**	**$1,000**	**15**	**51**

Source: National Center for Environmental Information Events Database, April 2025
Note: Losses reflect totals for all impacted areas for each event.
[2]CEMA reported one death as a result of Hurricane Matthew and three from Hurricane Helene, which were not included in NCEI records.

-The HMPC also researched past events that resulted in a federal and/or state emergency or disaster declaration for Chatham County in order to identify significant hazards. Federal and/or state disaster declarations may be granted when the Governor certifies that the combined local, county and state resources are insufficient and that the situation is beyond their recovery capabilities. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state government capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

Records of designated counties for FEMA major disaster declarations started in 1964. Since then, Chatham County has been designated in eight major disaster declarations, as detailed in Table 2-3, and 11 emergency declarations, as detailed in Table 2-4.

Table 2-3 – FEMA Major Disaster Declarations, Chatham County

Disaster #	Dec. Date	Incident Type	Event Title	Individual Assistance Applications Approved	Total Individual and Households Program Dollars Approved	Total Public Assistance Grant Dollars Obligated
4830	9/24/2024	Hurricane	Hurricane Helene	212,590	$316,179,451.04	Not available at time of data capture
4821	8/5/2024	Tropical Storm	Tropical Storm Debby	2658	$8,848,752.05	Not available at time of data capture
4501	3/29/2020	Pandemic	Georgia Covid-19 Pandemic	18,721	$128.634.931.44	$353,076,391.01
4338	9/15/2017	Hurricane	Hurricane Irma	9,371	$13,643,351.67	$119,793,063.20
4284	10/8/2016	Hurricane	Hurricane Matthew	2,093	$6,611,177.87	$95,732,065.50
1209	3/11/1998	Severe Storm(S)	Severe Storms and Flooding	No data available	No data available	No data available
1042	10/19/1994	Severe Storm(S)	Heavy Rains, Tornados, Flooding, High Winds	No data available	No data available	No data available
536	6/2/1977	Freezing	Shrimp Loss Due to Cold Weather	No data available	No data available	No data available

Source: FEMA Disaster Declarations Summary, July 10, 2025
Note: Number of applications approved, and all dollar values represent totals for all counties included in disaster declaration.

Table 2-4 – FEMA Emergency Declarations, Chatham County

Disaster #	Dec. Date	Incident Type	Event Title/Description
3616	9/26/2024	Hurricane	Hurricane Helene
3607	8/05/2024	Hurricane	Hurricane Debby
3464	3/13/2020	Pandemic	Georgia Covid-19
3422	09/01/2019	Hurricane	Hurricane Dorian
3406	10/10/2018	Hurricane	Hurricane Michael
3387	09/08/2017	Hurricane	Hurricane Irma
3379	10/06/2016	Hurricane	Hurricane Matthew
3218	09/05/2005	Hurricane	Hurricane Katrina Evacuation

Disaster #	Dec. Date	Incident Type	Event Title/Description
3144	09/14/1999	Hurricane	Hurricane Floyd
3097	03/15/1993	Snow	Severe Snowfall, Winter Storm
3044	07/20/1977	Drought	Drought

Using the above information and additional discussion, the HMPC evaluated each hazard's significance to the planning area in order to decide which hazards to include in this plan update. Some hazard titles have been updated either to better encompass the full scope of a hazard or to assess closely related hazards together. Table 2-5 summaries the determination made for each hazard.

Table 2-5 – Hazard Evaluation Results

Hazard	Included in this plan update?	Explanation for Decision
Natural Hazards		
Tropical Cyclone (Hurricane and Tropical Storm)	Yes	The 2020 Chatham County plan and 2024 State plan addressed this hazard. Between 1999 and 2024, 19 tropical cyclones impacted the County, making this a high-risk hazard. The hazard profile will assess wind and storm surge impacts of tropical cyclones.
Sea Level Rise	Yes	NOAA's Sea Level Rise Viewer shows potential inundation in Chatham County due to sea level rise. The 2020 Chatham County plan profiled this hazard and found it a high-risk hazard with a possibility for 4-5 feet of sea level rise over the next 100 years.
Severe Weather (Wind, Lightning, Hail)	Yes	The 2020 Chatham County plan profiled these hazards individually and found them to be high and moderate risk hazards. NCEI records 515 related events in the past 20 years.
Tornado	Yes	The 2020 Chatham County plan found tornado a high-risk hazard. NCEI recorded 1 tornado causing $3.7M in damages since 1950.
Flood (Inland Flooding and Coastal Flood)	Yes	The 2020 Chatham County plan rated flood the highest risk hazard for the planning area. Over $13.4M in reported damages over the last 25 years are attributable to flood.
Severe Winter Weather	Yes	The 2020 Chatham County plan found Winter Storm and Freeze to be a high-risk hazard.
Drought	Yes	The 2020 Chatham County plan found drought to be a high-risk hazard.
Wildfire	Yes	Wildfire was addressed in the 2020 Chatham County plan and the State plan. The County plan found wildfire to be a high-risk hazard.
Earthquake*	Yes	The 2020 Chatham County plan found earthquake to be a moderate-risk hazard.
Geologic Hazards (Sinkhole & Landslide)	No	The 2020 Chatham County plan did not address this hazard due to low incidence, low vulnerability, and no known recorded past events. The HMPC agreed that this hazard is not a growing threat to the county and that there is still no history of events.
Dam Failure	Yes	The 2020 Chatham County plan found dam failure to be a low-risk hazard and there are no High Hazard Potential Dams (HHPD) in the county, However, it will be carried forward in this risk assessment due to the presence of dams in the planning area.
Extreme Heat	Yes	The 2020 Chatham County plan found extreme heat to be a high-risk hazard, however it will be carried forward in this risk assessment due to potential for increased probability based on the county's regional climate
Erosion	Yes	The 2020 Chatham County plan found erosion to be a moderate-risk hazard.

Hazard	Included in this plan update?	Explanation for Decision
Communicable Disease	Yes	The 2025 plan adds communicable disease as a natural hazard based on the 2020 COVID-19 pandemic and the possibility of recurrence or other novel virus outbreaks.
Conflagration	Yes	Conflagration was added to the 2025 plan by the HMPC based on expansion of large warehousing facilities across the county.
Tsunami	Yes	The HMPC added tsunami as a hazard for analysis in the 2025 plan. The decision to include this hazard was based on coastal vulnerabilities in the county coupled by potential seismic activity in the region.
Technological and Human-Caused Hazards & Threats		
Hazardous Materials Incident	Yes	There are many fixed facility sites and transportation routes with hazardous materials in the planning area. The 2020 Chatham County plan addressed this hazard and found it a high-risk hazard in the planning area.
Hostile Threat	Yes	The 2020 Chatham County plan addressed this as a moderate-risk hazard. The HMPC determined the hazard should be expanded to include all hostile threats due to the presence of sites and events that could be targeted by a range of nefarious threats or acts.
Cyberattack	Yes	For the 2025 plan, the HMPC determined cyberattack to be a growing threat to government and business operations in the county. Cyberattack was included in the 2020 plan as a subset of Terror Threat.

*These hazards were found to be low-risk hazards through the risk assessment process; therefore, they are not prioritized for mitigation actions.

2.3 RISK ASSESSMENT METHODOLOGY AND ASSUMPTIONS

The Disaster Mitigation Act of 2000 requires that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. Each hazard was evaluated to determine its probability of future occurrence and potential impact. A vulnerability assessment was conducted for each hazard using either quantitative or qualitative methods depending on the available data, to determine its potential to cause significant human and/or monetary losses. A consequence analysis was also completed for each hazard.

Each hazard is profiled in the following format:

Hazard Description

This section provides a description of the hazard, including discussion of its speed of onset and duration, as well as any secondary effects followed by details specific to the Chatham County planning area.

Location

This section includes information on the hazard's physical extent, with mapped boundaries where applicable.

Extent

This section includes information on the hazard extent in terms of magnitude, describe how the severity of the hazard can be measured. Where available, the most severe event on record used as a frame of reference.

Past Occurrences

This section contains information on historical events, including the location and consequences of all past events on record within or near the Chatham County planning area. Where possible, this plan uses a consistent 20-year period.

Probability of Future Occurrence

This section gauges the likelihood of future occurrences based on past events and existing data. The frequency is determined by dividing the number of events observed by the number of years on record and multiplying by 100. This provides the percentage chance of the event happening in any given year according to historical occurrence (e.g. 10 winter storm events over a 30-year period equates to a 33 percent chance of experiencing a severe winter storm in any given year). The likelihood of future occurrences is categorized into one of the classifications as follows:

- ***Highly Likely*** – Near or more than 100 percent chance of occurrence within the next year
- ***Likely*** – Between 10 and 100 percent chance of occurrence within the next year (recurrence interval of 10 years or less)
- ***Possible*** – Between 1 and 10 percent chance of occurrence within the next year (recurrence interval of 11 to 100 years)
- ***Unlikely*** – Less than 1 percent chance or occurrence within the next 100 years (recurrence interval of greater than every 100 years)

Climate Change

While no longer required under FEMA policy, this section discusses how climate change associated with applicable hazards may or may not influence the risk posed by the hazard on the planning area in the future.

Vulnerability Assessment

This section quantifies, to the extent feasible, using best available data, assets at risk to natural hazards and potential loss estimates. People, properties and critical facilities, and environmental assets that are vulnerable to the hazard are identified. Future development is also discussed in this section, including how exposure to the hazard may change in the future or how development may affect hazard risk.

The vulnerability assessments followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (August 2001). The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard. Data used to support this assessment included the following:

- Geographic Information System (GIS) datasets, including building footprints, topography, aerial photography, and transportation layers;
- Hazard layer GIS datasets from state and federal agencies including HAZUS analysis provided through the Georgia Mitigation Information System (GMIS);
- Written descriptions of inventory and risks provided by the 2024 Georgia Hazard Mitigation Strategy;
- Written descriptions of inventory and risks provided by the 2020 Chatham County Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan;
- Written descriptions and inventory of 2025 building stock and essential facilities as provided by Chatham County and its municipalities
- Exposure and vulnerability estimates derived using local parcel and building data; and

- Crop insurance claims by cause from USDA's Risk Management Agency.

Two distinct risk assessment methodologies were used in the formation of the vulnerability assessment. The first consists of a quantitative analysis that relies upon best available data and technology, while the second approach consists of a qualitative analysis that relies on local knowledge and rational decision making. The quantitative analysis involved the use of FEMA's HAZUS-MH, a nationally applicable standardized set of models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses a statistical approach and mathematical modeling of risk to predict a hazard's frequency of occurrence and estimated impacts based on recorded or historic damage information. The HAZUS risk assessment methodology is parametric, in that distinct hazard and inventory parameters—such as wind speed and building type—were modeled using the HAZUS software to determine the impact on the built environment. Chatham County's GIS-based risk assessment was completed using data collected from local, regional and national sources that included Chatham County, GEMA, and FEMA.

In addition to this risk assessment, GEMA's HAZUS report for Chatham County, provided in Appendix E, includes information on hurricanes, riverine flooding, and tornadoes.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information conveys the vulnerability of that area to that hazard.

Priority Risk Index

The conclusions drawn from the hazard profiling and vulnerability assessment process can be used to prioritize all potential hazards to the Chatham County planning area. The Priority Risk Index (PRI) was applied for this purpose because it provides a standardized numerical value so that hazards can be compared against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time, and duration). Each degree of risk was assigned a value (1 to 4) and a weighting factor as summarized in Table 2-6.

Table 2-6 – Priority Risk Index

RISK ASSESSMENT CATEGORY	LEVEL	DEGREE OF RISK CRITERIA	INDEX	WEIGHT
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	**1**	**30%**
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY	**3**	
	HIGHLY LIKELY	100% ANNUAL PROBABILITY	**4**	
IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	**1**	**30%**
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 DAY	**2**	

RISK ASSESSMENT CATEGORY	LEVEL	DEGREE OF RISK CRITERIA	INDEX	WEIGHT
hazard event occurs?	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 WEEK.	3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES > 30 DAYS.	4	
SPATIAL EXTENT How large of an area could be impacted by a hazard event? Are impacts localized or regional?	NEGLIGIBLE	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	4	
WARNING TIME Is there usually some lead time associated with the hazard event? Have warning measures been implemented?	MORE THAN 24 HRS	SELF DEFINED	1	10%
	12 TO 24 HRS	SELF DEFINED	2	
	6 TO 12 HRS	SELF DEFINED	3	
	LESS THAN 6 HRS	SELF DEFINED	4	
DURATION How long does the hazard event usually last?	LESS THAN 6 HRS	SELF DEFINED	1	10%
	LESS THAN 24 HRS	SELF DEFINED	2	
	LESS THAN 1 WEEK	SELF DEFINED	3	
	MORE THAN 1 WEEK	SELF DEFINED	4	

The sum of all five risk assessment categories equals the final PRI value, demonstrated in the equation below (the highest possible PRI value is 4.0).

PRI = [(PROBABILITY x .30) + (IMPACT x .30) + (SPATIAL EXTENT x .20) + (WARNING TIME x .10) + (DURATION x .10)]

The purpose of the PRI is to categorize and prioritize all potential hazards for the Chatham County planning area as high, moderate, or low risk. The summary hazard classifications generated through the use of the PRI allows for the prioritization of those high and moderate hazard risks for mitigation planning purposes. Mitigation actions are not developed for hazards identified as low risk through this process.

PRI ratings by category for the planning area as a whole are provided throughout each hazard profile. Ratings specific to each jurisdiction are provided at the end of each hazard profile. The results of the risk assessment and overall PRI scoring are provided in Section 2.6 Conclusions on Hazard Risk.

2.4 ASSET INVENTORY

An inventory of assets within Chatham County was compiled to identify those structures potentially at risk to the identified hazards and assess the level of vulnerability. Assets include elements such as buildings, property, business/industry goods, and civil infrastructure. Parcel, building footprint, foundation type, and building value data were provided by Chatham County. By identifying the type and number of assets that exist and where they are in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed.

2.4.1 Building Exposure

The properties identified to be at risk include all improved properties in Chatham County and its incorporated jurisdictions according to parcel, building footprint, and fair market value data provided by SAGIS. The information is provided in Table 2-7. This risk information is detailed by flood zone in in Section 2.5.6. For non-spatially defined hazards, the estimates below represent the total building exposure to the hazard.

Table 2-7 – Chatham County Building Exposure by Jurisdiction and Occupancy

Occupancy by Jurisdiction	Estimated Building Count	Building Value	Estimated Content Value	Estimated Total Value
Bloomingdale	**1,434**	**$306,252,955**	**$275,792,527**	**$582,045,482**
Commercial	74	$99,707,820	$99,707,820	$199,415,640
Government	13	$4,210,200	$4,210,200	$8,420,400
Industrial	19	$64,346,360	$96,519,540	$160,865,900
Non-Profit	32	$12,426,500	$12,426,500	$24,853,000
Residential	1,291	$125,414,646	$62,707,323	$188,121,969
Utility	5	$147,429	$221,144	$368,573
Garden City	**3,368**	**$1,127,080,552**	**$1,307,144,984**	**$2,434,225,536**
Commercial	548	$261,519,692	$261,519,692	$523,039,384
Government	20	$14,026,300	$14,026,300	$28,052,600
Industrial	395	$585,157,621	$877,736,432	$1,462,894,053
Non-Profit	85	$39,111,200	$39,111,200	$78,222,400
Residential	2,288	$226,147,249	$113,073,625	$339,220,874
Utility	32	$1,118,490	$1,677,735	$2,796,225
Pooler	**11,114**	**$4,385,040,792**	**$43,711,732,242**	**$8,096,773,034**
Commercial	770	$1,094,183,099	$1,094,183,099	$2,188,366,198
Government	13	$6,633,200	$6,633,200	$13,266,400
Industrial	177	$944,621,160	$1,416,931,740	$2,361,552,900
Non-Profit	36	$48,354,800	$48,354,800	$96,709,600
Residential	10,107	$2,291,243,397	$1,145,621,699	$3,436,865,096
Utility	11	$5,136	$7,704	$12,840
Port Wentworth	**4,823**	**$1,407,307,282**	**$1,228,896,390**	**$2,636,203,672**
Commercial	213	$315,335,050	$315,335,050	$630,670,100
Government	20	$5,905,200	$5,905,200	$11,810,400
Industrial	100	$362,361,118	$543,541,677	$905,902,795
Non-Profit	29	$4,512,900	$4,512,900	$9,025,800
Residential	4,436	$719,187,958	$359,593,979	$1,078,781,937
Utility	25	$5,056	$7,584	$12,640
Savannah	**55,351**	**$18,095,408,782**	**$14,358,197,326**	**$32,453,606,108**
Commercial	5,074	$5,839,573,854	$5,839,573,854	$11,679,147,708
Government	186	$1,046,161,837	$1,046,161,837	$2,092,323,674
Industrial	753	$1,308,741,033	$1,963,111,550	$3,271,852,583
Non-Profit	1,100	$1,080,911,900	$1,080,911,900	$2,161,823,800
Residential	48,132	$8,801,592,053	$4,400,796,027	$13,202,388,080
Utility	106	$18,428,105	$27,642,158	$46,070,263
Thunderbolt	**1,218**	**$257,861,725**	**$171,824,113**	**$429,685,638**
Commercial	102	$64,228,600	$64,228,600	$128,457,200
Government	6	$1,943,400	$1,943,400	$3,886,600

Occupancy by Jurisdiction	Estimated Building Count	Building Value	Estimated Content Value	Estimated Total Value
Industrial	39	$7,999,500	$11,999,250	$19,998,750
Non-Profit	16	$3,615,500	$3,615,500	$7,231,000
Residential	1053	$180,074,725	$90,037,363	$270,112,088
Utility	2	$0	$0	$0
Tybee Island	**3,855**	**$1,147,813,133**	**$618,135,241**	**$1,768,948,374**
Commercial	151	$76,404,481	$76,404,481	$152,808,962
Government	9	$6,396,300	$6.396.300	$12,792,600
Historic	8	$3,945,400	$3,945,400	$7,890,800
Industrial	4	$859,400	$1,289,100	$2,148,500
Non-Profit	27	$5,765,700	$5,765,700	$11,531,400
Residential	3,653	$1,054,328,518	$527,164,259	$1,581,492,777
Utility	3	$113,334	$170,001	$283,335
Unincorporated Couty	**37,046**	**$12,342,377,190**	**$8,127,518,678**	**$20,520,080,728**
Commercial	888	$1,348,968,701	$1,348,968,701	$2,697,937,402
Government	26	$143,570,100	$143,570,100	$287,140,200
Industrial	256	$1,095,642,472	$1,643,463,708	$2,739,106,180
Non-Profit	195	$189,677,200	$189,677,200	$379,354,400
Residential	35,625	$9,561,670,727	$4,797,566,984	$14,409,432,571
Utility	56	$2,847,990	$4,271,985	$7,119,975
Vernonburg	**68**	**$33,463,240**	**$16,731,620**	**$50,194,860**
Residential	68	$33,463,240	$16,731,620	$50,194,860
Countywide Total	**118,277**	**$39,812,576,821**	**$29,812,576,821**	**$68,971,773,432**
Commercial	7820	$9,099,921,297	$9,099,921,297	$18,199,842,594
Government	293	$1,228,846,537	$1,222,450,237	$2,457,692,874
Historic	8	$3,945,400	$3,945,400	$7,890,800
Industrial	1743	$4,369,728,664	$6,554,592,997	$10,924,321,661
Non-Profit	1520	$1,384,375,700	$1,384,375,700	$2,768,751,400
Residential	106653	$22,993,122,513	$11,513,292,879	$34,556,610,252
Utility	240	$22,665,540	$33,998,311	$56,663,851

Source: Chatham County parcel and building footprint data, 2025

Note: Content value estimations are generally based on the FEMA HAZUS methodology of estimating value as a percentage of improved structure values by property type. The residential property type assumes a content replacement value equal to 50% of the building value. Commercial, government, historic, and non-profit property types assume a content replacement value equal to 100% of the building value. Industrial and utility property type assumes a content replacement value equal to 150% of the building value.

2.4.2 Critical Facilities and Infrastructure Exposure

Of significant concern with respect to any disaster event is the location of critical facilities and infrastructure in the planning area. Critical facilities are often defined as those essential services and lifelines that, if damaged during an emergency event, would result in severe consequences to public health, safety, and welfare. Critical facilities and infrastructure assessed in this risk assessment were identified by Chatham County Emergency Management and verified by the HMPC. These facilities and infrastructure are listed in each community's annex. Additional data on critical facilities is compiled and managed by GMIS. A sample GMIS report on critical facility risk is provided in Appendix E.

2.5 HAZARD PROFILES, ANALYSIS, AND VULNERABILITY

2.5.1 Dam Failure

Hazard Background

A dam is a barrier constructed across a watercourse that stores, controls, or diverts water. Dams are usually constructed of earth, rock, concrete, or mine tailings. The water impounded behind a dam is referred to as the reservoir and is measured in acre-feet. One acre-foot is the volume of water that covers one acre of land to a depth of one foot. Dams can benefit farm land, provide recreation areas, generate electrical power, and help control erosion and flooding issues. A dam failure is the collapse or breach of a dam that causes downstream flooding. Dam failures may be caused by natural events, manmade events, or a combination. Due to the lack of advance warning, failures resulting from natural events, such as earthquakes or landslides, may be particularly severe. Prolonged rainfall and subsequent flooding are the most common cause of dam failure.

Dam failures usually occur when the spillway capacity is inadequate, and water overtops the dam or when internal erosion in dam foundation occurs (also known as piping). If internal erosion or overtopping causes a full structural breach, a high-velocity, debris-laden wall of water is released and rushes downstream, damaging or destroying anything in its path. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following:

- Prolonged periods of rainfall and flooding;
- Inadequate spillway capacity, resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross-section of the dam and abutments, or maintain gates, valves, and other operational components;
- Improper design, including the use of improper construction materials and construction practices;
- Negligent operation, including the failure to remove or open gates or valves during high flow periods;
- Failure of upstream dams on the same waterway; or
- High winds, which can cause significant wave action and result in substantial erosion.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. Dam failures are generally catastrophic if the structure is breached or significantly damaged. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major casualties and loss of life could result, as well as water quality and health issues. Potentially catastrophic effects on roads, bridges, and homes are also of major concern. Associated water quality and health concerns could also be issues. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

Dam failure can occur with little warning. Intense storms may produce a flood in a few hours or even minutes for upstream locations. Flash floods occur within six hours of the beginning of heavy rainfall, and dam failure may occur within hours of the first signs of breaching. Other failures and breaches can take much longer to occur, from days to weeks, as a result of debris jams or the accumulation of melting snow.

Dam failures are of particular concern because the failure of a large dam has the potential to cause more death and destruction than the failure of any other manmade structure. This is because of the destructive power of the flood wave that would be released by the sudden collapse of a large dam. Dams are innately hazardous structures. Failure or poor operation can result in the release of the reservoir contents—this can include water, mine wastes, or agricultural refuse–causing negative impacts upstream or downstream or at locations far from the dam. Negative impacts of primary concern are loss of human life, property damage, lifeline disruption, and environmental damage.

Warning Time: 4 – Less than 6 hours

Duration: 3 – Less than 1 week

Location

The Georgia Safe Dams Program, an entity of the Georgia Department of Natura Resources' Environmental Protection Division, provides an inventory of all the dams in the state.

Table **2-8** provides details for four dams and three ponds/impoundments listed in the inventory as of April 2025 that are located within Chatham.

Dam Name	NIDID	Location and Distance to Chatham County	Height (Ft.)	NID Storage (acre-feet)	Primary Purpose	Hazard Category	EAP
Beaufort-Jasper Water Sewer Authority Dam 1	SCD5068	Beaufort County, SC (40 miles)	11	84	Not provided	High	No
Ivanhoe Plantation Dam	SC01545	Allendale County, SC (80 miles)	13	199	Recreation	High	No
Banks Lake Dam	GA03321	Candler County, GA	11	151	Recreation	High	No

Figure 2-1 on the following page reflects the location of these dams within the County. None of these dams are considered a high hazard. Note that the Ottawa Farms Lake Dam is currently only proposed.

Table 2-8 – National Inventory of Dams Listings for Chatham County, GA

Dam Name	NIDID	Owner	Height (Ft.)	NID Storage (acre-feet)	Primary Purpose	Hazard Category	EAP
Lake Mayer Dam	GA00927	County Government	9	382	Recreation	Low	NR
Forest City Gun Club Lake Dam	GA00928	Forest City Gun Club	10	273	Recreation	Low	NR
Jones Mill Pond Dam	GA03217	Rogers Correctional Institution	11	164	Other	Low	NR
Proposed Ottawa Farms Lake Dam	GA04907	Ottawa Farms Properties I LLC	9	144	Fire Protection, Stock, or Small Fish Pond	Low	NR

Dam Name	NIDID	Owner	Height (Ft.)	NID Storage (acre-feet)	Primary Purpose	Hazard Category	EAP
Raw Water Storage Impoundment	GA07180	City of Savannah	29	450	Water Supply	Low	NR
Pond 29 (Oglethorpe Pond)	GA08226	Ft Stewart/ HAAF	19	71	Recreation, Fish & Wildlife Pond	Low	Y (2010)
Pond 24 (Halstrom Pond)	GA08220	Ft Stewart/ HAAF	26	45	Recreation, Fish & Wildlife Pond	Low	Y (2010)

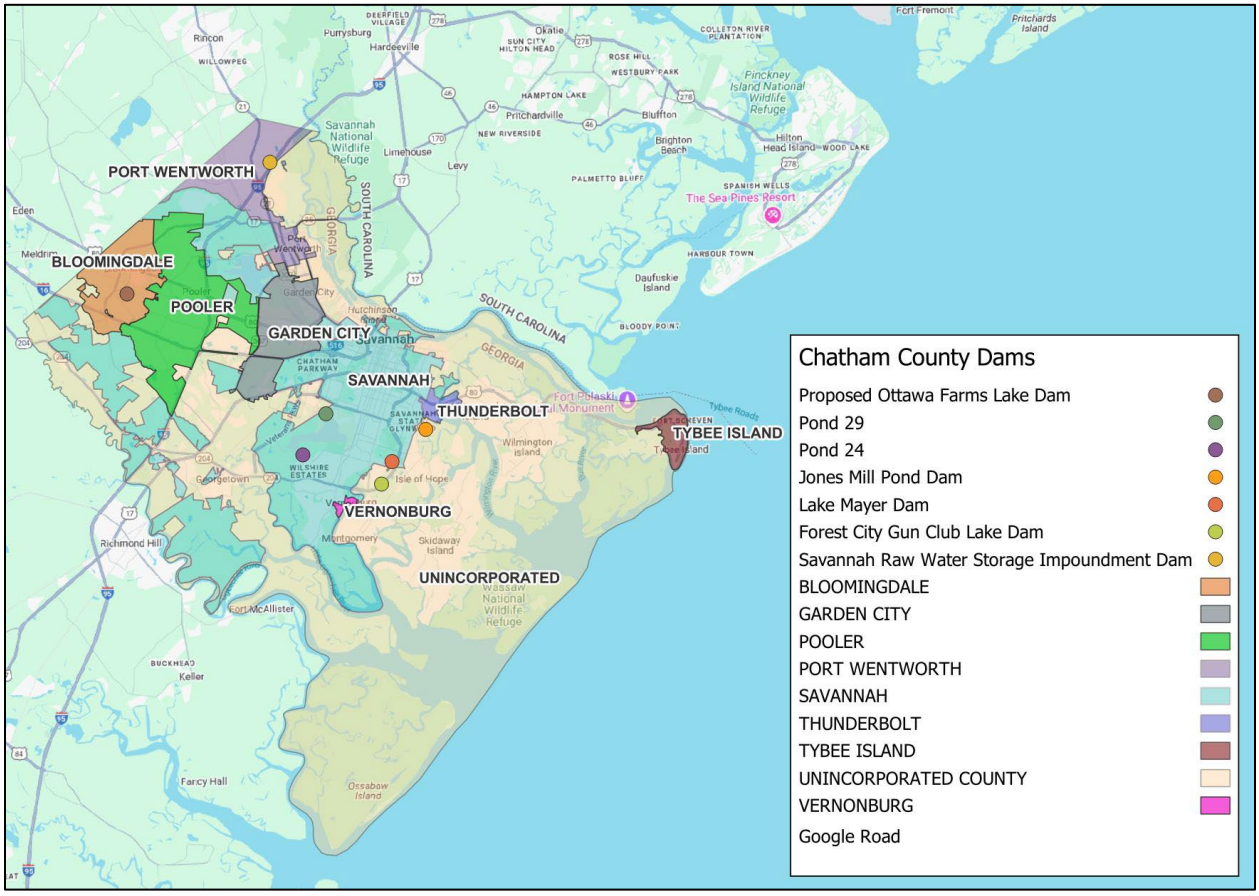
Source: National Inventory of Dams, March 2025

Research shows that there are no High Hazard Potential Dams (HHPD) within Chatham County or within any distance to cause inundation risk to the county. For planning reference, the closest HHPDs are provided in Table 2-9.

Table 2-9 – High Hazard Potential Dams Relative to Chatham County

Dam Name	NIDID	Location and Distance to Chatham County	Height (Ft.)	NID Storage (acre-feet)	Primary Purpose	Hazard Category	EAP
Beaufort-Jasper Water Sewer Authority Dam 1	SCD5068	Beaufort County, SC (40 miles)	11	84	Not provided	High	No
Ivanhoe Plantation Dam	SC01545	Allendale County, SC (80 miles)	13	199	Recreation	High	No
Banks Lake Dam	GA03321	Candler County, GA (60 miles)	11	151	Recreation	High	No

Figure 2-1 – Dam Locations in Chatham County



Source: National Inventory of Dams. April 2025

Extent

Each state has definitions and methods to determine the Hazard Potential of a dam. In Georgia, dams are recognized by the state if they are 25 feet or more in height or impound 100 acre-feet or more. The height of a dam is from the highest point on the crest of the dam to the lowest point on the downstream toe, and the storage capacity is the volume impounded at the elevation of the highest point on the crest of the dam. A dam is regulated only if it is deemed that its failure would result in loss of human life.

Georgia Safe Dams Program engineers determine the "hazard potential" of a dam based on the consequences of failure, meaning the probable damage in terms of loss of human life that would occur if the structure failed. Dams are assigned one of two categories based on their hazard potential:

1. Category II (Low Hazard) includes dams located where failure will not cause loss of human life. Situations constituting probably loss of life are situations that involve frequently occupied structures or facilities, including, but not limited to, residences, commercial and manufacturing facilities, schools, and churches.
2. Category I (High Hazard) includes dams located where failure will likely cause loss of human life.

Category I dams are then further classified by their size with corresponding minimum spillway design requirements expressed in terms of Probable Maximum Precipitation (PMP), as follows:

- Small: 25% PMP
- Medium: 33.3% PMP

- Large: 50% PMP
- Very Large: 100% PMP

Category I dams are assessed bi-annually by Georgia Environmental Protection Division staff and quarterly by their owners to ensure safety and compliance with regulations. Category II dams are reevaluated every 5 years for any hazard potential. The Safe Dams Program notes that there is a significant backlog in work which means many Category II and proposed dams throughout the state need further study. Given the lack of high hazard dams in the planning area, potential impact is considered limited. It is possible that dams in the planning area present greater risk since they were last evaluated due to downstream development and increased exposure, but without a reevaluation of these dams it is difficult to draw any conclusions.

Impact: 1 – Minor

Spatial Extent: 1 – Negligible

Historical Occurrences

There are no records of historical dam failures occurrences in or affecting the planning area.

Probability of Future Occurrence

There are seven low hazard dams within Chatham County that could impact the County, but a flooding hazard from future dam failure is unlikely. However, regular monitoring is still necessary to prevent these events from occurring. With heavy rain events becoming more frequent and intense, conditions conducive to dam failure may occur more frequently as well.

Probability: 1 – Unlikely

Climate Change

Studies have been conducted to investigate the impact of climate change scenarios on dam safety. Climate change impacts on dam failure will most likely be related to changes in precipitation and flood likelihood. Climate change projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on dams and increasing likelihood of dam failure. The safety of dams for the future climate can be based on an evaluation of changes in design floods and the freeboard available to accommodate an increase in flood levels. The results from the studies indicate that the design floods with the corresponding outflow floods and flood water levels will increase in the future, and this increase will affect the safety of the dams in the future. Studies concluded that the total hydrological failure probability of a dam will increase in the future climate and that the extent and depth of flood waters will increase by the future dam break scenario.

Vulnerability Assessment

Methodologies and Assumptions

No data was available on dam inundation areas in order to estimate potential losses that could result from dam failure. Therefore, this vulnerability assessment provides a qualitative assessment of the potential impacts of dam failure.

People

A person's immediate vulnerability to a dam failure is directly associated with the person's distance downstream of the dam as well as proximity to the stream carrying the floodwater from the failure. For dams that have an Emergency Action Plan (EAP), the vulnerability of loss of life for persons in their homes

or on their property may be mitigated by following the EAP evacuation procedures; however, the displaced persons may still incur sheltering costs. For persons located on the river (e.g. for recreation) the vulnerability of loss of life is significant.

People are also vulnerable to the loss of use of a reservoir upstream of a dam following failure. Several uses are minor, such as aesthetics or recreational use. However, some reservoirs serve as drinking water supplies and their loss could disrupt the drinking water supply and present a public health problem. Chatham County gets its drinking water via aquifer, and the extent of any potential contamination due to dam failure is unknown at this time.

There are no high hazard dams in or immediately upstream of the planning area, therefore loss of life would not be expected even in the unlikely event of a failure.

Property

Given the current dam inventory and historic data, a dam breach is unlikely in the future. However, regular monitoring can help mitigate or prevent failures if appropriate actions are taken when it is determined a failure may be likely.

Vulnerability of the built environment includes damage to the dam itself, and any man-made feature located within the inundation area caused by the dam failure. A detailed assessment of exposure to dam failure could not be completed because no data was available on dam inundation areas.

Downstream of a dam, vulnerability includes potential damage to homes, personal property, commercial buildings and property, and government owned buildings and property; destruction of bridge or culvert crossings; weakening of bridge supports through scour; and damage or destruction of public or private infrastructure that crosses the stream such as water and sewer lines, gas lines and power lines. Water dependent structures on a reservoir upstream of the dam, such as docks/piers, floating structures or water intake structures, may be damaged by the rapid reduction in water level during the failure.

As land improvements, rezoning, and development occur downstream of a Category II dam, the overall exposure to dam failure may result in a need to increase the rating of that dam to a Category I, which would require more stringent maintenance and reporting criteria. However, given that Category II dams are only inspected every 5 years and that there is a delay between development occurring and a Category change being made, it is possible that some Category I dams are currently unrecognized as such and that actual exposure to high hazard dam failure has increased. Changes in development could continue this trend. In both cases, risk is greater during the period where exposure has increased but additional reporting and maintenance criteria have not been enacted.

Table 2-10 – Dam Inspection Dates

Dam	Most Recent Inspection Date
Savannah Raw Storage Impoundment Dam	N/A
Pond 24	03/05/2023
Pond 29	03/06/2023
Jones Millpond	06/01/2010
Forest City Gun Club Lake	03/16/2016
Lake Mayer Dam	03/16/2016
Proposed Ottawa Farms Lake Dam	03/16/2016

Environment

Aquatic species within the reservoir may be displaced or destroyed by a dam failure. The velocity of the flood wave will likely damage or destroy riparian and instream vegetation and negatively affect wetland function. The flood wave will like cause erosion within and adjacent to the stream. Deposition of eroded deposits may choke instream habitat or disrupt riparian areas. Sediments within the reservoir bottom and any low oxygen water from within the reservoir may be dispersed, potentially causing fish kills or releasing heavy metals found in the reservoir sediment layers.

Consequence Analysis

Table 2-11 summarizes the potential negative consequences of dam failure.

Table 2-11 – Consequence Analysis – Dam Failure

Category	Consequences
Public	Localized impact expected to be severe for inundation area and moderate to light for other adversely affected areas.
Responders	Localized impact expected to limit damage to personnel in the inundation area at the time of the incident.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel in the area of the incident may require temporary relocation of some operations. Localized disruption of roads and/or utilities may postpone delivery of some services. Regulatory waivers may be needed locally. Fulfillment of some contracts may be difficult. Impact may reduce deliveries.
Property, Facilities and Infrastructure	Localized impact to facilities and infrastructure in the inundation area of the incident. Some severe damage possible.
Environment	Localized impact expected to be severe for inundation area and moderate to light for other adversely affected areas. Consequences include erosion, water quality degradation, wildlife displacement or destruction, and habitat destruction.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period of time, depending on damage and length of investigation.
Public Confidence in the Jurisdiction's Governance	Localized impact is expected to primarily adversely affect only the dam owner and local entities.

Hazard Summary by Jurisdiction

The following table summarizes dam failure hazard risk by jurisdiction. Warning time and duration are inherent to the hazard and remain constant cross jurisdictions. Spatial extent of any dam failure will be negligible relative to the planning area. There are no high hazard potential dams in the county, so all jurisdictions were assigned a probability rating of unlikely and an impact rating of minor.

Table 2-12 – Dam Failure Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	2	1	4	3	1.8	L
Bloomingdale	1	1	1	4	3	1.5	L
Garden City	1	1	1	4	3	1.5	L
Pooler	1	1	1	4	3	1.5	L
Port Wentworth	1	1	1	4	3	1.5	L
Savannah	1	2	1	4	3	1.8	L
Thunderbolt	1	1	1	4	3	1.5	L
Tybee Island	1	1	1	4	3	1.5	L
Vernonburg	1	1	1	4	3	1.5	L

2.5.2 Drought

Hazard Background

Drought is a deficiency in precipitation over an extended period. It is a normal, recurrent feature of climate that occurs in virtually all climate zones. The duration of a drought varies widely. There are cases when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind, and there are other cases when drought spans multiple years, or even decades. Studying the paleoclimate record is often helpful in identifying when long-lasting droughts have occurred. Common types of drought are detailed below in Table 2-13

Table 2-13 – Types of Drought

Type	Details
Meteorological Drought	Meteorological Drought is based on the degree of dryness (rainfall deficit) and the length of the dry period.
Agricultural Drought	Agricultural Drought is based on the impacts to agriculture by factors such as rainfall deficits, soil water deficits, reduced ground water, or reservoir levels needed for irrigation.
Hydrological Drought	Hydrological Drought is based on the impact of rainfall deficits on the water supply such as stream flow, reservoir and lake levels, and ground water table decline.
Socioeconomic Drought	Socioeconomic drought is based on the impact of drought conditions (meteorological, agricultural, or hydrological drought) on supply and demand of some economic goods. Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related deficit in water supply.

The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop both a definition to describe drought and an index to measure it. Many quantitative measures of drought have been developed in the United States, depending on the discipline affected, the region being considered, and the particular application. Several indices developed by Wayne Palmer, as well as the Standardized Precipitation Index, are useful for describing the many scales of drought.

The U.S. Drought Monitor provides a summary of drought conditions across the United States and Puerto Rico. Often described as a blend of art and science, the Drought Monitor map is updated weekly by combining a variety of data-based drought indices and indicators and local expert input into a single composite drought indicator.

The **Palmer Drought Severity Index** (PDSI) devised in 1965, was the first drought indicator to assess moisture status comprehensively. It uses temperature and precipitation data to calculate water supply and demand, incorporates soil moisture, and is considered most effective for unirrigated cropland. It primarily reflects long-term drought and has been used extensively to initiate drought relief. It is more complex than the Standardized Precipitation Index (SPI) and the Drought Monitor.

The **Standardized Precipitation Index** (SPI) is a way of measuring drought that is different from the PDSI. Like the PDSI, this index is negative for drought, and positive for wet conditions. But the SPI is a probability index that considers only precipitation, while PDSI are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff).

The State of Georgia adopted Drought Management Rules in 2015 that specify response strategies to varying levels of declared drought. These rules provide the framework to coordinate statewide response to drought.

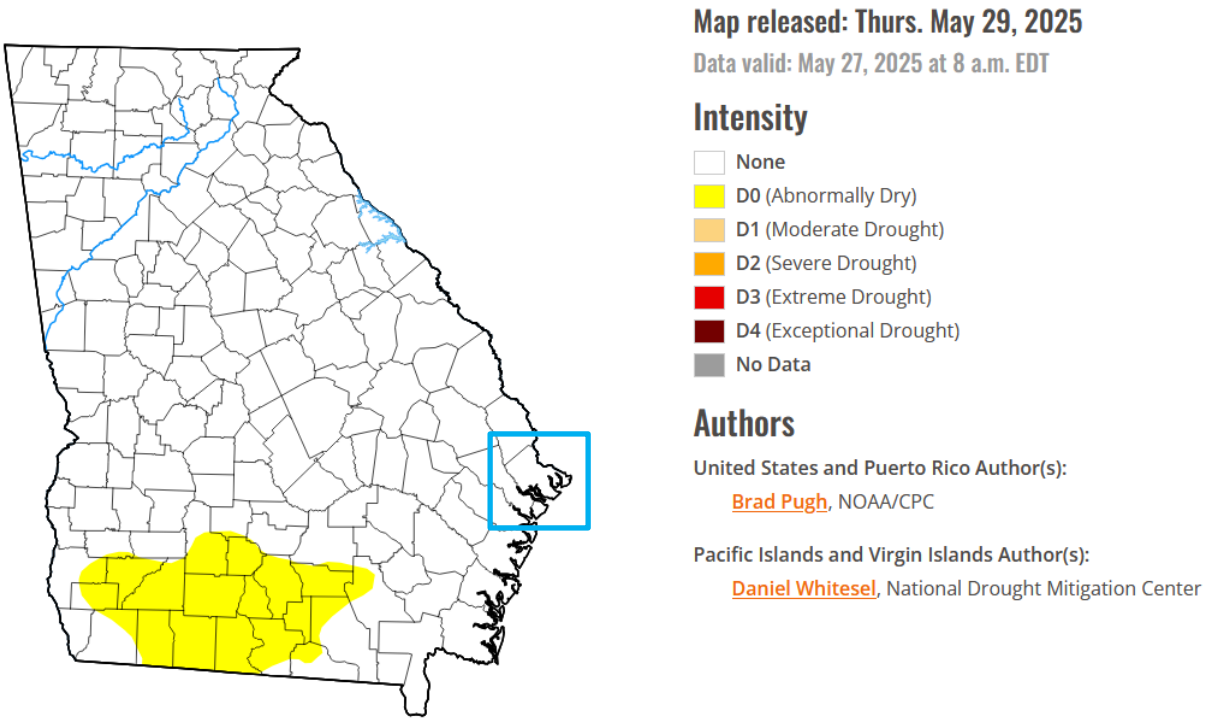
Warning Time: 1 – More than 24 hours

Duration: 4 – More than one week

Location

Drought is a regional hazard that can cover an entire planning area, and in some cases the entire state. According to the PDSI, Eastern Georgia has a low-moderate risk for drought compared to the rest of the United States. Figure 2-2 notes the U.S. Drought Monitor's drought ratings for Georgia as of May 29, 2025; as of that date, Chatham County was experiencing no impacts of drought. However, the figure does nonetheless illustrate the large-scale, regional nature of drought as depicted with a D0 drought in south-central Georgia.

Figure 2-2 – US Drought Monitor for Week of May 29, 2025



Source: U.S. Drought Monitor
Note: Blue square indicates location of Chatham County.

Extent

Drought extent can be defined in terms of intensity, using the U.S. Drought Monitor scale. The Drought Monitor Scale measures drought episodes with input from the Palmer Drought Severity Index, the Standardized Precipitation Index, the Keetch-Byram Drought Index, soil moisture indicators, and other inputs as well as information on how drought is affecting people. Figure 2-3 details the classifications used by the U.S. Drought Monitor. A category of D2 (severe) or higher on the U.S. Drought Monitor Scale can typically result in crop or pasture losses, water shortages, and the need to institute water restrictions.

Figure 2-3 – U.S. Drought Monitor Classifications

			Ranges				
Category	Description	Possible Impacts	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

Source: U.S. Drought Monitor

The most severe droughts to impact Chatham County in the past 10 years were D2 (Severe Drought) between March 13 – April 23, 2018, September 24 – October 21, 2019, and May 10 – July 11, 2022. Prior to 2014, Chatham County spent 4 weeks in D3 (Extreme Drought) in 2013, and 53 weeks in D3/D4 (Extreme and Exceptional Drought) between May 31, 2011, and June 4, 2012.

Impact: 1 – Minor

Spatial Extent: 4 – Large

Historical Occurrences

U.S. Drought Monitor records drought intensity weekly throughout the country. Table 2-14 presents the number of weeks that Chatham County spent in drought by intensity over the period from December 31, 2013, through June 2, 2025, for which the Drought Monitor has records for 597 weeks.

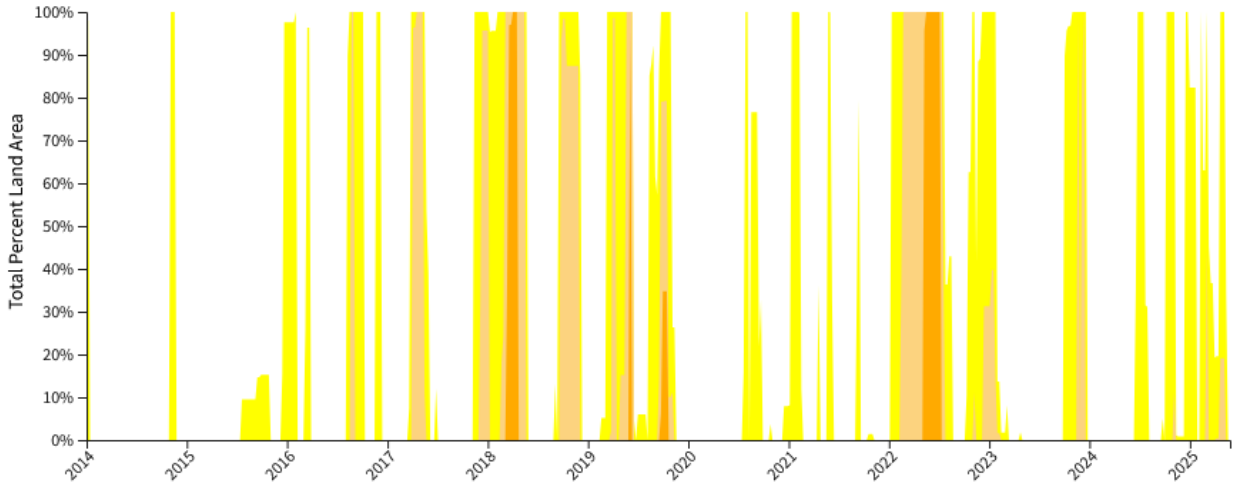
Table 2-14 – Weeks in Drought, 2014-2025

	Total Weeks						% of time in Severe Drought or Worse
County	Total	D0	D1	D2	D3	D4	
Chatham	597	270	101	21	0	0	3.52%

Source: U.S. Drought Monitor History

Figure 2-4 shows the historical periods where the county was considered in some level of drought condition. The color key shown in Figure 2-4 indicates the intensity of the drought. Between 2014 and 2025, Chatham County was at some level of drought 65% of the time.

Figure 2-4 – US Drought Monitor Historical Trends – Chatham County



Source: U.S. Drought Monitor

Chatham County receives an average of 49.2" of precipitation annually as measured at the Savannah International Airport. Table 2-15 below shows annual precipitation and the departure from normal from 2014 through 2024 in Chatham County. Per this assessment Chatham County experienced the greatest magnitude of drought between 2022 and 2023, totaling 19.5 inches of precipitation deficit. Precipitation was also below normal in 2018.

Table 2-15 – Departure from Normal Precipitation Levels

Year	Annual Precipitation (inches)	Departure from Normal (49.2")
2014	50.6	1.4
2015	47.6	-1.6
2016	55.5	6.3
2017	53.2	4.0
2018	43.0	-6.2
2019	51.4	2.2
2020	50.3	1.1
2021	49.1	-0.1
2022	36.9	-12.3
2023	42.0	-7.2
2024	56.6	7.4

Source: Extreme Weather Watch

The National Drought Mitigation Center (NDMC), located at the University of Nebraska in Lincoln, provides a clearinghouse for information on the effects of drought, based on reports from media, observers, impact records, and other sources. According to the NDMC's Drought Impact Reporter, during the 10-year period from January 2014 through December 2024, 107 drought impacts were noted for the State of Georgia, of which 13 were reported to affect Chatham County. Table 2-16 summarizes the number of impacts reported by category. Note that the Drought Impact Reporter assigns multiple categories to each impact.

Table 2-16 – Drought Impacts Reported for Chatham County, January 2014 – December 2024

Category	Impacts
Agriculture	5
Business & Industry	1
Energy	0
Fire	4
Plants & Wildlife	4
Relief, Response, and Restrictions	5
Society and Public Health	0
Relief, Response & Restrictions	0
Water Supply & Quality	5

Source: Drought Impact Reporter, https://unldroughtcenter.maps.arcgis.com/apps/dashboards/46afe627bb60422f85944d70069c09cf

NCEI reports on hazard data do not include any drought records for Chatham County between 2014 and 2024. Additionally, the County has had only one FEMA Emergency Declaration for a drought in July 1977.

Probability of Future Occurrence

Probability: 3 – Likely

Over the 10-year period, for which Drought Monitor reports on 597 weeks, from 2014 through 2024, Chatham County had 392 weeks of drought conditions ranging from abnormally dry to severe drought. Of this time, 21 weeks were categorized as a severe (D2) drought, which translates to a 3.5 percent chance of severe drought in any given week. Considering annual rainfall between 2014 and 2024, there were 5 years with rain deficit but only two had deficits greater than 2 inches. When annualizing drought risk based on annual rainfall, the County can assume a 208% chance of significant rain deficit related drought in any year.

Climate Change

The Sixth Intergovernmental Panel of Climate Change (IPCC) Assessment Report 2023) reports that the Southeast region of the United States faces more coastal flooding, damaging hurricane intensification, and more risky heat days. As temperature is projected to continue rising, evaporation rates are expected to increase, resulting in decreased surface soil moisture levels in times when precipitation levels are below normal. Together, these factors suggest that drought intensity and duration may increase in the region.

Vulnerability Assessment

Methodologies and Assumptions

From 2000 to 2025, there is no Chatham County death, injury, property damage, or crop damage history data to estimate potential losses that could result from future droughts; therefore, vulnerability to drought is assessed qualitatively.

People

Drought can affect people's physical and mental health. For those economically dependent on a reliable water supply, drought may cause anxiety or depression about economic losses, reduced incomes, and other employment impacts. Conflicts may arise over water shortages. People may be forced to pay more for water, food, and utilities affected by increased water costs. Drought may cause health problems due to poor water quality from lower water levels. If accompanied by extreme heat, drought can also result in higher incidents of heat stroke and even loss of life.

Property

Drought is unlikely to cause damages to the built environment. However, in areas with shrinking and expansive soils, drought may lead to structural damages. Drought may cause severe property loss for the agricultural industry in terms of crop and livestock losses. The USDA's Risk Management Agency (RMA) maintains a database of all paid crop insurance claims. According to NCEI data, there have been no property or crop damage in Chatham County in the past 25 years. Per the USDA's Census of Agriculture County Summary Highlights (2022), Chatham County has 41 farms totaling 7,742 acres with an average product market value of $247,549.[14]

Agriculture only accounts for 2.3 percent of the County's total land area. It is a small portion of the property damage risk but has the highest vulnerability to drought. There have been no significant development changes that affect vulnerability; all land and structures are at risk to drought exposure in county making the exposure risk high.

Environment

Drought can affect local wildlife by shrinking food supplies and damaging habitats. Sometimes this damage is only temporary, and other times it is irreversible. Wildlife may face increased disease rates due to limited access to food and water. Increased stress on endangered species could cause extinction. Drought may also increase likelihood of wind and water erosion of soils.

Another concern during a drought is that contaminants such as pesticides and fertilizers may be washed into waterways during heavy rains and flooding. Given the cultural and economic importance of water access in Chatham County, any increase in contaminants in rivers could adversely affect the planning area.

Drought conditions can also provide a substantial increase in wildfire risk. When plants and trees die from a lack of precipitation, or even increased insect infestations, and diseases—which are associated with drought—they increase wildfire fuel loads. Long periods of drought can result in more intense wildfires, which bring additional consequences.

Consequence Analysis

Table 2-17 summarizes the potential negative consequences of drought.

Table 2-17 – Consequence Analysis - Drought

Category	Consequences
Public	Can cause anxiety or depression about economic losses, conflicts over water shortages, reduced incomes, fewer recreational activities, higher incidents of heat stroke, and fatality.
Responders	Impacts to responders are unlikely. Exceptional drought conditions may impact the amount of water available for firefighting operations.
Continuity of Operations (including Continued Delivery of Services)	Drought would have minimal impacts on continuity of operations due to the relatively long warning time that would allow for plans to be made to maintain continuity of operations.
Property, Facilities and Infrastructure	Drought has the potential to affect water supply for residential, commercial, institutional, industrial, and government-owned areas. Drought can reduce water supply in wells and reservoirs. Utilities may be forced to increase rates.

[14] https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Georgia/st13_2_001_001.pdf. Retrieved July 14, 2025.

Category	Consequences
Environment	Environmental impacts include strain on local plant and wildlife; damage to wet ecosystems, and increased probability of erosion and wildfire.
Economic Condition of the Jurisdiction	Farmers may face crop losses or increased livestock costs. Businesses that depend on farming may experience secondary impacts. Extreme drought has the potential to impact local businesses in landscaping, recreation and tourism, and public utilities.
Public Confidence in the Jurisdiction's Governance	When drought conditions persist with no relief, local or State governments must often institute water restrictions, which may impact public confidence.

Hazard Summary by Jurisdiction

The following table summarizes drought hazard risk by jurisdiction. Drought risk is uniform across the planning area. Warning time, duration, and spatial extent are inherent to the hazard and remain constant across jurisdictions. The majority of damages that result from drought are to crops and other agriculture-related activities as well as water-dependent industries; therefore, the magnitude of the impacts is typically greater in unincorporated areas. In more heavily developed areas, the magnitude of drought is less severe, with lawns and local gardens affected and potential impacts on local water supplies during severe, prolonged drought.

Table 2-18 – Drought Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	2	4	1	4	2.8	H
Bloomingdale	3	2	4	1	4	2.8	H
Garden City	3	1	4	1	4	2.5	H
Pooler	3	1	4	1	4	2.5	H
Port Wentworth	3	1	4	1	4	2.5	H
Savannah	3	1	4	1	4	2.5	H
Thunderbolt	3	1	4	1	4	2.5	H
Tybee Island	3	1	4	1	4	2.5	H
Vernonburg	3	1	4	1	4	2.5	H

2.5.3 Earthquake

Hazard Background

An earthquake is a movement or shaking of the ground. Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

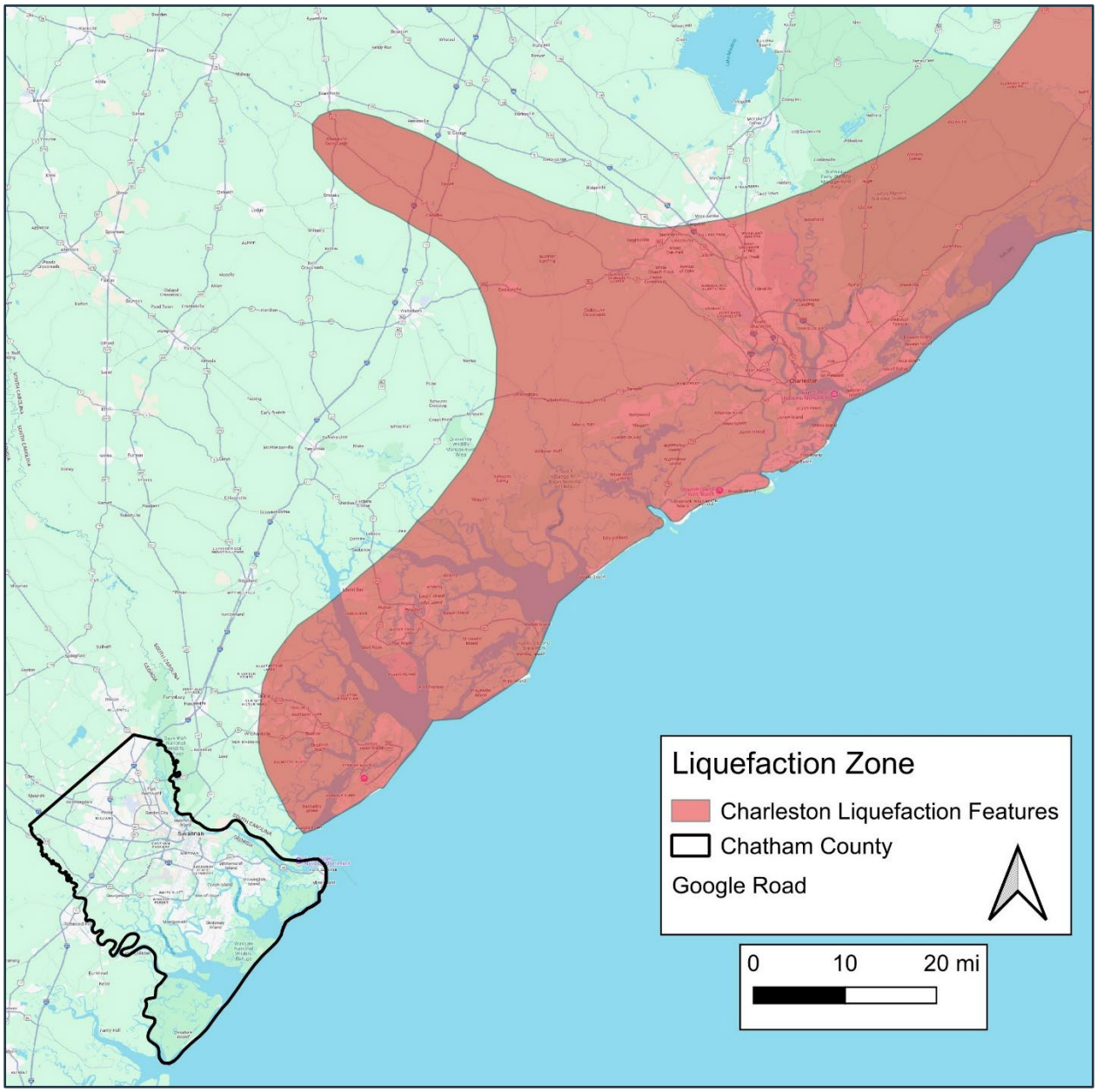
Warning Time: 4 – Less than 6 hours

Duration: 1 – Less than 6 hours

Location

The United State Geological Survey's Quaternary faults database was consulted to define the location of potential earthquakes within range of Chatham County. Quaternary faults are active faults recognized at the surface which have evidence of movement in the past 2.58 million years. The Charleston liquefaction features is the primary active fault area that could produce an earthquake affecting Chatham County. Figure 2-5 reflects the location of the Charleston liquefaction features in relation to Chatham County based on data from the USGS Earthquake Hazards Program.

Figure 2-5 – US Quaternary Faults, Charleston Liquefaction Features



Source: USGS Earthquake Hazards Program

All of Georgia is subject to earthquakes, with the western and southern region most vulnerable to a damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both faults have generated earthquakes measuring greater than 8.0 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines in eastern Tennessee and throughout North Carolina that could produce less severe shaking. Chatham County is closest to and therefore more likely to face risk from the Charleston Fault zone.

Extent

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through

a measure of shock wave amplitude. A detailed description of the Richter Scale is given in Table 2-19. Although the Richter scale is usually used by the news media when reporting the intensity of earthquakes and is the scale most familiar to the public, the scale currently used by the scientific community in the United States is called the Modified Mercalli Intensity (MMI) scale. The MMI scale is an arbitrary ranking based on observed effects. Table 2-20 shows descriptions for levels of earthquake intensity on the MMI scale compared to the Richter scale. Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 2-19 – Richter Scale

Magnitude	Effects
Less than 3.5	Generally, not felt, but recorded.
3.5 – 5.4	Often felt but rarely causes damage.
5.4 – 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 – 6.9	Can be destructive in areas up to 100 kilometers across where people live.
7.0 – 7.9	Major earthquake. Can cause serious damage over larger areas.
8.0 or greater	Great earthquake. Can cause serious damage to areas several hundred kilometers across.

Source: FEMA

Table 2-20 – Comparison of Richter Scale and Modified Mercalli Intensity (MMI) Scale

MMI	Richter Scale	Felt Intensity
I	0 – 1.9	Not felt. Marginal and long period effects of large earthquakes.
II	2.0 – 2.9	Felt by persons at rest, on upper floors, or favorably placed.
III	3.0 – 3.9	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV	4.0 – 4.3	Hanging objects swing. Vibration like passing of heavy trucks. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink the upper range of IV, wooden walls and frame creak.
V	4.4 – 4.8	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Pendulum clocks stop, start.
VI	4.9 – 5.4	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Books, etc., fall off shelves. Pictures fall off walls. Furniture moved. Weak plaster and masonry D cracked. Small bells ring. Trees, bushes shaken.
VII	5.5 – 6.1	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Waves on ponds. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
VIII	6.2 – 6.5	Steering of motor cars is affected. Damage to masonry C; partial collapse. Some damage to masonry B. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
IX	6.6 – 6.9	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluvial areas sand and mud ejected, earthquake fountains, sand craters.
X	7.0 – 7.3	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes,

MMI	Richter Scale	Felt Intensity
		embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
XI	7.4 – 8.1	Rails bent greatly. Underground pipelines completely out of service.
XII	> 8.1	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown in the air.

Masonry A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces. Masonry B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces. Masonry C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces. Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

The most severe earthquake to impact the Chatham County area measured a 7.3 on the Richter Scale and X on the Modified Mercalli Intensity Scale. The earthquake hit the Savannah area on August 31, 1886, with three epicenters outside of Charleston, SC. Historical accounts noted that the statue of Liberty on the Pulaski Monument in Monterey Square twisted six inches on its pedestal. A wall at Bay and Drayton Streets crashed through the roof of an adjoining building. A crack opened from the ground to the roof on the east wall of Christ Church. A twenty-foot-long fissure ripped through Bay Street.[15]

Impact: 1 – Minor

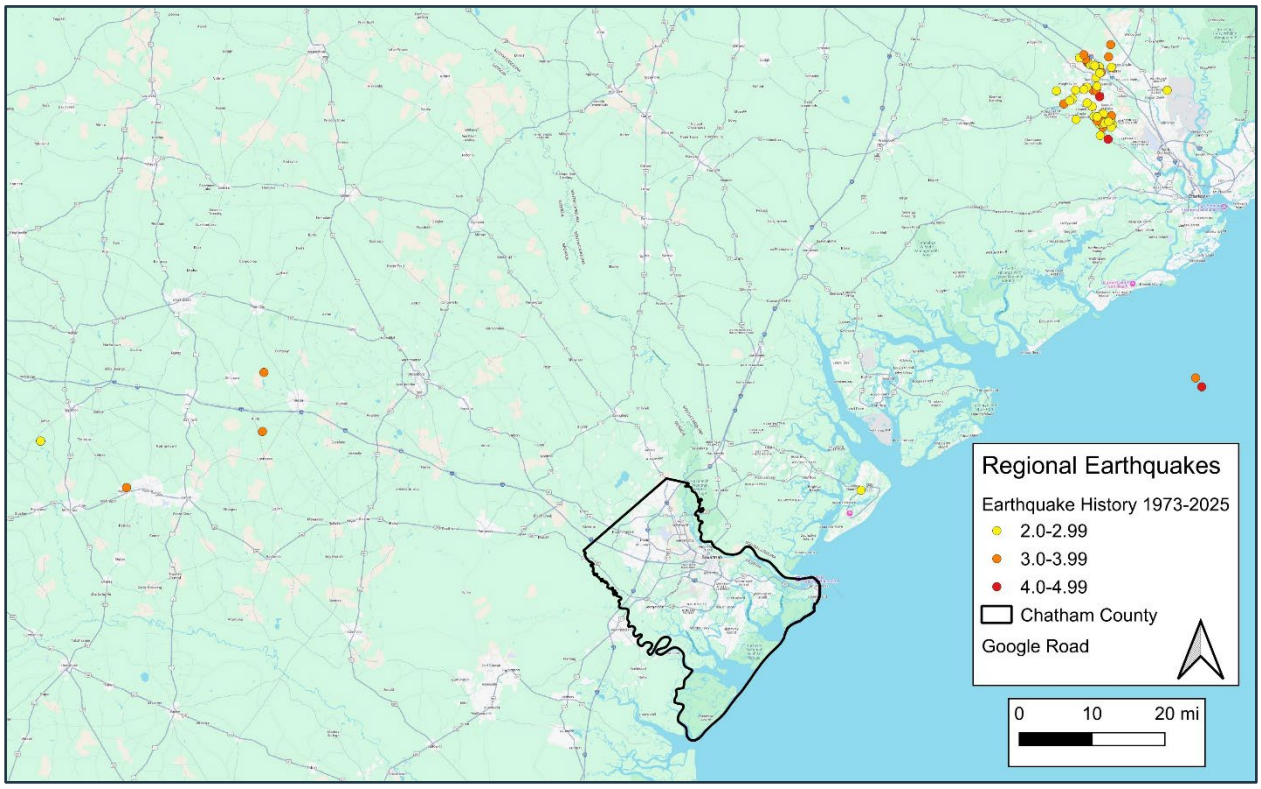
Spatial Extent: 3 – Moderate

Historical Occurrences

The USGS Earthquake Hazards Program maintains a database of historical earthquakes of a magnitude 2.5 and greater from 1973 to 2022. Earthquake events that occurred within and around the Charleston liquefaction features and in South Georgia are shown in Figure 2-6 in relation to Chatham County.

[15] Connect Savannah, *The Great Quake of 1886*, August 23, 2011.

Figure 2-6 – Historical Earthquakes by Magnitude, 1973-2025



Source: USGS Earthquakes Hazard Program

The above map documents earthquakes that have occurred within 100 miles of Chatham County in or near the Charleston liquefaction features fault zone. However, given the long distances across which earthquake impacts can be felt, these events do not encompass all earthquakes that have affected Chatham County. The National Geophysical Data Center maintains a database of all earthquakes from 1811 to 2019 including the maximum intensity for each locality that felt the earthquake. Since 1973, no major earthquake events have impacted the planning area. Table 2-21 includes the list of historical earthquakes within 100 miles of Chatham County between 1973 and 2022. Five more recent records are included from earthquakelist.org.

Table 2-21 – Historical Earthquakes Felt in Chatham County, 1973-2025

Date	Epicenter Location	Magnitude	Depth (km)	MM Scale
November 22, 1974	10 km SSW of Ladson, South Carolina	4.7	18	V
December 27, 1976	0 km NNE of Higgston, Georgia	3.7	5	III
January 18, 1977	6 km NNW of Summerville, South Carolina	3	5	III
December 15, 1977	5 km S of Centerville, South Carolina	2.6	8	II
September 7, 1978	5 km NNW of Summerville, South Carolina	2.6	10.1	II
October 30, 1978	1 km NE of Summerville, South Carolina	2.5	0.7	II
January 27, 1979	3 km N of Summerville, South Carolina	2.8	9.3	II
August 11, 1979	6 km WSW of Centerville, South Carolina	2.5	10.5	II
December 7, 1979	1 km N of Centerville, South Carolina	2.8	4.8	II
September 1, 1980	3 km SW of Centerville, South Carolina	2.9	7.2	II
March 1, 1982	6 km SSW of Ladson, South Carolina	2.8	6.1	II
November 6, 1983	6 km S of Centerville, South Carolina	3.3	7.5	III
September 17, 1986	7 km SW of Ladson, South Carolina	2.6	6.1	II

Date	Epicenter Location	Magnitude	Depth (km)	MM Scale
January 23, 1988	6 km S of Centerville, South Carolina	3.3	7.4	III
January 2, 1989	6 km S of Centerville, South Carolina	2.6	4.9	II
January 4, 1989	1 km ESE of Hilton Head, South Carolina	2.8	6	II
February 7, 1990	9 km S of Centerville, South Carolina	2.9	9.3	II
May 11, 1990	5 km SSE of Centerville, South Carolina	2.6	6.1	II
June 2, 1990	6 km SSW of Ladson, South Carolina	2.5	5.4	II
June 18, 1990	5 km SSE of Centerville, South Carolina	2.6	4.9	II
November 13, 1990	4 km SSW of Ladson, South Carolina	3.5	3.4	III
August 21, 1992	1 km SSE of Centerville, South Carolina	4.1	6.5	IV
April 17, 1995	0 km NNW of Centerville, South Carolina	3.9	8.4	III
March 4, 1996	9 km SW of Soperton, Georgia	2.5	1.3	II
May 17, 1997	9 km SW of Soperton, Georgia	2.5	5.4	
November 26, 1997	7 km S of Centerville, South Carolina	2.5	6.9	II
March 29, 1999	3 km NNW of Sangaree, South Carolina	3	10.7	III
January 11, 2002	6 km SSW of Ladson, South Carolina	2.7	6.1	II
July 7, 2002	1 km NW of Sangaree, South Carolina	2.9	10.8	II
July 16, 2002	5 km SSW of Ladson, South Carolina	2.8	6.7	II
July 26, 2002	4 km NNW of Summerville, South Carolina	3	10	III
November 8, 2002	24 km SSE of Kiawah Island, South Carolina	3.5	3.9	III
November 11, 2002	26 km SSE of Kiawah Island, South Carolina	4	2.4	IV
November 29, 2002	3 km N of Summerville, South Carolina	2.5	9.1	II
December 16, 2002	3 km NNW of Summerville, South Carolina	2.8	8.5	II
February 28, 2003	7 km S of Centerville, South Carolina	2.6	4.3	II
March 2, 2003	7 km S of Centerville, South Carolina	2.9	6.5	II
May 5, 2003	4 km NNW of Summerville, South Carolina	3.1	11.4	III
June 12, 2003	5 km WSW of Centerville, South Carolina	2.6	10.4	II
July 13, 2003	6 km N of Cobbtown, Georgia	3.6	5	III
July 19, 2003	7 km SSW of Ladson, South Carolina	2.5	5.7	II
October 14, 2003	5 km S of Centerville, South Carolina	2.5	7.2	II
December 22, 2003	8 km S of Centerville, South Carolina	3	5.6	III
May 1, 2004	3 km ENE of Goose Creek, South Carolina	2.7	10.7	II
July 20, 2004	7 km WSW of Centerville, South Carolina	3.1	10.3	III
August 18, 2004	0 km NE of Summerville, South Carolina	2.5	7.7	II
November 25, 2004	4 km NNW of Summerville, South Carolina	2.7	12.9	II
November 19, 2005	2 km W of Centerville, South Carolina	2.6	5	II
December 16, 2008	5 km N of Sangaree, South Carolina	3.6	15.39	III
January 29, 2009	2 km SW of Summerville, South Carolina	2.5	6.45	II
May 6, 2009	2 km N of Summerville, South Carolina	2.5	2.02	II
August 29, 2009	2 km NE of Summerville, South Carolina	3.2	4.93	III
May 12, 2010	6 km SSW of Ladson, South Carolina	2.8	1.26	II
October 15, 2011	4 km W of Centerville, South Carolina	2.5	8.05	II
December 21, 2011	7 km SW of Centerville, South Carolina	2.6	12.33	II
January 4, 2012	3 km SSW of Centerville, South Carolina	2.6	4.94	II
July 31, 2012	5 km S of Centerville, South Carolina	2.8	8.21	II
September 19, 2013	8 km WSW of Summerville, South Carolina	2.5	11.44	II
March 19, 2014	0 km WNW of Centerville, South Carolina	3	6.91	III
September 27, 2021	Unreported, South Carolina	3.27	6.75	III
September 27, 2021	3 km NNE of Summerville, South Carolina	2.82	5.79	II
June 18, 2022	7 km E of Stillmore, Georgia	3.9	0.75	III

Date	Epicenter Location	Magnitude	Depth (km)	MM Scale
August 22, 2024	30 km SW of Statesboro, Georgia	2.4	0.7	II
December 7, 2024	13 km SSW of Summerville, Soth Carolina	2.1	6.2	II
March 20, 2025	34 km NNW of Hinesville, Georgia	2.4	4.6	II
March 20, 2025	35 km SSE of Statesboro, Georgia	2.2	8.3	II

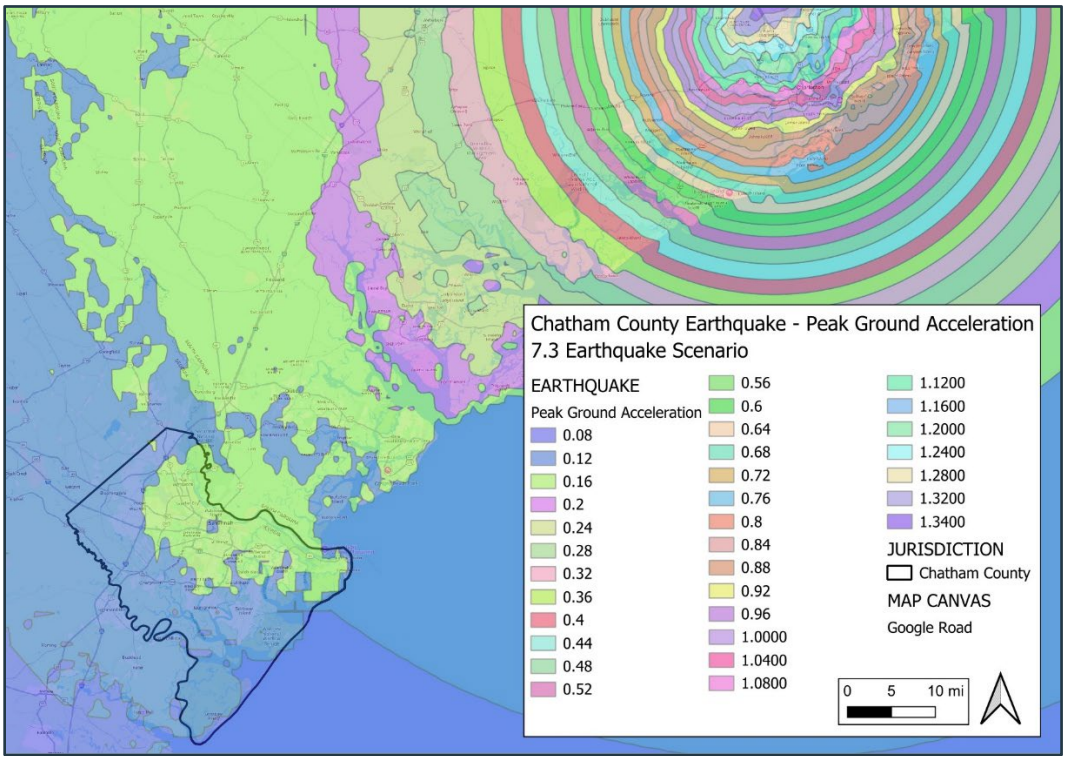
Source: National Geophysical Data Center, earthquakelist.org, and HMPC input

Probability of Future Occurrence

Ground motion is the movement of the earth's surface due to earthquakes or explosions. It is produced by waves generated by a sudden slip of a fault or sudden pressure at the explosive source and travels through the earth and along its surface. Ground motion is amplified when surface waves of unconsolidated materials bounce off of or are refracted by adjacent solid bedrock. The probability of ground motion is depicted in USGS earthquake hazard maps by showing, by contour values, the ground motions (of a particular frequency) that have a common given probability of being exceeded in 50 years.

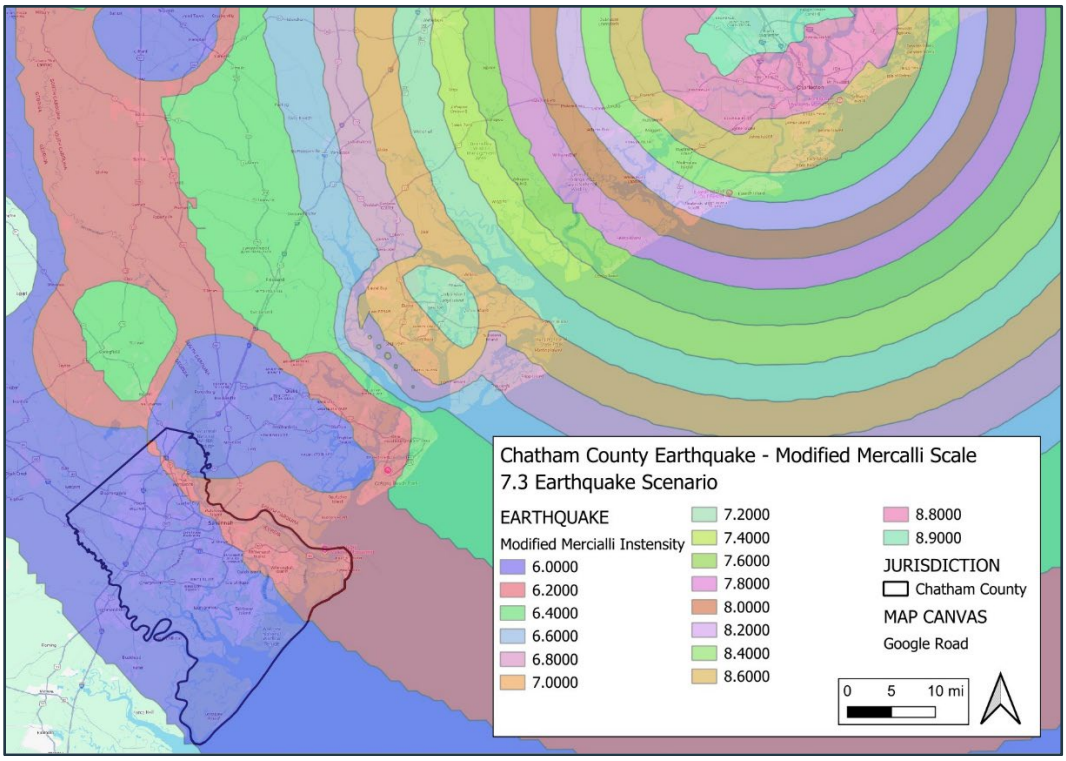
Figure 2-7 reflects the seismic hazard for Chatham County based on the national USGS map of peak acceleration with two percent probability of exceedance in 50 years, based on a 7.3 Richter Scale earthquake with an epicenter near North Charleston, South Carolina. To produce these estimates, the ground motions being considered at a given location are those from all future possible earthquake magnitudes at all possible distances from that location. The ground motion coming from a particular magnitude and distance is assigned an annual probability equal to the annual probability of occurrence of the causative magnitude and distance. The method assumes a reasonable future catalog of earthquakes, based upon historical earthquake locations and geological information on the recurrence rate of fault ruptures. When all the possible earthquakes and magnitudes have been considered, a ground motion value is determined such that the annual rate of its being exceeded has a certain value. Therefore, for the given probability of exceedance, two percent, the locations shaken more frequently will have larger ground motions. Chatham County is located within a zone with peak acceleration of 8-16% g. Figure 2-8 depicts the Modified Mercalli Scale for Chatham County with a 5.8-6.0 Earthquake for this scenario.

Figure 2-7 – Peak Ground Acceleration for Chatham County



Source: USGS Earthquake Hazards Program

Figure 2-8 – Modified Mercalli Scale for Chatham County



Source: USGS Earthquake Hazards Program

In simplified terms, based on the record of past occurrences there were 66 earthquakes over the period from 1973 to 2025; three had a magnitude of IV or higher on the Modified Mercalli Scale (4.7 MM) within 100 miles of Chatham County. Using past occurrence as an indicator of future probability, there is a 5.88 percent annual probability of an earthquake being felt in Chatham County. Only the 1886 earthquake could have caused building damage, defined for this purpose as an MMI of 6 or greater. Therefore, there is a 0 .07 percent annual chance of an earthquake causing some building damage in Chatham County.

Based on this data, it can be reasonably assumed that an earthquake event affecting Chatham County is possible.

Probability: 2 – Possible

Climate Change

Scientists are beginning to believe there may be a connection between climate change and earthquakes. Changing ice caps and sea-level redistribute weight over fault lines, which could potentially have an influence on earthquake occurrences. However, currently no studies quantify the relationship to a high level of detail, so recent earthquakes should not be linked with climate change. While not conclusive, early research suggests that more intense earthquakes and tsunamis may eventually be added to the adverse consequences that are caused by climate change.

Vulnerability Assessment

Methodologies and Assumptions

The USGS Earthquakes Hazards Program Magnitude 7.3 earthquake in Charleston, SC, Scenario was used to make assess potential impacts from a major earthquake impacting Chatham County.

People

Earthquake events in Chatham County are unlikely to produce more than minor ground shaking; therefore, injury or death is unlikely. Objects falling from shelves generally pose the greatest threat to safety. However, given proximity to the Charleston fault area, there is potential for more serious impacts.

Property

In a severe earthquake event, buildings can be damaged by the shaking itself or by the ground beneath them settling to a different level than it was before the earthquake (subsidence). Buildings can even sink into the ground if soil liquefaction occurs. If a structure (a building, road, etc.) is built across a fault, the ground displacement during an earthquake could seriously damage that structure.

Earthquakes can also cause damages to infrastructure, resulting in secondary hazards. Fires can be started by broken gas lines and power lines. Fires can be a serious problem, especially if the water lines that feed the fire hydrants have been damaged as well. Impacts of earthquakes also include debris clean-up and service disruption.

Chatham County has not yet been impacted by an earthquake with more than a moderate intensity, so major damage to the built environment is unlikely. However, there is potential for impacts to certain masonry buildings, as well as environmental damages with secondary impacts on structures.

There were no major development changes or incident occurrences since the previous plan that would have significantly altered vulnerability to earthquake in the planning area. However, all critical facilities should be considered at risk to minor damage should an earthquake event occur.

Environment

An earthquake is unlikely to cause substantial impacts to the natural environment in Chatham County. Impacts to the infrastructure and hazardous materials facilities in the county (e.g. ruptured gas line) could damage the surrounding environment. However, this type of damage is unlikely based on historical occurrences. Moreover, earthquakes are natural events, and any environmental damage should be considered natural processes.

Consequence Analysis

Table 2-22 summarizes the potential negative consequences of significant earthquakes.

Table 2-22 – Consequence Analysis - Earthquake

Category	Consequences
Public	Impact expected to be moderate for people who are unprotected or unable to take shelter; light impacts are expected for those who are protected.
Responders	Adverse impacts are expected to be moderate for unprotected personnel and light for protected personnel.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel in the area of the incident may require relocation of operations and lines of succession execution. Disruption of lines of communication and destruction of facilities are unlikely but could extensively postpone delivery of services.
Property, Facilities and Infrastructure	Damage to facilities and infrastructure in the area of the incident may be minimal (low) for facilities, people, infrastructure, and HazMat.
Environment	May cause minimal (low) damage, creating denial or delays in the use of some areas. If hazardous materials are impacted and released, environmental remediation may be needed.
Economic Condition of the Jurisdiction	Local economy and finances may be adversely affected, but likely for a short period of time.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective.

Hazard Summary by Jurisdiction

The following table summarizes earthquake hazard risk by jurisdiction. Despite minor differences in peak acceleration probabilities, earthquake risk is uniform across the planning area.

Table 2-23 –Earthquake Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	1	4	4	1	1.9	L
Bloomingdale	1	1	4	4	1	1.9	L
Garden City	1	1	4	4	1	1.9	L
Pooler	1	1	4	4	1	1.9	L
Port Wentworth	1	1	4	4	1	1.9	L
Savannah	1	1	4	4	1	1.9	L
Thunderbolt	1	1	4	4	1	1.9	L
Tybee Island	1	1	4	4	1	1.9	L
Vernonburg	1	1	4	4	1	1.9	L

2.5.4 Erosion

Hazard Background

Coastal Erosion

Coastal erosion is a process whereby large storms, flooding, strong wave action, sea level rise, and human activities, such as inappropriate land use, alterations, and shore protection structures, wear away the beaches and bluffs along the coast. Erosion undermines and often destroys homes, businesses, and public infrastructure and can have long-term economic and social consequences. According to NOAA, coastal erosion is responsible for approximately $500 million per year in coastal property loss in the United States, including damage to structures and loss of land. To mitigate coastal erosion, the federal government spends an average of $150 million each year on beach nourishment and other shoreline erosion control measures.

Coastal erosion has both natural causes and causes related to human activities. Gradual coastal erosion and accretion result naturally from the impacts of tidal longshore currents. Severe coastal erosion can occur over a short period when the state is impacted by hurricanes, tropical storms and other weather systems. Sand is continually removed by longshore currents in some areas, but it is also continually replaced by sand carried in by the same type of currents. Structures such as piers or sea walls, jetties, and navigational inlets may interrupt the movement of sand. Sand can become “trapped” in one place by these types of structures. The currents will, of course, continue to flow, though depleted of sand trapped elsewhere. With significant amounts of sand trapped in the system, the continuing motion of currents (now deficient in sand) results in erosion. In this way, human construction activities that result in the unnatural trapping of sand have the potential to result in significant coastal erosion.

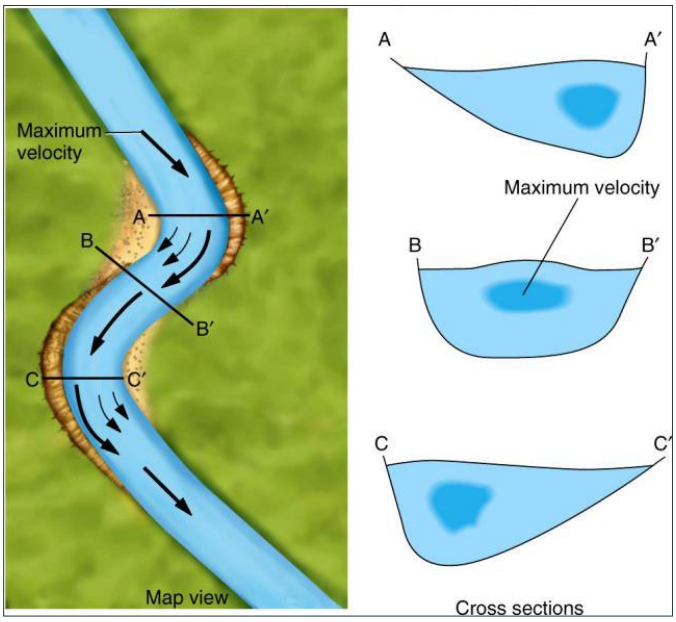
Erosion rates and potential impacts are highly localized. Severe storms can remove wide beaches, along with substantial dunes, in a single event. In undeveloped areas, these high recession rates are not likely to cause significant concern, but in some heavily populated locations, one or two feet of erosion may be considered catastrophic (NOAA, 2014).

Estuaries are partially enclosed, coastal water bodies where freshwater meets saltwater from the ocean. They are influenced by tides but still protected from the full force of ocean waves. Estuaries are often referred to as bays or sounds. Estuarine coastlines can experience erosion through short-term processes, such as tides, storms, wind, and boat wakes, as well as long-term processes, such as sea level rise. Many variables determine the rate of estuarine erosion including shoreline type, geographic location and size of the associated estuary, the type and abundance of vegetation, and the frequency and intensity of storms. Estuarine erosion is problematic as more development occurs along estuarine shorelines.

Stream Bank Erosion

Streambank erosion is a natural process and plays an important part in fish habitat. Stream banks erode by various processes both direct and indirect. The most common stream back erosion process is the washing away of material on the outside of a river channel. When the channel bends, water on the outside of the bend (the cut-bank) flows faster and water on the inside of the bend (the point) flows slower as shown in Figure 2-9. This distribution of velocity results in erosion occurring on the outside of the bend and deposition occurring on the inside of the bend.

Figure 2-9 – Stream Meanders



Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Stream bank erosion processes, although complex, are driven by two major components: stream bank characteristics (erodibility) and hydraulic/gravitational forces. Many land use activities can affect both of these components and lead to accelerated bank erosion. The vegetation rooting characteristics can protect banks from fluvial entrainment and collapse and provide internal bank strength. When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. Stream bank aggradation or degradation is often a response to stream channel instability. Since bank erosion is often a symptom of a larger, more complex problem, the long-term solutions often involve much more than just bank stabilization. Numerous studies have demonstrated that stream bank erosion contributes a large portion of the annual sediment yield.

Determining the cause of accelerated streambank erosion is the first step in solving the problem. When a stream is straightened or widened, streambank erosion increases. Accelerated streambank erosion is part of the process as the stream seeks to re-establish a stable size and pattern. Damaging or removing streamside vegetation to the point where it no longer provides for bank stability can cause a dramatic increase in bank erosion. A degrading streambed results in higher and often unstable, eroding banks. When land use changes occur in a watershed, such as clearing land for agriculture or development, runoff increases. With this increase in runoff the stream channel will adjust to accommodate the additional flow, increasing streambank erosion. Addressing the problem of streambank erosion requires an understanding of both stream dynamics and the management of streamside vegetation.

Warning Time: 1 – More than 24 hours

Duration: 4 – More than 1 week

Location

Erosion can occur along any shoreline in the region. Erosion is likely to be more frequent and severe along the Atlantic coast and Savannah River but occurs along other streambanks. In Chatham County, coastal

erosion is typically caused by coastal tides, ocean currents, and storm events. Erosion rates are dependent on many characteristics, including soil type. In Chatham County, coastal soils are composed of fine-grained particles such as sand, without the greater organic matter content of inland soils. This makes coastal areas more susceptible to erosion. While much of the coast undergoes natural erosion and accretion cycles, more developed areas, such as Tybee Island, are more susceptible to erosion that impacts inhabited areas.

Extent

The magnitude of erosion can be measured as a rate of change from a measured previous condition. The Georgia Coastal Hazards Portal maps shoreline change rates for coastal and estuarine shorelines. The program analyzed historical shorelines using AMBUR from the 1930s to the 2000s. From this analysis, the program derived erosional hot spots, based on research from the Applied Coastal Research Laboratory at Georgia Southern University. The coastal areas of Chatham County have experienced varying rates of erosion in some areas as well as accretion in others. Erosional hot spots from the Georgia Coastal Hazards Portal are shown in Figure 2-10**.**

Erosion rates can vary significantly across the region due to several factors including fetch, shoreline orientation, and soil composition as well as tidal and current fluctuations during storm events. To account for these variations, long-term erosion can also be measured by land cover changes and increases in open water. While a small fraction of the shoreline may exhibit accretion over a short period of time, cumulative impacts can still indicate an overall loss of estuarine coastline and marsh habitat. Table 2-24 provides from the NOAA Coastal Change Analysis Program (C-CAP) Land Cover Atlas showing land cover changes in the region from 2011 to 2021. This is the most recent data available on land cover changes.

Table 2-24 – Land Cover Changes, 2011-2021

Land Cover Type	2011 sq.mi	2021 sq.mi	Net Change	Percent Change
High Intensity Development	26.07	34.21	+8.21 sq. mi	+31.20%
Low Intensity Development	46.99	48.42	+1.43 sq. mi	+3.05%
Open Space, Developed	27.22	27.68	+0.46 sq. mi	+1.69
Agriculture	3.74	3.09	-0.65 sq. mi	-17.33%
Forested	74.89	67.37	-7.52 sq. mi	-10.4%
Woody Wetland	70.86	67.60	-3.25 sq. mi	-4.59%
Emergent Wetland	158.77	159.55	+0.78 sq. mi	+.49%
Barren Land	10.89	11.16	+0.27 sq. mi	+2.51
Open Water	198.75	197.88	-0.78 sq. mi	-0.44%

Source: https://coast.noaa.gov/digitalcoast/data/ccapregional.html

The C-CAP data indicates a small net decrease in open water and larger net decreases in wetland and forested land in the County. These are trends that continue from the previous dataset (1996-2010). Increases in open water and decreases in wetland area may be indicative of erosion-caused shoreline losses and decreases in forested land and wetland may also be indicative of development changes that can exacerbate erosion. Additionally, Chatham County saw a large increase in development, particularly high-intensity development, without a corresponding decrease in barren land or open space. This may indicate that most development is occurring in already well-developed areas. Area of impervious surfaces increased a very small amount, from 5.45% to 6.42%. Increase in impervious surfaces may result in may increase stormwater runoff, alter drainage patterns, and further exacerbate erosion and flood issues, but as there was not a substantially significant change in this metric in this dataset, we can assume that increases in high intensity development have not had an effect on erosion in this time frame.

In terms of the magnitude of impacts, erosion may cause property damage when severe but is unlikely to cause injury or death unless fast-moving and catastrophic mass wasting, which does not appear to have occurred nor is likely to occur in the County.

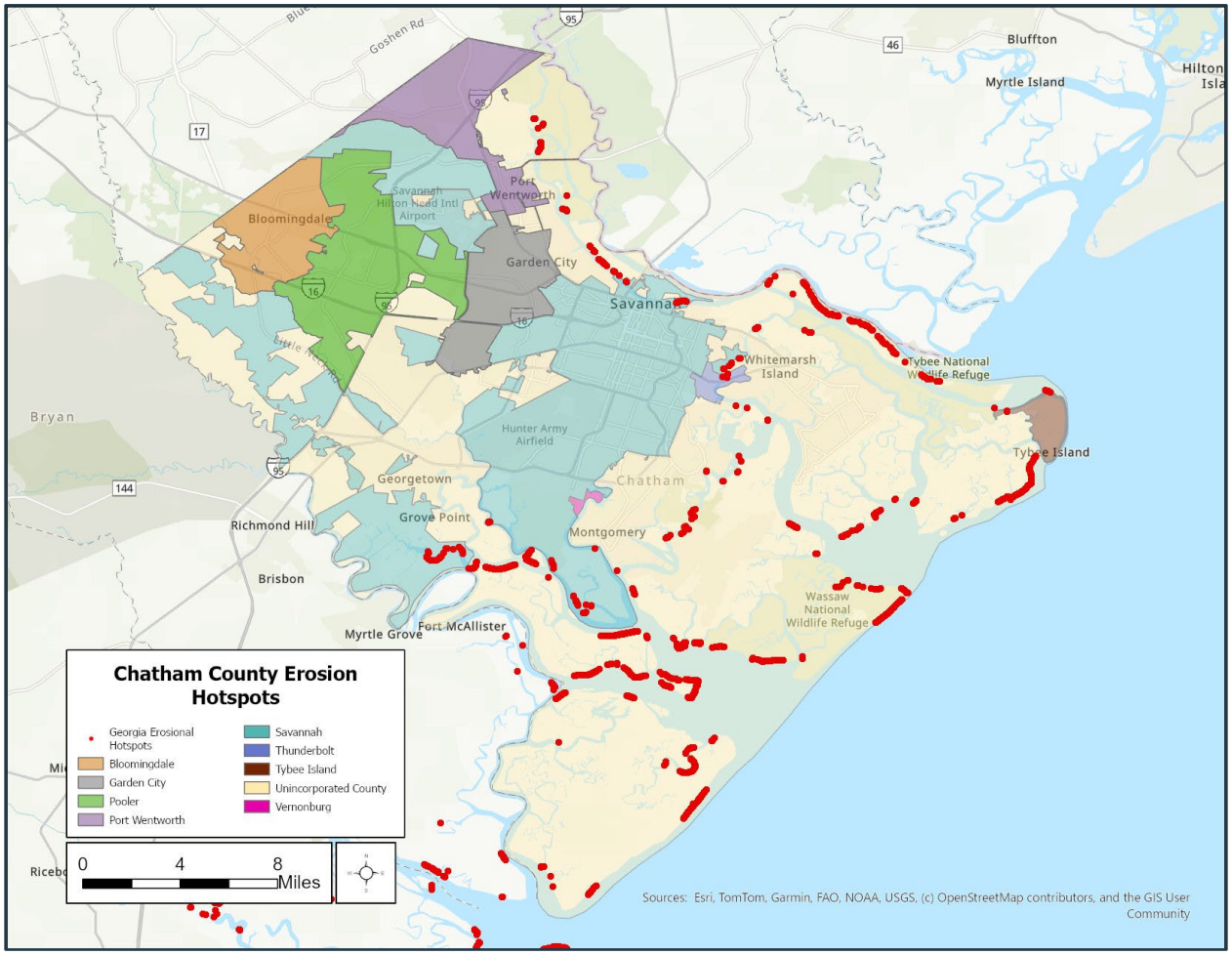
Impact: 2 – Minor

Spatial Extent: 2 – Small

Historical Occurrences

As Figure 2-10 shows, shoreline erosion is occurring along ocean and estuarine coastlines throughout Chatham County. Erosion is typically an ongoing process; however, it can be intensified during storm events, particularly hurricane storm tides.

Figure 2-10 – Erosional Hotspots, Chatham County



Source: Georgia Coastal Hazards Portal

Per an examination of event narratives in NCEI records for hurricanes, tropical storms, storm surges, and coastal floods, the following instances of major erosion are noted in Chatham County:

October 5, 2005 (Tropical Storm) – Tropical Storm Tammy moved ashore in northeast Florida, but the strongest effects were felt well north of the actual center. Tropical Storm force wind gusts as high as 50 mph affected the Georgia coast for many hours. Numerous trees were blown down, a few of which fell

on houses and cars. Coastal flooding and high surf also occurred due to Tammy. Significant beach erosion occurred at Tybee Island.

September 30, 2007 (Coastal Flood) – Severe beach erosion was reported on Tybee Island as High Astronomical Tides combined with strong Northeast winds across the coastal waters. Lifeguard towers were undermined or destroyed, and the beach was completely washed away in several areas. Several homes were also damaged due to high surf and coastal flooding.

October 7, 2016 (Storm Surge) – Across southeast Georgia, the main impacts from Hurricane Matthew included heavy rain, wind damage, and storm surge, specifically along coastal locations, such as Tybee Island. The entire southeast Georgia coast was impacted by storm surge generally ranging from 2 to 5 feet with some locations as high as 6 to 8 feet. Damage was storm surge was most notable on the northern ends of Tybee Island. Moderate erosion was noted near the Tybee Island Pier and oceanside of Center Street.

September 11, 2017 (Storm Surge) – Storm surge associated with Tropical Storm Irma had widespread significant impacts in Chatham County where 7 homes were destroyed, 369 sustained major damage, and 445 sustained minor damage. A National Weather Service storm survey team found significant beach erosion on Tybee Island with most, if not all, of the dune line eroded away by storm surge and wave action. Furthermore, in some areas on the Tybee Island beach, approximately 6-10 feet of dune escarpment was found washed away.

Hurricane Ian, 2022 – erosion from this storm caused nearly a year's worth of erosion on Tybee Island as well as other erosive effects throughout the coastal regions of the County.

June 2024 – A period of sustained strong northeasterly winds caused increased beach erosion on Tybee Island. Recent drone surveys on Tybee revealed that from 2020-2024, dues have accreted more than 28.000 cubic yards (+4%), and the beach has eroded more than 147,500 cubic yards (-22%).

Tropical Storm Debby, 2024 – Heavy surf and high tides led to significant beach erosion along Tybee Island's beaches and dunes, and along the Savannah River. Erosion washouts along the river led to partial closures of McQueen's Trail.

Hurricane Helene, 2024 – Wind, surf, and significant rainfall led to erosion issues along riverbeds in Chatham County, especially on the Savannah River banks along McQueen's Trail. Tybee Island experienced some beach erosion.

Probability of Future Occurrence

Erosion and accretion are ongoing natural processes that will continue to occur. The likelihood of significant instances of accelerated erosion will likely be tied to the occurrence of hurricane, tropical storm, and nor'easter events. Additionally, drawing from the likelihood of hurricanes, tropical storms, and Nor'easters, accelerated erosion is likely to occur.

Probability: 3 – Likely

Climate Change

As discussed under Climate Change in Section 2.5.6 and Section 2.5.7, climate change is expected to make heavy rain events and tropical storms and hurricanes more frequent and intense. As a result, the erosion typically caused by these storms can be expected to occur more frequently. Coastal erosion is also expected to increase as a result of rising seas. A 2018 study found that globally, between 1984 and 2015 erosion outweighed accretion. However, the study could not conclude the degree to which erosion during

this period is attributed to climate changes or increased coastal development. Nonetheless, increases in erosion have been observed and are expected to continue.

Vulnerability Assessment

Methodologies and Assumptions

Vulnerability to coastal hazards was assessed based on past occurrences nationally and internationally as well as data from NOAA, USGS, the Intergovernmental Panel on Climate Change (IPCC), and other sources.

In addition to the data presented below, the South Atlantic Coastal Study from the United States Army Corps of Engineers (USACE) South Atlantic Division provides supplementary data and details through a comprehensive coastal shoreline risks and needs assessment. This tool examines four hazards (hurricanes and storms, long-term erosion, flooding, and potential sea level rise) and how they impact population, the built environment, and the natural environment.

People

Erosion is unlikely to have any direct impact on the health or safety of individuals. However, it may cause indirect harm by weakening structures and by changing landscapes in ways that increase risk of other hazard impacts. For example, erosion of dune systems causes areas protected by those dunes to face higher levels of risk. Erosion also negatively impacts areas in the county that residents and visitors use for recreation. This can result in psychological impacts causing frustration, anger, and stress. Erosion in Chatham County can also cause water infiltration onto primary roadways, leading to stranded motorists and isolated communities.

Property

Property damage due to erosion typically happens in conjunction with significant storm events which also bring wind and water damages. These events can cause scour and weaken foundations, which may undermine affected buildings' structural integrity. The Hazard Mitigation Planning Committee noted that erosion issues are compounded by changes in development in the county due to additional impervious surfaces and land improvements that cause run-off onto nearby properties. The Committee also recognized that erosion leads to sedimentation in the county water conveyance infrastructure, leading to a greater need for maintenance of canals and drainage systems.

Environment

Erosion can change the shape and characteristics of coastal shorelines and riverine floodplains. Eroded material may clog waterways and decrease drainage capacity. Erosion can also negatively impact water quality by increasing sediment loads in waterways. Erosion is a natural process that is expected in coastal and riverine areas and rarely damages the natural environment in unexpected ways. Scouring along McQueen's Trail that runs adjacent to Hwy 80/Tybee Road is a recurring issue. The planning committee recognized the additional vulnerability to the roadway, which is the only route to and from Tybee Island.

Consequence Analysis

Table 2-25 summarizes the potential negative consequences of erosion.

Table 2-25 – Consequence Analysis – Erosion

Category	Consequences
Public	Erosion is unlikely to impact public health and safety.
Responders	Erosion is unlikely to require immediate response or rescue operations.

Category	Consequences
Continuity of Operations (including Continued Delivery of Services)	Erosion is unlikely to impact public continuity of operations.
Property, Facilities and Infrastructure	Erosion can result in property damage if it is severe enough or if scour occurs that undermines the integrity of structural foundations.
Environment	Erosion can increase sediment loads in waterbodies and change riverine and coastal topography.
Economic Condition of the Jurisdiction	Beach renourishment projects to counter erosion are extremely costly. Water dependent industries may suffer from lost shoreline and degraded water quality. Beach erosion also impacts the tourism economy in coastal Chatham County.
Public Confidence in the Jurisdiction's Governance	Erosion can impact public confidence where recreational areas and roadways are compromised and become inaccessible for public use.

Hazard Summary by Jurisdiction

The following table summarizes erosion hazard risk by jurisdiction. Exposure to erosion varies across jurisdictions, therefore probability and spatial extent are dependent upon the area at risk. Jurisdictions with shoreline at risk were assigned a probability of 3 (likely), an impact of 2 (limited), and a spatial extent of 2 (small). Jurisdictions with little to no shoreline at risk were assigned a probability score of 1 (unlikely), an impact of 1 (minor), and a spatial extent of 1 (negligible). Warning time and duration are inherent to the hazard and remain constant across jurisdictions.

Table 2-26 –Erosion Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	2	2	1	3	2.5	H
Bloomingdale	1	1	1	1	3	1.4	L
Garden City	1	1	1	1	3	1.4	L
Pooler	1	1	1	1	3	1.4	L
Port Wentworth	1	1	1	1	3	1.4	L
Savannah	3	2	2	1	3	2.5	H
Thunderbolt	3	2	2	1	3	2.5	H
Tybee Island	3	2	2	1	3	2.5	H
Vernonburg	3	2	2	1	3	2.5	H

2.5.5 Extreme Heat

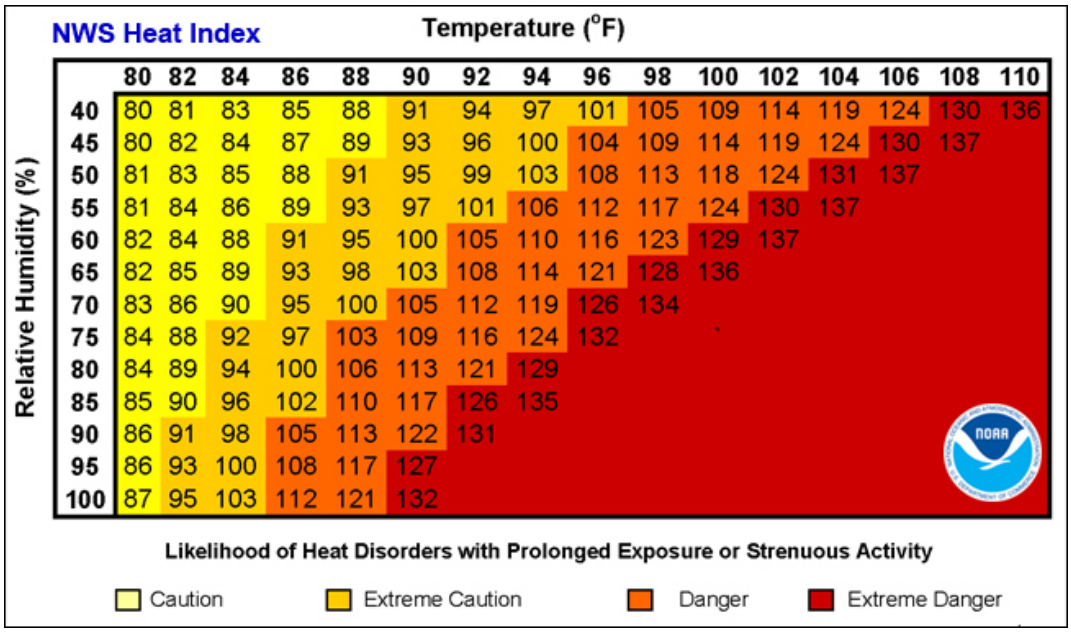
Hazard Background

Per FEMA, in most of the United States "extreme heat" is defined as a period of two to three days or longer of high heat relative to regional norms with temperatures usually above 90 degrees. In extreme heat, evaporation is slowed, and the body must work extra hard to maintain a normal temperature, which can lead to death from heatstroke. Extreme heat often results in the highest annual number of deaths among all weather-related disasters. Per Ready.gov:

- Extreme heat can occur quickly and without warning
- Older adults, children, and sick or overweight individuals are at greater risk from extreme heat
- Humidity increases the feeling of heat as measured by heat index

Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index Chart in Figure 2-11 uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Figure 2-11 – Heat Index Chart



Source: National Weather Service (NWS) https://www.weather.gov/safety/heat-index
Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a heat index that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

During these conditions, the human body has difficulties cooling through the normal method of the evaporation of perspiration. Health risks rise when a person is overexposed to heat. Those at greatest risk for heat-related illness include people 65 years of age and older, young children, people with chronic health problems such as heart disease, people who are obese, people who are socially isolated, and people who are on certain medications, such as tranquilizers, antidepressants, sleeping pills, or drugs for Parkinson's disease. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather or are not acclimated to hot weather. Table 2-27 lists typical symptoms and health impacts of heat exposure.

Table 2-27 – Typical Health Impacts of Extreme Heat

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heatstroke/sunstroke highly likely with continued exposure

Source: National Weather Service Heat Index Program, www.weather.gov/os/heat/index.shtml

The National Weather Service has a system in place to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when the maximum daytime Heat Index is expected to equal or exceed 105 degrees Fahrenheit (°F) and the nighttime minimum Heat Index is 80°F or above for two or more consecutive days. A heat advisory is issued when temperatures reach 105 degrees, and a warning is issued at 115 degrees.

The impact of Extreme Heat is not limited to human health. Heat exposure can have detrimental impacts on infrastructure as well. Prolonged high heat exposure increases the risk of pavement deterioration, as well as railroad warping or buckling. High heat also puts a strain on energy systems and consumption, as air conditioners are run at a higher rate and for longer; extreme heat can also reduce transmission capacity over electric systems. Particularly extreme heat can warp glass windows and melt blinds and window shades when direct sunlight shines through glass onto such surfaces.

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than one week

Location

The entire planning area is susceptible to high temperatures and incidents of extreme heat.

Extent

The extent of extreme heat can be defined by the maximum apparent temperature reached. Apparent temperature is a function of ambient air temperature and relative humidity and is reported as the heat index. The National Weather Service Forecast Office in Raleigh sets the following criteria for heat advisory and excessive heat warning:

- **Heat Advisory** – Heat Index of 105°F to 109°F for 3 hours or more. Can also be issued for lower values 100°F to 104°F for heat lasting several consecutive days
- **Excessive Heat Watch** – Potential for heat index values of 110°F or hotter within 24 to 48 hours. Also issued during prolonged heat waves when the heat index is near 110°F
- **Excessive Heat Warning** – Heat Index of 110°F or greater for any duration

Table 2-28 notes the highest temperature on record in Chatham County according to the National Weather Service.

Table 2-28 – Highest Temperature by Location

Temperature	Date
103°F	July 29, 1993
104°F	July 20, 2000
105°F	July 20, 1986

Source: National Weather Service, NOAA, Savannah, Georgia SAV Daily Extremes, Updated January 1, 2025

Impact: 3 – Critical

Spatial Extent: 4 – Large

Historical Occurrences

According to the National Oceanic and Atmospheric Administration (NOAA), 2019 was Georgia's hottest year of record; that record stretches back 124 years to 1895. 2016 and 2017 are tied as the second hottest years.

NCEI records 12 incidents of heat or excessive heat for Chatham County between 1999 and 2024, detailed in Table 2-29. There were no recorded fatalities or injuries nor was any property or crop damage reported. All 14 incidents occurred between July and August and impacted the entire county.

Table 2-29 – NCEI Records of Heat, 1999-2024

Location	Date	Event Type	Deaths	Injuries	Property Damage
Inland Chatham (Zone), Coastal Chatham (Zone)	8/1/1999	Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	7/27/2005	Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	8/1/2006	Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	8/2/2006	Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	8/3/2006	Heat	0	0	0
Inland Chatham (Zone)	8/10/2007	Excessive Heat	0	0	0
Inland Chatham (Zone)	8/11/2007	Excessive Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	7/25/2010	Excessive Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	7/26/2010	Excessive Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	7/30/2010	Excessive Heat	0	0	0
Inland Chatham (Zone)	7/31/2011	Excessive Heat	0	0	0
Inland Chatham (Zone), Coastal Chatham (Zone)	8/4/2011	Excessive Heat	0	0	0

Source: NCEI Storm Events Database

The following are a selection of narrative descriptions recorded in NCEI as well as the County's prior hazard mitigation plan for heat events:

July 27, 2005 – An upper ridge pressure settled over the region bringing extreme heat to portions of southeast Georgia. The heat, combined with high humidity, created heat indices averaging between 110°F and 120°F across inland areas and indices of 105°F to 110°F at the beaches. Temperatures cooled slighting into the next day, but heat indices still averaged 110°F

August 1-3, 2006 – Intense heat wave began on August 1st and lasted through the 5th. Heat advisories and excessive heat warnings were issued throughout this period. During the peak afternoon hours, heat indices across the region averaged between 105°F and 115°F.

July 25-26, 2010 – An expansive and deep layered ridge of high pressure extending across the southeast United States on July 25, 2010, resulted in very hot and humid conditions across southern South Carolina and southeast Georgia. Heat index values reached 118°F in inland areas of the county and 117°F on the coast. The following day, record heat across the area along with plenty of moisture produced heat index values between 115°F and 125°F triggering thunderstorm development. The heat index in Coffee Bluff measured 121°F and 117°F at Hunter Army Airfield.

August 4, 2011 – A strong mid and upper-level ridge produced large thickness values over the southeast. These thickness values supported afternoon high temperatures in the upper 90s to low 100s inland and mid 90s along the coast. These temperatures in combination with low to mid 70s dewpoints pooling along an afternoon sea breeze, produced dangerous heat indices over portions of southeast Georgia. A heat

index of 118°F was measured at Bamboo Farm Coastal Gardens and of 115°F at the Windsor Forest mesonet site.

According to Extreme Weather Watch, Chatham County had 121 days with natural temperatures over 90°F in 2011. The longest stretch of consecutive days with 90°F+ weather was 68 days, from June 22 to August 29, 2016. Between 1999 and 2024, there have been 2127 days with natural temperatures over 90°F/ Table 2-30 provides annual data.

Table 2-30 – Number of Days Over 90°F, 1999-2024

Year	Total Days	Year	Total Days
1999	68	2012	67
2000	84	2013	56
2001	59	2014	97
2002	76	2015	79
2003	57	2016	105
2004	61	2017	96
2005	70	2018	111
2006	81	2019	114
2007	67	2020	99
2008	88	2021	56
2009	70	2022	78
2010	102	2023	79
2011	121	2024	86
Sum			**2127**

Probability of Future Occurrence

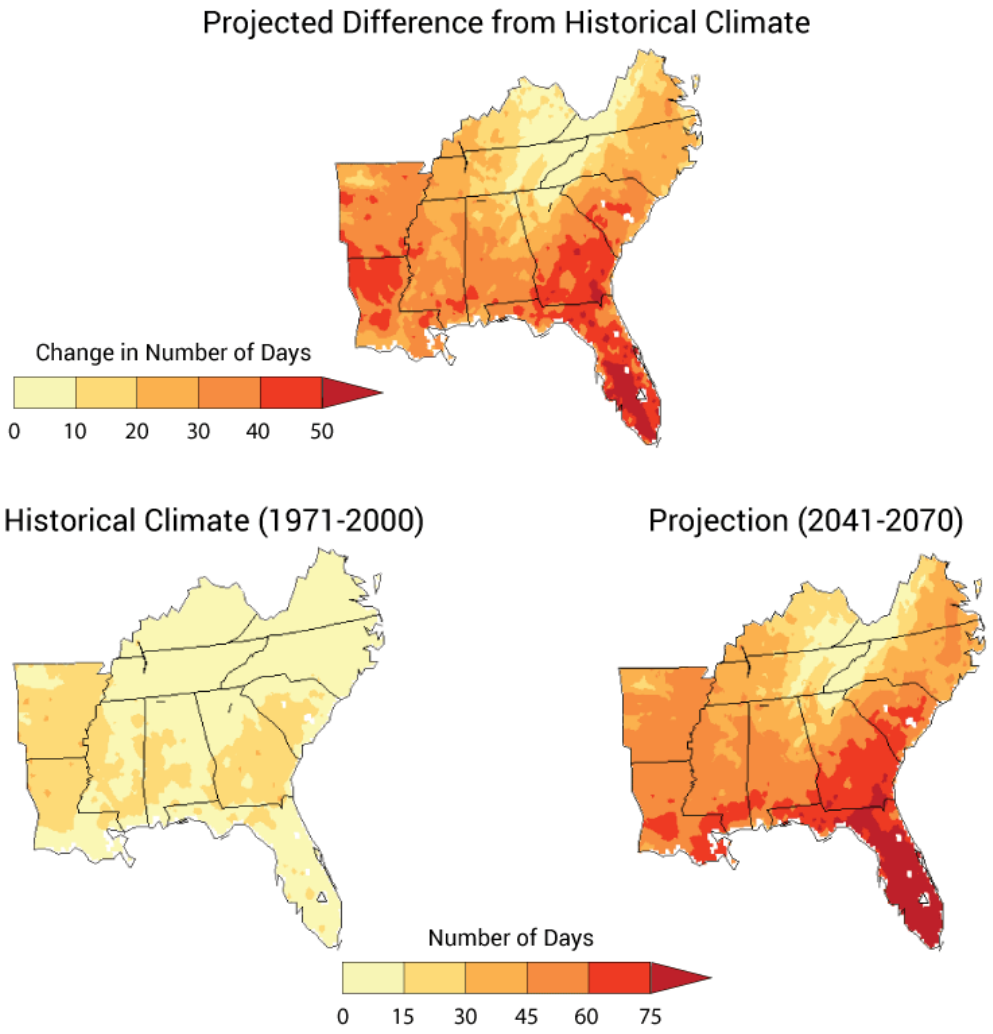
Based on 24 years of available data, the Region averages 88.6 days per year with temperatures above 90°F. Heat index temperature data history was not available for this study, but local anecdotal accounts indicate that heat indices generate “feels like” temperatures above 100°F for a few days each year.

Probability: 4 – Highly Likely

Climate Change

Research shows that average temperatures will continue to rise in the Southeast United States and globally, directly affecting Chatham County. Per the Sixth Intergovernmental Panel of Climate Change (IPCC) Assessment Report, “extreme temperatures are projected to increase even more than average temperatures. Cold waves are projected to become less intense and heat waves more intense.” The number of days over 95°F is expected to increase by between 20 and 30 days annually, as shown in Figure 2-12. Figure 2-12

Figure 2-12 – Projected Change in Number of Days Over 95°F



Source: NOAA NCDC from 2023, IPCC Climate Assessment Report

Vulnerability Assessment

Methodologies and Assumptions

No data is available to assess the potential for deaths, injuries, property damages in the planning area that could result from extreme heat; therefore, vulnerability is assessed on a qualitative basis for this hazard.

People

Extreme heat can cause heat stroke and even loss of human life. The elderly and the very young are most at risk to the effects of heat. People who are isolated are also more vulnerable to extreme heat.

Property

Extreme heat is unlikely to cause significant damages to the built environment. However, road surfaces can be damaged as asphalt softens, and concrete sections may buckle under expansion caused by heat. Train rails may also distort or buckle under the stress of heat induced expansion. Power transmission lines

may sag from expansion and if contact is made with vegetation the line may short out causing power outages. Additional power demand for cooling also increases power line temperature adding to heat impacts. Extreme heat can also cause significant agricultural losses.

Changes in development that have added impervious surface areas can exacerbate heat conditions through the urban heat island effect, whereby the concentration of structures, infrastructure, and human activity, traps and stores heat resulting in localized "heat islands." Impervious surface area has increased slightly in Chatham County since the last plan update.

Environment

Wild animals are vulnerable to heat disorders similar to humans, including mortality. Vegetation growth will be stunted, or plants may be killed if temperatures rise above their tolerance extremes.

Consequence Analysis

Table 2-31 summarizes the potential negative consequences of extreme heat.

Table 2-31 – Consequence Analysis – Extreme Heat

Category	Consequences
Public	Extreme heat may cause illness and/or death.
Responders	Consequences may be greater for responders if their work requires exertion and/or wearing heavy protective gear.
Continuity of Operations (including Continued Delivery of Services)	Continuity of operations is not expected to be impacted by extreme heat because warning time for these events is long, though heat-related infrastructure failure, such as power outages or climate control systems failures could impact business operations during those periods
Property, Facilities and Infrastructure	Minor impacts may occur, including possible damages to road surfaces, power supplies, and climate control systems.
Environment	Environmental impacts include strain on local plant and wildlife, including potential for illness or death.
Economic Condition of the Jurisdiction	Farmers may face crop losses or increased livestock costs. Businesses may suffer economic impacts if operations are halted due to heat impacts.
Public Confidence in the Jurisdiction's Governance	Extreme heat is unlikely to impact public confidence.

Hazard Summary by Jurisdiction

The following table summarizes extreme heat hazard risk by jurisdiction. Extreme heat risk does not vary significantly by jurisdiction.

Table 2-32 –Extreme Heat Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	4	3	4	1	3	3.3	H
Bloomingdale	4	3	4	1	3	3.3	H
Garden City	4	3	4	1	3	3.3	H
Pooler	4	3	4	1	3	3.3	H
Port Wentworth	4	3	4	1	3	3.3	H
Savannah	4	3	4	1	3	3.3	H
Thunderbolt	4	3	4	1	3	3.3	H
Tybee Island	4	3	4	1	3	3.3	H
Vernonburg	4	3	4	1	3	3.3	H

2.5.6 Flood

Hazard Background

Flooding is defined by the rising and overflowing of water onto normally dry land. As defined by FEMA, a flood is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties. Flooding can result from an overflow of inland waters or an unusual accumulation or runoff of surface waters from any source.

Flooding is the most frequent and costly of all-natural hazards in the United States. The National Weather Service estimates the last several decades have seen an average of 125 flood-related deaths per year. Approximately 75 percent of presidentially declared disasters result from flood-related natural hazard events. Taken as a whole, more frequent, localized flooding problems that do not meet federal disaster declaration thresholds ultimately cause the majority of damages across the United States.

Sources and Types of Flooding

Flooding in Chatham County can be attributed to four main sources as noted below. Due to its low-lying coastal setting, flooding can occur anywhere in the county.

Coastal Tidal Flooding: All lands bordering the coast along the Atlantic Ocean and in low-lying coastal plains are susceptible to tidal effects and flooding. Coastal land such as sand bars, barrier islands and deltas provides a buffer zone to help protect human life and real property relative to the sea much as flood plains provide a buffer zone along rivers and other bodies of water. Coastal floods usually occur because of abnormally high tides or tidal waves, storm surge and heavy rains in combination with high tides, tropical storms and hurricanes. As noted in the 2018 Flood Insurance Study (FIS) report, Chatham County is particularly susceptible to coastal flooding due to "its openness to Atlantic Ocean surges and unfavorable bathymetry extending offshore. Many of the large streams near the coast have wide mouths and are bordered by extensive areas of low marsh. In addition, the terrain at the coast is generally too low to provide an effective barrier, and the offshore ocean depths are shallow for great distances, generating a high Atlantic Ocean surge."

Riverine Flooding: Chatham County has numerous rivers and canals running throughout its jurisdiction that are susceptible to overflowing their banks during and following excessive precipitation events. While flash flooding caused by surface water runoff is not uncommon in Chatham County, riverine flood events (such as the "100-year flood") will cause significantly more damage and economic disruption for the area. Chatham County's FIRM dated August 16, 2018, was used for this assessment. The Savannah River and the Ogeechee River, along with their many tributaries, are the primary riverine flood sources in the County. Other streams have chiefly tidal estuaries within the county and include the Little Ogeechee River, Vernon River, Bear River, Wilmington River, Bull River, and numerous tributaries to these. Main openings to the Atlantic Ocean are Ossabaw Sound and Wassaw Sound, both of which are wide and deep. Much of the land situated in the floodplain is undeveloped marshland, with some residential, commercial, and industrial development.

Flash or Rapid Flooding: A flash flood occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, possibly from slow-moving intense thunderstorms and sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterways and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation. Flash flooding can happen in Special Flood Hazard Areas (SFHAs) as delineated by the National Flood Insurance Program (NFIP) and can also happen in areas not associated with floodplains. Flash flood hazards caused by surface water runoff are most common in urbanized areas, where greater

population density generally equates to more impervious surface (e.g., pavement and buildings) which increases the amount of surface water generated.

Flash flooding is a dangerous form of flooding which can reach full peak in only a few minutes. Rapid onset allows little or no time for protective measures. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding can result in higher loss of life, both human and animal, than slower developing river and stream flooding.

Localized/Stormwater Flooding: Localized stormwater flooding can occur throughout Chatham County. Localized stormwater flooding occurs when heavy rainfall and an accumulation of runoff overburden the stormwater drainage system. The cause of localized stormwater flooding in Chatham County can be attributed to its generally flat topography, abundance of water features, and the amount of developed and impervious land, which limits ground absorption and increases surface water runoff.

Localized flooding may be caused by the following issues:

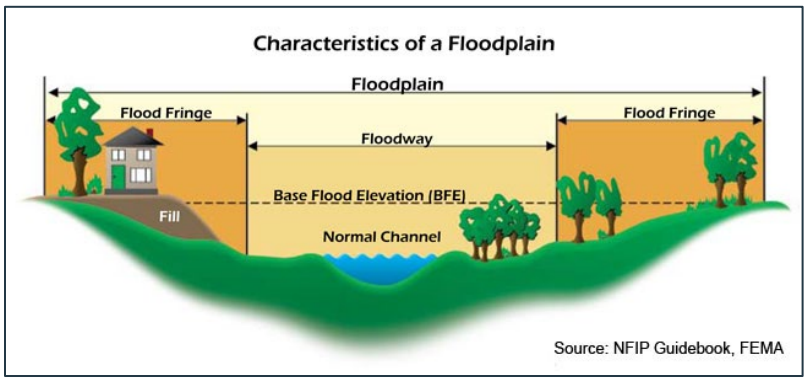
- **Inadequate Capacity –** An undersized/under capacity pipe system can cause water to back-up behind a structure which can lead to areas of ponded water and/or overtopping of banks.
- **Clogged Inlets** – Debris covering the asphalt apron and the top of grate at catch basin inlets may contribute to an inadequate flow of stormwater into the system. Debris within the basin itself may also reduce the efficiency of the system by reducing the carrying capacity.
- **Blocked Drainage Outfalls** – Debris blockage or structural damage at drainage outfalls may prevent the system from discharging runoff, which may lead to a back-up of stormwater within the system.
- **Improper Grade** – Poorly graded asphalt around catch basin inlets may prevent stormwater from entering the catch basin as designed. Areas of settled asphalt may create low spots within the roadway that allow for areas of ponded water.

While localized flooding may not be as destructive as coastal flooding, it is a chronic problem. The repetitive damage caused by such flooding can add up. Sewers may back up, yards can be inundated, and homes, businesses and vehicles can be flooded. Drainage and sewer systems not designed to carry the capacity currently needed to handle increased storm runoff can cause water to back into basements and damage mechanical systems. These impacts, and other localized flooding impacts, can create public health and safety concerns.

Flooding and Floodplains

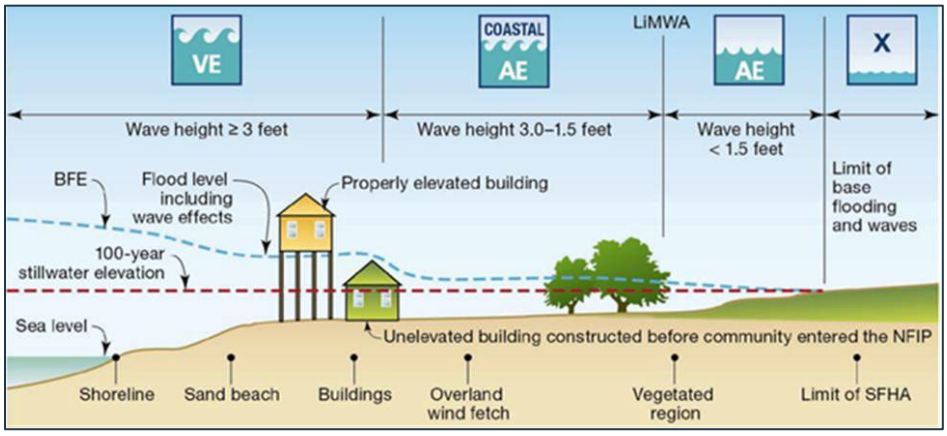
A floodplain, as shown in Figure 2-13, is flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but which do not experience a strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited that gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the bed of the stream.

Figure 2-13 – Characteristics of a Floodplain



In coastal areas, flooding occurs due to high tides, tidal waves, storm surge, or heavy rains in combination with these other sources. In these areas, flood hazards typically include the added risk of wave action delineated by the VE Zone and Coastal AE Zone. Wave height and intensity decreases as floodwaters move inland. Figure 2-14 shows the typical coastal floodplain and the breakdown of flood zones in these settings. These flood zones are defined in Table 2-33.

Figure 2-14 – Characteristics of a Coastal Floodplain



Source: FEMA

In its common usage, the floodplain most often refers to that area that is inundated by the "100-year flood," which is the flood that has a 1% chance in any given year of being equaled or exceeded. The 500-year flood is the flood that has a 0.2% chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

The 100-year flood, which is the minimum standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. Participation in the NFIP requires adoption and enforcement of a local floodplain management ordinance which is intended to prevent unsafe development in the floodplain, thereby reducing future flood damages. Participation in the NFIP allows for the federal government to make flood insurance available within the community as a financial protection against flood losses. Since floods have an annual probability of occurrence, have a known magnitude, depth and

velocity for each event, and in most cases, have a map indicating where they will likely occur, they are in many ways often the most predictable and manageable hazard.

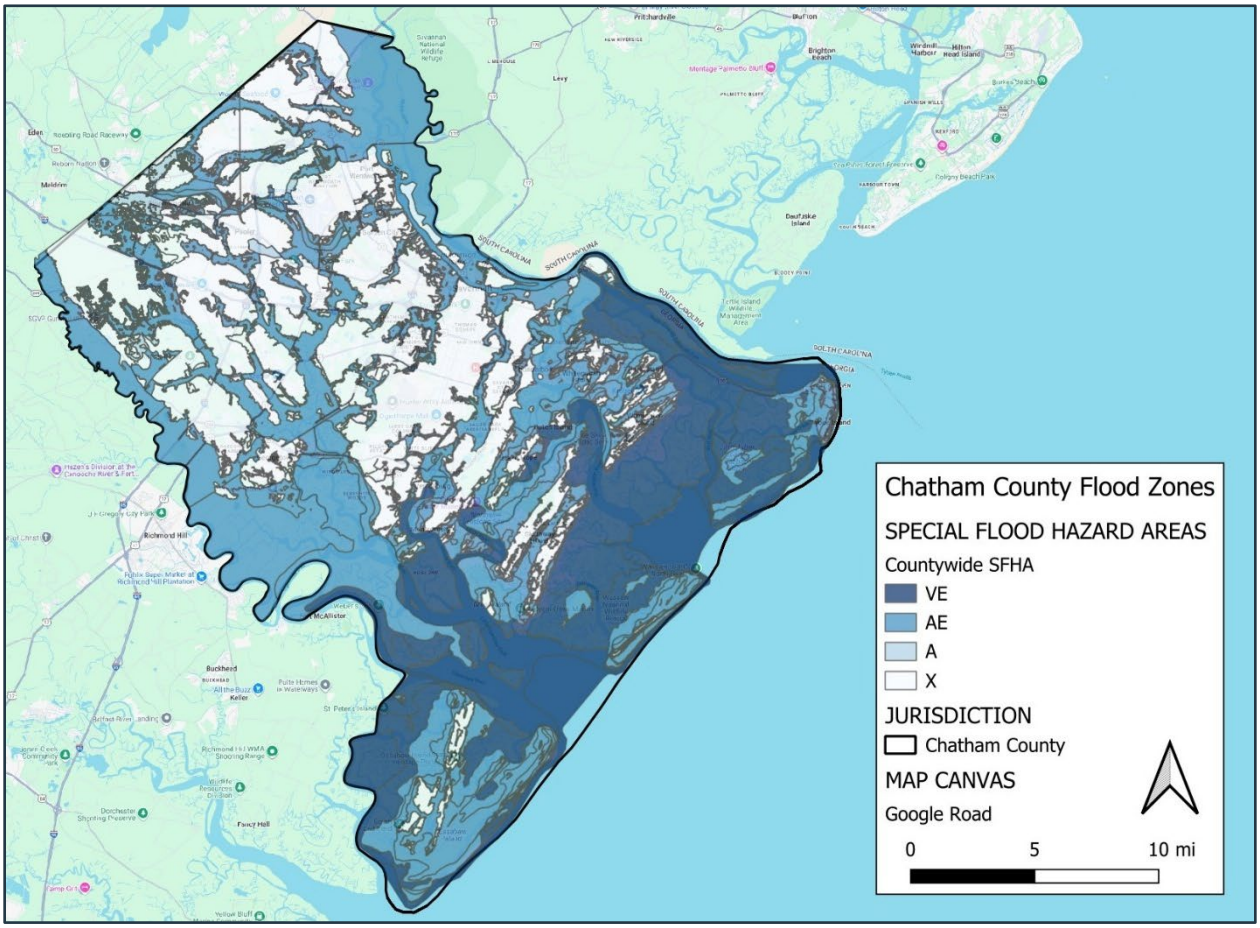
Warning Time: 3 – 6 to 12 hours

Duration: 3 – Less than 1 week

Location

Figure 2-15 reflects the 2018 mapped flood insurance zones for Chatham County. Maps for each participating jurisdiction are provided in the jurisdictional annexes.

Figure 2-15 – FEMA Flood Hazard Areas in Chatham County



Source: FEMA 2018 DFIRM

Extent

Flood extent can be defined by the amount of land in the floodplain and the potential magnitude of flooding as measured by flood height and velocity.

Regulated floodplains are illustrated on inundation maps called Flood Insurance Rate Maps (FIRMs). It is the official map for a community on which FEMA has delineated both the Special Flood Hazard Areas (SFHAs) and the risk premium zones applicable to the community. SFHAs represent the areas subject to inundation by the 100-year flood event. Structures located within the SFHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Flood prone areas were identified within Chatham

County using the FIRM dated August 16, 2018. Table 2-33 summarizes the flood insurance zones identified by the Digital FIRM (DFIRM).

Table 2-33 – Mapped Flood Insurance Zones within Chatham County

Zone	Description
VE	Also known as the coastal high hazard areas. They are areas subject to high velocity water including waves; they are defined by the 1% annual chance (base) flood limits (also known as the 100-year flood) and wave effects 3 feet or greater. The hazard zone is mapped with base flood elevations (BFEs) that reflect the combined influence of stillwater flood elevations, primary frontal dunes, and wave effects 3 feet or greater.
AE	AE Zones, also within the 100-year flood limits, are defined with BFEs that reflect the combined influence of stillwater flood elevations and wave effects less than 3 feet. The AE Zone generally extends from the landward VE zone limit to the limits of the 100-year flood from coastal sources, or until it reaches the confluence with riverine flood sources. The AE Zones also depict the SFHA due to riverine flood sources, but instead of being subdivided into separate zones of differing BFEs with possible wave effects added, they represent the flood profile determined by hydrologic and hydraulic investigations and have no wave effects. The Coastal AE Zone is differentiated from the AE Zone by the Limit of Moderate Wave Action (LiMWA) and includes areas susceptible to wave action between 1.5 to 3 feet.
AH	Areas subject to inundation by 1% -annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown in this zone.
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
A99	Areas subject to inundation by the 1%-annual-chance flood event, but which will ultimately be protected upon completion of an under-construction federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may only be used when the flood protection system has reached specified statutory progress toward completion. No Base Flood Elevations (BFEs) or depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
0.2% Annual Chance (X 500 or shaded Zone X)	Moderate risk areas within the 0.2%-annual-chance floodplain, areas of 1%-annual-chance flooding where average depths are less than 1 foot, areas of 1-%-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1%-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (Zone X (shaded) is used on new and revised maps in place of Zone B.)
Zone X (unshaded)	Minimal risk areas outside the 1%- and 0.2%-annual-chance floodplains. No BFEs or base flood depths are shown within these zones. Zone X (unshaded) is used on new and revised maps in place of Zone C.

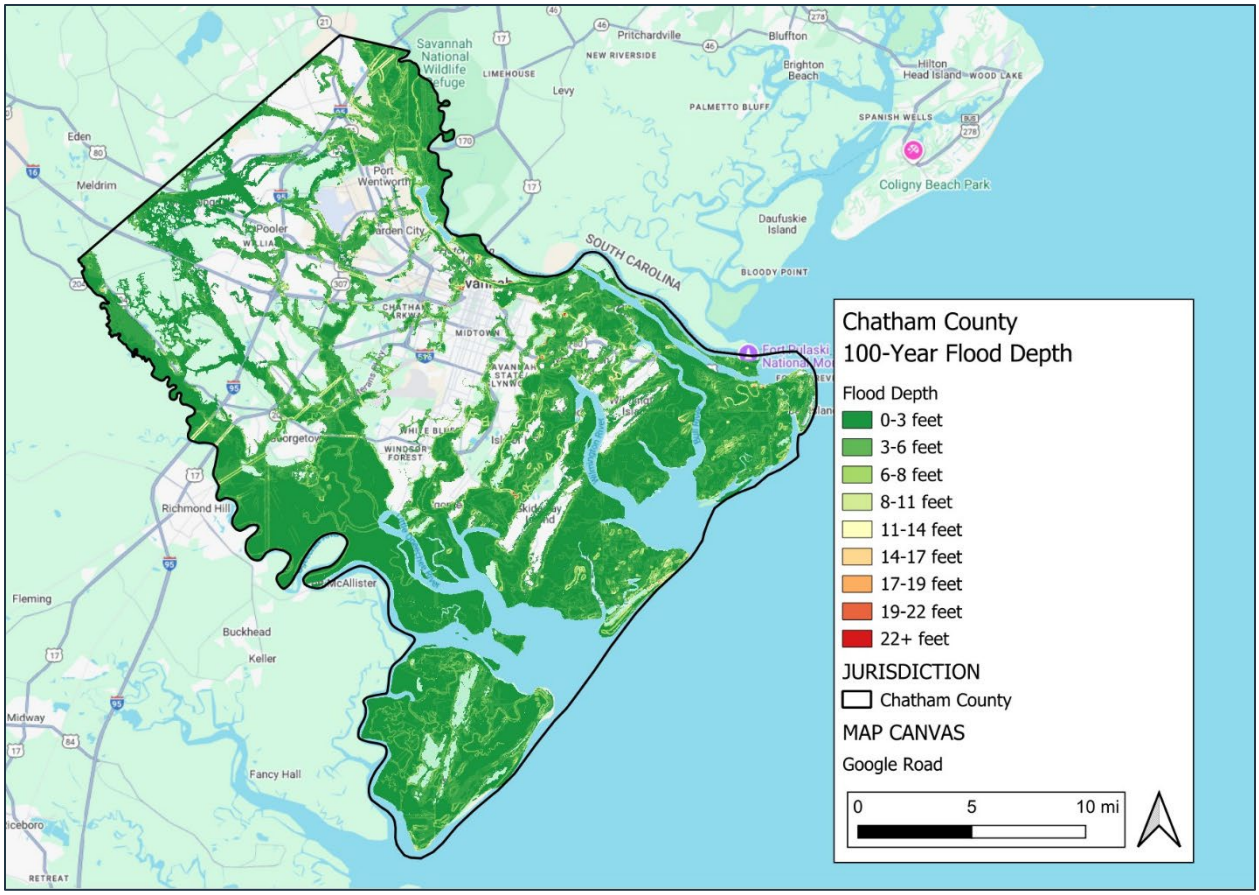
Approximately 65% of Chatham County falls within the SFHA. Table 2-34 provides a summary of the County's total area (excluding open water) by flood zone on the 2018 effective DFIRM. This is further broken down by jurisdiction in each individual annex. Figure 2-16 shows the depth of flooding predicted from a 1% annual chance flood.

Table 2-34 – Flood Zone Acreage in Chatham County

Flood Zone	Acreage	Percent of Total (%)
A	2,282.41	0.69%
AE	128,245.68	38.8%
VE	86,873.03	26.29%
X500	21,103.27	6.39%
X	91,965.59	27.83%
SFHA Total	**217,401.12**	**N/A**
County Total Acres	**330,469.98**	**N/A**
Percent of County in the SFHA		**65.79%**

Source: FEMA 2018 DFIRM

Figure 2-16 – Flood Depth, Chatham County



Source: GEMA, UGA ITOS 2025

The NFIP utilizes the 100-year flood as a basis for floodplain management. The Flood Insurance Study (FIS) defines the probability of flooding as flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 100-year period (recurrence intervals). Considered another way, properties in a 100-year flood zone have a 1% probability of flooding during any given year. Mortgage lenders require that owners of properties with federally backed mortgages located within SFHAs purchase and maintain flood insurance policies on their properties. Consequently, newer and recently purchased properties in the community are typically insured against flooding.

Impact: 3 – Critical

Spatial Extent: 3 – Moderate

Historical Occurrences

Table 2-35 details the historical occurrences of flooding identified from 1999 through 2024 by NCEI Storm Events database. Where multiple instances of flooding were reported across different locations on the same date, these events are combined so as to indicate the number of days of flooding. It should be noted that only those historical occurrences listed in the NCEI database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

Table 2-35 – NCEI Records of Flooding, 1999-2024

Type	Event Count	Deaths/Injuries	Reported Property Damage	Reported Crop Damage
Coastal Flood	22	0/0	$40,000	$0
Flash Flood	45	0/0	$7,365,000	$0
Flood	1	0/0	$2,000	$0
Heavy Rain	2	0/0	$0	$0
Storm Surge/Tide	4	0/0	$5,000,000	$0
Total	**74**	**0/0**	**$12,407,000**	**$0**

Source: NCEI

According to NCEI, 74 recorded flood events affected the planning area from 1999 to 2024 causing an estimated $12,407,000 in property damage, but no injuries, fatalities, or crop damage.

Table 2-36 provides a summary of this historical information by location. In some cases, multiple locations were reported as experiencing flooding within the same day. It is important to note that many of the events attributed to the county are countywide or include incorporated areas. Similarly, though some events have a starting location identified, the event may have covered a larger area including multiple jurisdictions. Still, this list provides an indication of areas that may be particularly flood prone.

Table 2-36 – Summary of Historical Flood Occurrences by Location, 1999-2024

Location	Event Count	Deaths/Injuries	Property Damage
Coastal Chatham	25	0/0	$40,000
Eastern Chatham County	4	0/0	$12,000,000
Garden City	2	0/0	$100,000
Pooler	0	0/0	$0
Port Wentworth	1	0/0	$0
Savannah	20	0/0	$75,000
Thunderbolt	1	0/0	$5,000
Tybee Island	2	0/0	$0
Unincorporated Chatham County	17	0/0	$186,000
Vernonburg	2	0/0	$1,000
Total	**74**	**0/0**	**$12,407,000**

Source: NCEI

The following event narratives are provided in the NCEI Storm Events Database and illustrate the impacts of flood events on the county:

June 29, 1999 – Slow moving showers and thunderstorms developed repeatedly across Chatham County and Effingham County during the day. Twenty-four-hour rainfall amounts ranged from about 7 inches to over 13 inches. As a result of the flooding, over 500 homes and businesses were damaged to varying

degrees and almost 600 automobiles were damaged. Water was as much as 6 ft deep in some places. Numerous roads were washed out and/or closed during the flooding. Estimated dollar damage for public property was 4.5 million dollars and at least another 2.5 million dollars for private property.

October 11, 2002 – Tropical Storm Kyle dumped 3 to 5 inches of rain in the Savannah area within a 12-hour period. This very heavy rainfall caused flooding of roads, low lying areas and places with poor drainage. Numerous cars stalled and roads were closed as the flooding began to endanger lives.

July 30, 2007 – A weak frontal boundary in combination with sea breeze and numerous low-level boundaries in a highly unstable environment resulted in numerous showers and thunderstorms across the region. Numerous road closures were reported in Downtown Savannah as well as high water entering some apartments. Cars were seen floating down the roadway at 65th and Abercorn Street.

September 30, 2007 – Strengthening High pressure over New England and low pressure off the Southeast U.S. coastline, resulted in a tight pressure gradient across southern South Carolina and Southeast Georgia. Strong Northeast winds and High Astronomical Tides combined to produce significant Beach Erosion across the region. Severe Beach Erosion was reported at Tybee Island. Lifeguard towers were undermined or destroyed. Several homes were damaged due to high surf and coastal flooding. The beach was completely washed away in several areas.

December 21, 2007 – Low pressure developed off the coast of South Carolina and Georgia as a potent upper-level disturbance moved across the region. Moderate to heavy rains fell across the area, bringing much needed rainfall to some drought-stricken areas. The pressure gradient between the area of low pressure and a wedge of high pressure across the piedmont of South Carolina and Georgia, associated with strong cold air damming, produced strong winds along the coast. This larger event resulted in seven reported incidents county wide. Aviation Court and Bonnie Bridge were reported flooded by the Chatham County Emergency Manager. Across the county, numerous roads were flooded, including parts of Commerce Boulevard in Garden City where the water depth was as high as 6 feet, completely submerging cars in some places. In Savannah, one house was evacuated due to flooding.

June 22-23, 2009 – An anomalously high Perigean Spring Tides resulted in significant coastal flooding along the Georgia coast. On June 22, the high tide peaked at 10.11 feet Mean Lower Low Water (MLLW) at the National Ocean Service (NOS) site on Tybee Island, Georgia. The next day, it peaked at 10.07 feet MLLW. Chatham County Emergency Management reported numerous roads flooded across the county as well as yards flooded in the Wilmington Island and Burnside areas of Chatham County. A federal employee reported roads flooded due to anomalously high tides throughout Ossabaw Island, with one dike completely destroyed.

June 23, 2014 – The combination of the a very unstable atmosphere, the presence of a weak surface trough and the passing of a Mesoscale Convective Vortex (MCV) produced numerous showers and thunderstorms. A line of stationary thunderstorms produced between 4 and 10 inches of rain across Chatham County, which resulted in flash flooding. KSAV observed the wettest June day on record since observations began in 1871. Widespread flash flooding along with numerous road closures were reported in parts of Garden City, Pooler, Port Wentworth and at the Savannah Airport in Georgia. Water levels were reported to be over tires; flooding was observed around some businesses and tow trucks were used to relocate vehicles from flooded locations. Flood waters also washed out a section of the CSX rail line near Highway 307 and Gulf Stream Road. Total costs were generally estimated to be around $15,000.

October 27, 2015 – A combination of persistent and strong east/northeast winds, the perigean spring tide and a full moon produced two days of elevated high tide cycles along the southeast Georgia coast. 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.

September 2, 2016 – The National Ocean Service tide gauge at Fort Pulaski measured a peak storm surge of 1.64 feet associated with Tropical Storm Hermine.

October 7, 2016 – During Hurricane Matthew, The National Ocean Service tide gauge at Fort Pulaski peaked at 12.56 ft above Mean Lower Low Water at 248 AM on October 8th, which is the highest high tide on record. A peak surge of 7.69 ft was also recorded at the Fort Pulaski tide gauge at 242 AM on October 8th. A National Hurricane Center survey team found a high-water mark of three feet in a home several blocks from the shoreline on the northern end of Tybee Island. The observed debris field and high-water marks indicate preliminary inundation values of five to six feet MHHW close to the northern Tybee Island shoreline. In downtown Savannah, water flooded a parking lot and entered the Hyatt Ballroom building 10-18 inches deep. Water reached the doorways of many businesses on River Street, but no significant saltwater intrusion or damage was reported. A restaurant on the east end of River Street was flooded with three to six inches of water from the Savannah River. An eyewitness reported that the hulls of boats tied up at River Street rose to the level of the railing along the Savannah River. Farther east, along U.S. Route 80, about one foot of water entered a restaurant on the Isle of Armstrong. On Whitemarsh Island, debris on U.S. Route 80 indicated that the road was inundated. At Fort Pulaski, a NWS/NHC survey team measured five feet of inundation near the Coast Guard station and around the fort on the northern end of the island.

September 11, 2017 – Storm surge associated with Tropical Storm Irma had widespread significant impacts in Chatham County. The National Ocean Service tide gauge at Fort Pulaski measured a peak tide level of 12.24 feet Mean Lower Low Water (MLLW) or 4.73 feet Mean Higher High Water (MHHW). This tide value ranks as the 2nd highest on record for the Fort Pulaski gauge and the peak surge value measured during the event was 5.63 feet. According to Chatham County Emergency Management, seven homes were destroyed, 369 sustained major damage, and 445 sustained minor damage. The Savannah River did breach onto River Street, but water remained out of businesses. Storm surge damage was most extensive on Tybee Island, specifically on Lewis Avenue and the southwestern portion of the island. Homes on Pelican Drive were also damaged by surge. Some storm surge related damage occurred to homes on Dutch Island and Burnside Island. Highway 80 between Savannah and Tybee Island was closed due to saltwater covering and inundating the roadway. Several rescues were performed as surge trapped people in their homes. USGS high water mark analysis revealed storm surge related inundation ranging from 1.19-5.25 feet above ground level across coastal portions of the county. The peak inundation value of 5.25 feet above ground level was taken from a high-water mark at Oakridge Golf Course on Skidaway Island. Another notable high-water mark of 3.28 feet above ground level was analyzed on 6th Street near Lewis Avenue on Tybee Island. Extensive flooding took place at the Fort Pulaski National Monument area including the visitors center. A picture taken by National Park staff showed a water line indicative of 17 inches of water inside one of the park structures.

November 23-24, 2018 – Astronomical effects including a full moon and upcoming lunar perigee combined to produce an elevated morning high tide. The level of the high tide was driven even higher by the presence of strong northeasterly winds along the coast due to strong surface high pressure centered between the Mid-Atlantic states and New England. The high tide resulted in coastal flooding along the southeast Georgia coast including Savannah and Tybee Island. A maximum tide level of 10.25 feet above Mean Lower Low Water (MLLW), or 2.75 feet above Mean Higher High Water (MHHW), was observed at the Fort Pulaski tide gage. Major coastal flooding typically begins along the southeast Georgia coast when tide levels reach 10.0 feet above MLLW, or 2.5 feet above MHHW, at the Fort Pulaski tide gage.

Chatham County Police closed Highway 80 near Tybee Island due to the roadway being inundated with saltwater. Also, flooding of homes, yards, and several roadways was reported around the Plantation golf course on Skidaway Island. Chatham County Police closed Highway 80 between Savannah and Tybee Island due to saltwater flooding making the road impassable.

July 22, 2024 – A cluster of thunderstorms developed along the sea breeze in the afternoon and remained nearly stationary across Chatham County. This cluster of thunderstorms produced extremely heavy rainfall across portions of Chatham County, with the heaviest rain occurring in the Savannah area. Approximately 3 to 5 inches of rain was measured at several automated rain gauge sites, with most of the rain falling in a 1-to-2-hour period of time. Numerous roads were flooded and closed in Savannah due to the heavy rain. One flash flood event occurred as well, with water entering the first floor of an apartment building.

August 4-9, 2024 – Tropical Storm Debby tracked across Southeast Georgia as a tropical storm (45 mph) before slowly emerging off the Southeast Coast at tropical storm strength (40 mph) near Tybee Island, Georgia on August 6th. Across Southeast Georgia, the main impacts associated with Debby included flash flooding due to widespread heavy rainfall and scattered tree damage associated with near tropical storm force winds. Prolonged heavy rainfall across Southeast Georgia brought widespread flash flooding on August 5th and 6th, additional areas of flash flooding on August 7th and 8th, along with considerable and prolonged flooding of creeks, streams and main stem rivers for several days thereafter. Numerous homes and roads were flooded, leading to rescues and/or evacuations. Storm total rainfall amounts from August 4th to August 9th generally ranged between 5 to 14 inches with highest amounts across inland areas along a stretch from Tattnall County to Screven County and into parts of Evans County and Effingham County. The highest water level at the Fort Pulaski (FPKG1) tide gauge was 1.68 ft MHHW during the evening of August 5th. No injuries or fatalities occurred with flash flooding/flooding.

Between 1999 and 2024, Chatham County had six FEMA Major Disaster Declarations for severe weather events that include elements of flooding. All declarations during this period were tropical cyclones, which contributed to isolated to severe flooding associated with the event.

Probability of Future Occurrence

By definition of the 100-year flood event, SFHAs are defined as those areas that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. Properties located in these areas have a 26% chance of flooding over the life of a 30-year mortgage.

The 500-year flood area is defined as those areas that will be inundated by the flood event having a 0.2% chance of being equaled or exceeded in any given year; it is not the flood that will occur once every 500 years.

While exposure to flood hazards vary across jurisdictions, all jurisdictions have at least some area of land in FEMA flood hazard areas. Additionally, there is risk of localized and stormwater flooding as well as severe wind-driven surge in areas outside the SFHA and at different intervals than the 1% annual chance flood. In the 24-year period between 1999-2024, there were 74 flood-related events recorded by NCEI, which equates to 3.17 annualized events. Therefore, the probability of flooding is considered highly likely for all jurisdictions.

Probability: 4 – Highly Likely

Climate Change

Per the Sixth Intergovernmental Panel of Climate Change (IPCC) Assessment Report, frequency and intensity of heavy precipitation events is expected to increase across the country. More specifically, it is

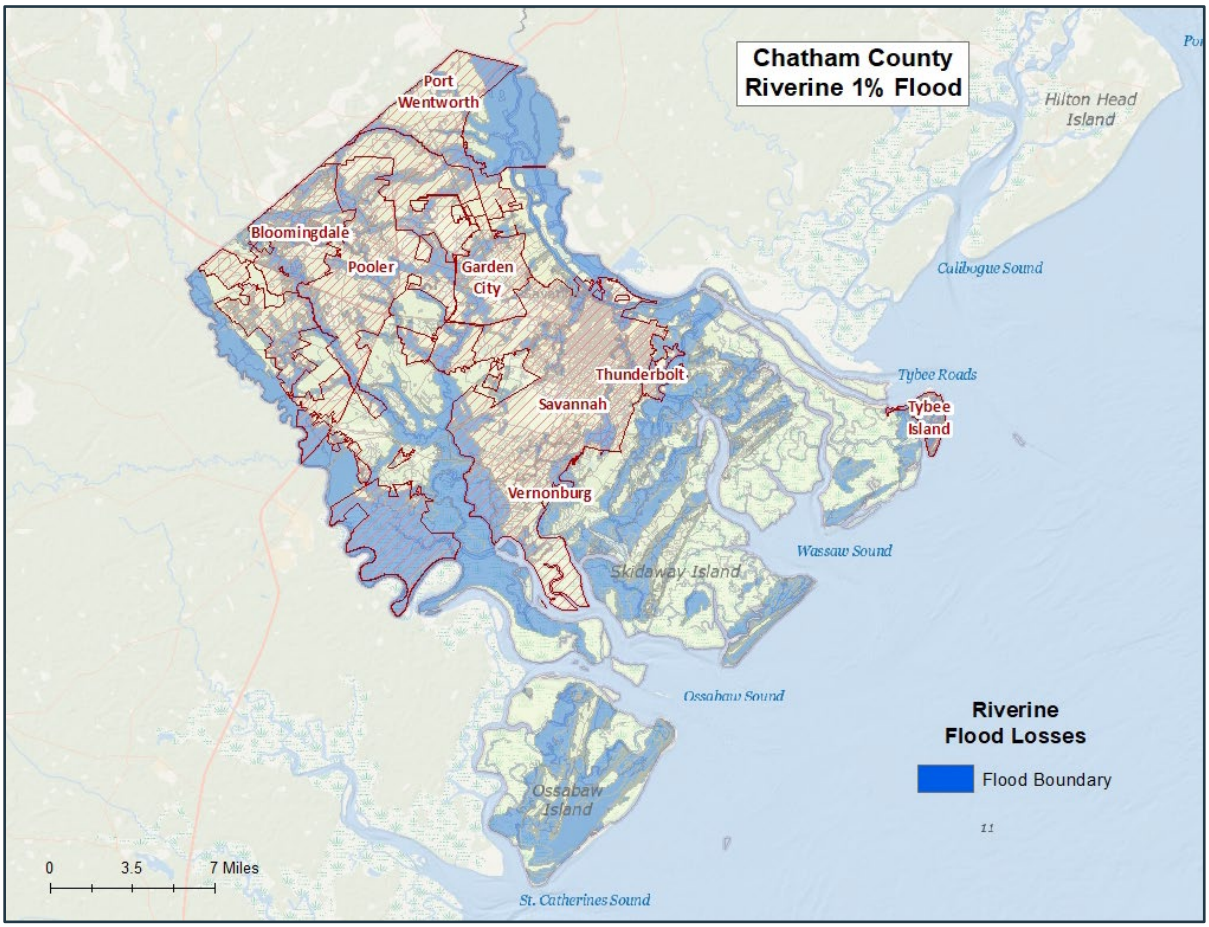
"very likely" (90-100% probability) that most areas of the United States will exhibit an increase of at least 5% in the maximum 5-day precipitation by late 21st century. Additionally, increases in precipitation totals are expected in the Southeast. The mean change in the annual number of days with rainfall over 1 inch for the Southeastern United States is 0.5 to 1.5 days. Therefore, with more rainfall falling in more intense incidents, the region may experience more frequent flash flooding. Increased flooding may also result from more intense tropical cyclone; researchers have noted the occurrence of more intense storms bringing greater rainfall totals, a trend that is expected to continue as ocean and air temperatures rise.

Vulnerability Assessment

Methodologies and Assumptions

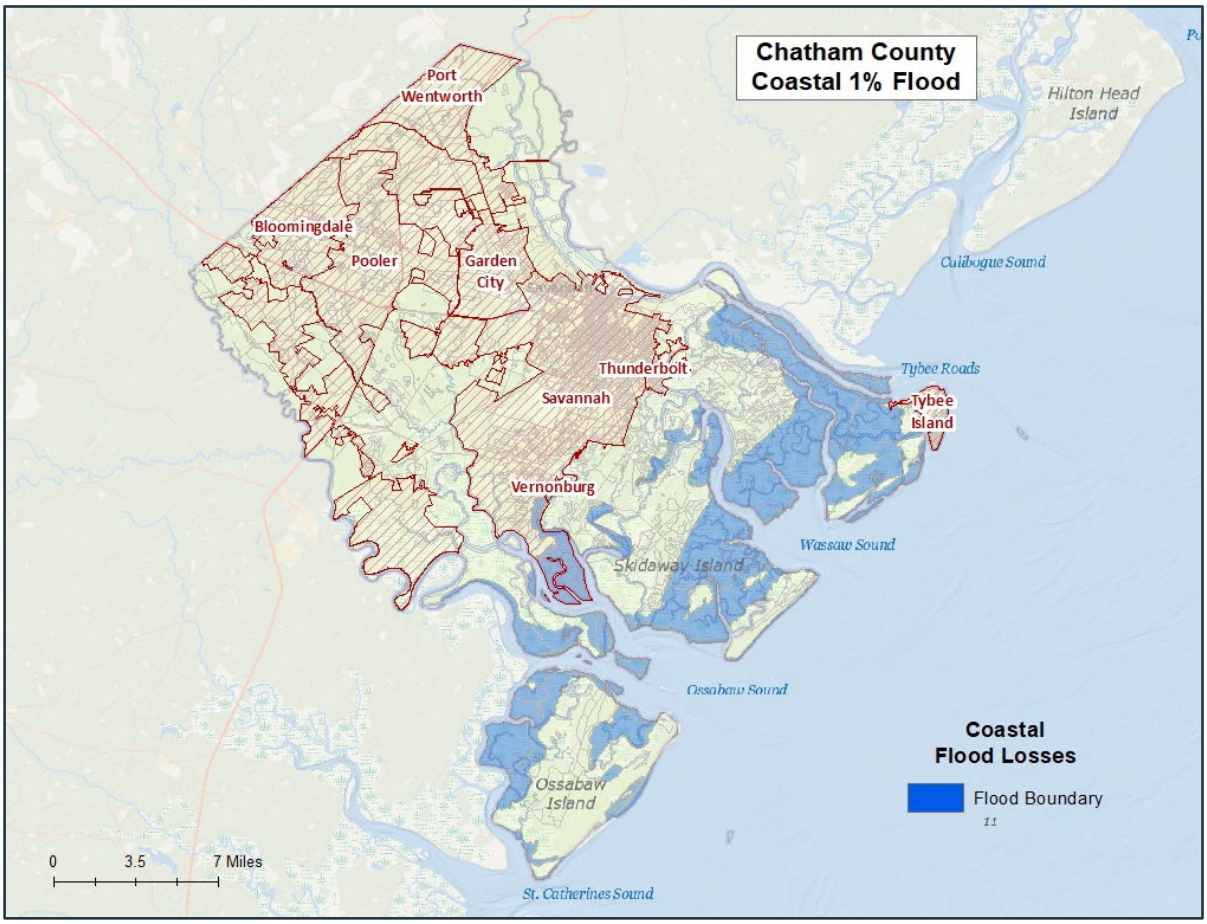
GMIS performed a flood loss analysis in HAZUS-MH by leveraging 2025 parcel data provided by Chatham County. The flood assessment is based on the 1% annual chance event that includes both coastal and riverine assessments. Riverine losses were determined from the 1% flood boundaries downloaded from the FEMA Flood Map Service Center in March 2025. The flood boundaries were overlaid with the USGS 10-meter DEM using the HAZUS-MH Enhanced Quick Look tool to generate riverine depth grids. The riverine flood depth grid was then imported into H AZUS-MH to calculate the riverine flood loss estimates. Figure 2-17 and Figure 2-18 illustrate the riverine and coastal inundation boundaries associated with the 1% annual chance.

Figure 2-17 – Riverine 1% Flood Inundation Boundary, Chatham County



Source: GMIS HAZUS Report, 2025

Figure 2-18 – Coastal 1% Flood Inundation Boundary, Chatham County



Source: GMIS HAZUS Report, 2025

GEMA's full HAZUS report, which estimates flood loss is available in Appendix E.

People

Certain health hazards are common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where farm animals are kept or where their wastes are stored can contribute polluted waters to the receiving streams.

Debris also poses a risk both during and after a flood. During a flood, debris carried by floodwaters can cause physical injury from impact. During the recovery process, people may often need to clear debris out of their properties but may encounter dangers such as sharp materials or rusty nails that pose a risk of tetanus. People must be aware of these dangers prior to a flood so that they understand the risks and take necessary precautions before, during, and after a flood.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as E.coli and other disease-causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If the municipal water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and personal belongings destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Floods can also result in fatalities. Individuals face high risk when driving through flooded streets. However, NCEI does not contain any records of deaths in Chatham County caused by flooding events.

The estimate of population at risk to riverine flooding was developed based on the assessment of residential property in the HAZUS Riverine 1% scenario. Counts of residential buildings at risk were multiplied by a household factor for each jurisdiction, derived from a weighted average of the 2018-2023 American Community Survey's average household size for owner- and renter-occupied housing, rounding to the nearest full number. The resulting estimates of population at risk are shown in Table 2-37. Overall, approximately 27,007 people live in high-risk flood zones.

Table 2-37 – Chatham County Population at Risk to Riverine Flood

Jurisdiction	Residential Properties at Risk	Household Factor	Population at Risk
City of Bloomingdale	N/A	N/A	N/A
City of Garden City	78	2.61	204
City of Pooler	1	2.61	3
City of Port Wentworth	24	2.61	63
City of Savannah	1597	2.61	4,168
Town of Thunderbolt	151	2.61	394
City of Tybee Island	2388	2.61	6,233
Town of Vernonburg	7	2.61	18
Unincorporated Chatham County	6101	2.61	15,924
Total	**10,347**	**--**	**27,007**

Source: FEMA, U.S. Census Bureau 2018-2013 ACS 5-Year Estimates; HAZUS Riverine 1% Scenario, Appendix E.

The estimate of population at risk to coastal flooding was developed based on the assessment of residential property in the HAZUS Coastal 1% scenario. Counts of residential buildings at risk were multiplied by a household factor for each jurisdiction, derived from a weighted average of the 2018-2023 American Community Survey's average household size for owner- and renter-occupied housing, rounding to the nearest full number. The resulting estimates of population at risk are shown in Table 2-38. Overall, approximately 27,007 people live in high-risk flood zones.

Table 2-38 – Chatham County Population at Risk to Coastal Flood

Jurisdiction	Residential Properties at Risk	Household Factor	Population at Risk
City of Bloomingdale	N/A	N/A	N/A
City of Garden City	N/A	N/A	N/A
City of Pooler	N/A	N/A	N/A

Jurisdiction	Residential Properties at Risk	Household Factor	Population at Risk
City of Port Wentworth	N/A	N/A	N/A
City of Savannah	11	2.61	29
Town of Thunderbolt	N/A	N/A	N/A
City of Tybee Island	34	2.61	89
Town of Vernonburg	N/A	N/A	N/A
Unincorporated Chatham County	98	2.61	256
Total	**143**	**--**	**374**

Source: FEMA, U.S. Census Bureau 2018-2013 ACS 5-Year Estimates; HAZUS Riverine 1% Scenario, Appendix E.

Property

Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by flood waters.

Table 2-39 and Table 2-40 detail the estimated losses for the 100-year flood event, calculated using HAZUS methodologies for value of contents based on occupancy type. The total damage estimate value is based on damages to the total of improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

Table 2-39 – Estimated Building Damage and Content Loss for Riverine 1% Annual Chance Flood by Jurisdiction

Occupancy	Total Buildings in the Jurisdiction	Total Buildings Damaged in the Jurisdiction	Total Building Exposure in the Jurisdiction	Total Losses to Buildings in the Jurisdiction	Loss Ratio of Exposed Buildings to Damaged Buildings in the Jurisdiction
Garden City					
Residential	1,845	72	$273,757,865	$2,403,421	0.88%
Commercial	322	3	$199,350,721	$87,095	0.04%
Industrial	204	3	$690,091,190	$1,338,825	0.19%
Education	8	1	$24,030,240	$216	0.00%
Port Wentworth					
Residential	9,282	1	$2,694,143,053	$36,058	0.00%
Industrial	50	2	$635,651,416	$2,423,558	0.38%
Residential	3,959	24	$755,813,567	$4,989,868	0.66%
Commercial	96	2	$190,543,319	$387,172	0.20%
Savannah					
Agricultural	9	1	$38,708,479	$33,693	0.09%
Religious	349	8	$87,422,931	$167,179	0.19%
Residential	45,121	1,597	$11,487,549,681	$94,206,416	0.82%
Commercial	3,059	44	$2,821,840,981	$21,767,795	0.77%
Industrial	637	39	$2,149,012,666	$1,798,539	0.08%
Thunderbolt					
Commercial	47	19	$26,208,218	$1,671,917	6.38%
Industrial	46	11	$14,088,544	$3,346,543	23.75%
Residential	879	151	$192,081,912	$7,528,485	3.92%

Occupancy	Total Buildings in the Jurisdiction	Total Buildings Damaged in the Jurisdiction	Total Building Exposure in the Jurisdiction	Total Losses to Buildings in the Jurisdiction	Loss Ratio of Exposed Buildings to Damaged Buildings in the Jurisdiction
Tybee Island					
Commercial	81	41	$28,809,862	$708,737	2.46%
Government	2	2	$699,260	$34,484	4.93%
Religious	3	2	$227,582	$11,117	4.88%
Residential	3,276	2,388	$1,026,249,628	$119,488,151	11.64%
Industrial	6	5	$374,723	$70,450	18.80%
Vernonburg					
Residential	66	7	$48,807,676	$1,002,257	2.05%
Unincorporated					
Religious	61	3	$24,660,245	$200,500	0.81%
Education	18	2	$144,587,298	$586,419	0.41%
Industrial	224	51	$2,399,899,758	$19,371,263	0.81%
Government	16	1	$56,104,525	$5,677	0.01%
Commercial	490	43	$732,496,488	$9,917,439	1.35%
Residential	32,316	6,101	$9,717,023,077	$368,194,826	3.79%
County Total					
	102,472	10,624	$36,460,234,903	$661,778,100	

Source: HAZUS-MH

Table 2-40 – Estimated Building Damage and Content Loss for Coastal 1% Annual Chance Flood by Jurisdiction

Occupancy	Total Buildings in the Jurisdiction	Total Buildings Damaged in the Jurisdiction	Total Building Exposure in the Jurisdiction	Total Losses to Buildings in the Jurisdiction	Loss Ratio of Exposed Buildings to Damaged Buildings in the Jurisdiction
Savannah					
Agricultural	9	1	$38,708,479	$2,575	0.01%
Residential	45,121	11	$11,487,549,681	$539,248	0.00%
Tybee Island					
Residential	3,276	34	$1,026,249,628	$1,796,547	0.18%
Commercial	81	1	$28,809,862	$30,268	0.11%
Unincorporated					
Residential	32,316	98	$9,717,023,077	$9,420,854	0.10%
Commercial	490	2	$732,496,488	$9,321	0.00%
County Total					
	81,293	147	$23,030,837,214	$11,798,813	

Source: HAZUS-MH

The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all buildings located within the 100-year floodplain) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from a flood. Loss ratios for all occupancy types with identified structures in Chatham County are well above 10%, meaning that in the event of a flood with a magnitude of the 1%-

annual-chance event or greater, the planning area would face extreme difficulty in recovery. Even smaller, more probabilistic floods may also result in the county having difficulty recovering.

Essential facilities may encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). The analysis identified 12 essential facilities that were subject to damage in the Chatham County riverine 1% probability floodplain; no essential facilities were subject to damage in the 1% coastal floodplain. The critical facilities that may be at risk of damages from a 1% riverine flood event are identified in Table 2-41.

Table 2-41 – Riverine 1% Flood Damaged Essential Facilities

Name	Category	City
Oaks at Pooler	Medical Care	Pooler
Chatham County Health Department	Medical Care	Savannah
Georgia Regional Hospital	Medical Care	Savannah
Chatham EMS Station #7	Fire Station	Savannah
Chatham Fire Station #11	Fire Station	Savannah
Chatham Fire Station #15	Fire Station	Tybee Island
City of Tybee Island Fire Department	Fire Station	Tybee Island
Bloomingdale Police Department	Police Station	Bloomingdale
Largo-Tibet Elementary School	School	Savannah
Tybee Island Maritime Academy	School	Tybee Island
7012 Skidaway Mar Ext	School	Savannah
7015 Skidaway Shellfish	School	Savannah

According to FEMA flood insurance policy records as of November 30, 2024, there have been a total of 5,431 flood losses reported in Chatham County through the NFIP since 1978 (note, not all jurisdictions had joined the NFIP at this time) totaling over $80 million in claim payments. A summary of these figures by jurisdiction can be found in Table 2-42. Note that these figures include only losses to structured insured under the NFIP and for losses were claimed under the program and granted payouts. It is highly likely that additional losses occurred in Chatham County that were either uninsured, denied claim payments, or simply not reported. Further detail on NFIP policies is provided in individual jurisdictional annexes.

Table 2-42 – Summary of Insured Flood Losses by Jurisdiction

Jurisdiction	Number of Policies	Number of Claims	Total Claims Payments
Bloomingdale	192	29	$293,341
Garden City	201	83	$2,166,765
Pooler	1030	92	$1,146,998
Port Wentworth	149	48	$357,273
Savannah	5,655	2,373	$33,023,932
Thunderbolt	314	49	$1,062,458
Tybee Island	2,698	747	$14,431,181
Unincorporated Areas	13,738	2,010	$27,887,835
Chatham County Total	**23,977**	**5,431**	**$80,369,783**

Source: Federal Emergency Management Agency, National Flood Insurance Program Community Information System, Accessed November 2019

Changes in development can impact vulnerability by increasing flood risk. The Hazard Mitigation Planning Committee noted that new development results in an increase in impervious surface and elevation changes outside of the SFHA, which has increased stormwater runoff, altered drainage patterns, and exacerbated flooding. For example, new development can be built in areas prone to flooding, and that development can also cause changes to the floodplain and flood flows that cause existing properties to become exposed to flood. Properly elevating new development, limiting fill, requiring compensatory storage, and other development restrictions can mitigate the impacts of new development on flood risk.

Repetitive Loss Analysis

A repetitive loss property is a property for which two or more flood insurance claims of more than $1,000 have been paid by the NFIP within any 10-year period since 1978. An analysis of repetitive loss was completed to examine repetitive losses within the planning area.

According to 2024 NFIP records, there are a total of 587 repetitive loss properties within the Chatham County planning area, of which 38.39 percent are insured. Data was not available on the occupancy type of these properties; however, it can be reasonably assumed that the majority are residential. The 2016 plan was the last plan with access to repetitive loss data (2014) and reported that nearly all of the then 395 repetitive loss properties were single-family residential while the remaining few were non-residential (commercial). Table 2-43 summarizes repetitive loss properties by jurisdiction as identified by FEMA through the NFIP and reported in the Georgia Mitigation Information System (GMIS).

Table 2-43 – Repetitive Loss Properties by Jurisdiction

Jurisdiction	Total Number of Properties	Total Number of Losses	Number of Properties Insured	Number Properties Mitigated	Most Recent Date of Loss
Bloomingdale	1	3	0.0	1	01/14/1993
Chatham County	143	336	782	16	11/7/2021
Garden City	2	4	2	0	09/11/2017
Pooler	8	21	3	0	6/20/2023
Port Wentworth	5	15	1	0	5/22/2017
Savannah	323	844	60	133	9/13/2022
Thunderbolt	3	6	2	0	9/11/2022
Tybee Island	102	227	79	6	8/25/2018
Vernonburg	0	0	N/A	N/A	N/A
Total	**587**	**1456**	**929**	**156**	**-**

Source: NFIP as of 02/25/2024

Environment

During a flood event, chemicals and other hazardous substances may end up contaminating local water bodies. Flooding kills animals and in general disrupts the ecosystem. Snakes and insects may also make their way to the flooded areas.

Floods can also cause significant erosion, which can alter streambanks and deposit sediment, changing the flow of streams and rivers and potentially reducing the drainage capacity of those waterbodies.

Consequence Analysis

Table 2-44 summarizes the potential detrimental consequences of flooding.

Table 2-44 – Consequence Analysis - Flood

Category	Consequences
Public	Localized impact is expected to be severe for incident areas and moderate to light for other adversely affected areas.
Responders	First responders are at risk when attempting to rescue people from their homes. They are subject to the same health hazards as the public. Flood waters may prevent access to areas in need of response, or the flood may prevent access to the critical facilities themselves, which may prolong response time. Damage to personnel will generally be localized to those in the flood areas at the time of the incident and is expected to be limited.
Continuity of Operations (including Continued Delivery of Services)	Floods can severely disrupt normal operations, especially when there is a loss of power. Damage to facilities in the affected area may require temporary relocation of some operations. Localized disruption of roads, facilities, and/or utilities caused by incident may postpone delivery of some services.
Property, Facilities and Infrastructure	Buildings and infrastructure, including transportation and utility infrastructure, may be damaged or destroyed. Impacts are expected to be localized to the area of the incident. Severe damage is possible.
Environment	Chemicals and other hazardous substances may contaminate local water bodies. Wildlife and livestock deaths are possible. The localized impact is expected to be severe for incident areas and moderate to light for other areas affected by the flood.
Economic Condition of the Jurisdiction	Local economy and finances will be adversely affected, possibly for an extended period of time. During floods (especially flash floods), roads, bridges, farms, houses and automobiles are destroyed. Additionally, the local government must deploy firemen, police and other emergency response personnel and equipment to help the affected area. It may take years for the affected communities to be rebuilt and business to return to normal.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective.

Hazard Summary by Jurisdiction

Table 2-45 summarizes flood hazard risk. Flood risk due to storm surge, high tide flooding, flash flooding, and stormwater flooding exists across the entire county. All participating jurisdictions have at least some area in SFHA and are thus exposed to a high risk of flooding; given that other sources of flooding and other levels of flooding may occur beyond these areas, the spatial extent was considered moderate for all jurisdictions. Impact ratings were based upon HAZUS loss estimates; only Bloomingdale had an overall loss estimate below 10% and was rated with an impact of limited, while remaining jurisdictions were rated with an impact of critical. All communities also face a uniform probability of flooding.

Table 2-45 –Flood Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	4	3	3	3	3	3.3	H
Bloomingdale	4	2	3	3	3	3.0	H
Garden City	4	3	3	3	3	3.3	H
Pooler	4	3	3	3	3	3.3	H
Port Wentworth	4	3	3	3	3	3.3	H
Savannah	4	3	3	3	3	3.3	H
Thunderbolt	4	3	3	3	3	3.3	H
Tybee Island	4	3	3	3	3	3.3	H
Vernonburg	4	3	3	3	3	3.3	H

2.5.7 Tropical Cyclone (Hurricane and Tropical Storm)

Hazard Background

Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in the Atlantic basin is about six.

While hurricanes pose the greatest threat to life and property, tropical storms and depressions also can be devastating. A tropical disturbance can grow to a more intense stage through an increase in sustained wind speeds. The progression of a tropical disturbance is described below.

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

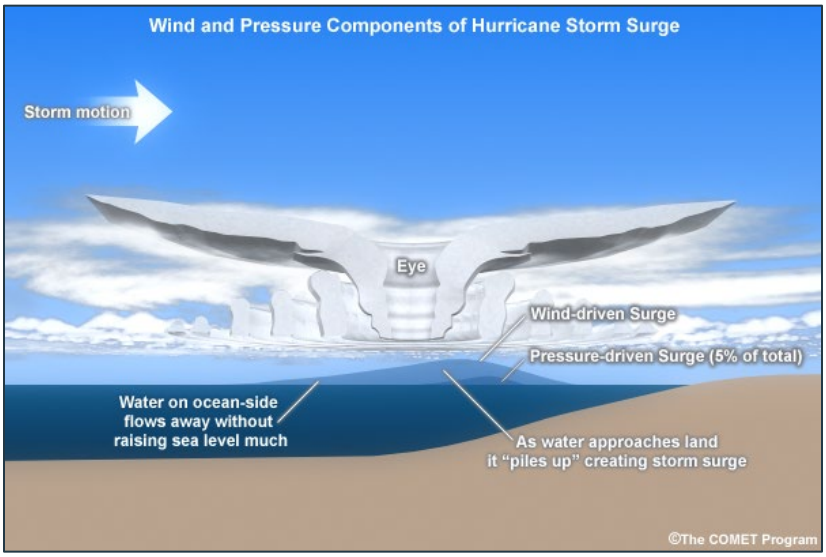
As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricanes are given a classification based on the Saffir-Simpson Scale; this scale is reproduced in Table 2-46.

The greatest potential for loss of life related to a hurricane is from the storm surge. Storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm as shown in Figure 2-19. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level to heights impacting roads, homes and other critical infrastructure. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides.

The maximum potential storm surge for a location depends on several different factors. Storm surge is a very complex phenomenon because it is sensitive to the slightest changes in storm intensity, forward speed, size (radius of maximum winds-RMW), angle of approach to the coast, central pressure (minimal

contribution in comparison to the wind), and the shape and characteristics of coastal features such as bays and estuaries. Other factors which can impact storm surge are the width and slope of the continental shelf and the depth of the ocean bottom. A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. A shallow slope, as is found off the coast of Chatham County, will produce a greater storm surge than a steep shelf.

Figure 2-19 – Components of Hurricane Storm Surge



Source: NOAA/The COMET Program

Damage during hurricanes may also result from inland flooding from associated heavy rainfall.

Similar to hurricanes, nor'easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their strong winds and heavy surf. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful.

Nor'easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding. There are two main components to a nor'easter: (1) a Gulf Stream low-pressure system (counter-clockwise winds) generated off the southeastern U.S. coast, gathering warm air and moisture from the Atlantic, and pulled up the East Coast by strong northeasterly winds at the leading edge of the storm; and (2) an Arctic high-pressure system (clockwise winds) which meets the low-pressure system with cold, arctic air blowing down from Canada. When the two systems collide, the moisture and cold air produce a mix of precipitation and can produce dangerously high winds and heavy seas. As the low-pressure system deepens, the intensity of the winds and waves increases and can cause serious damage to coastal areas as the storm moves northeast.

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than 1 week

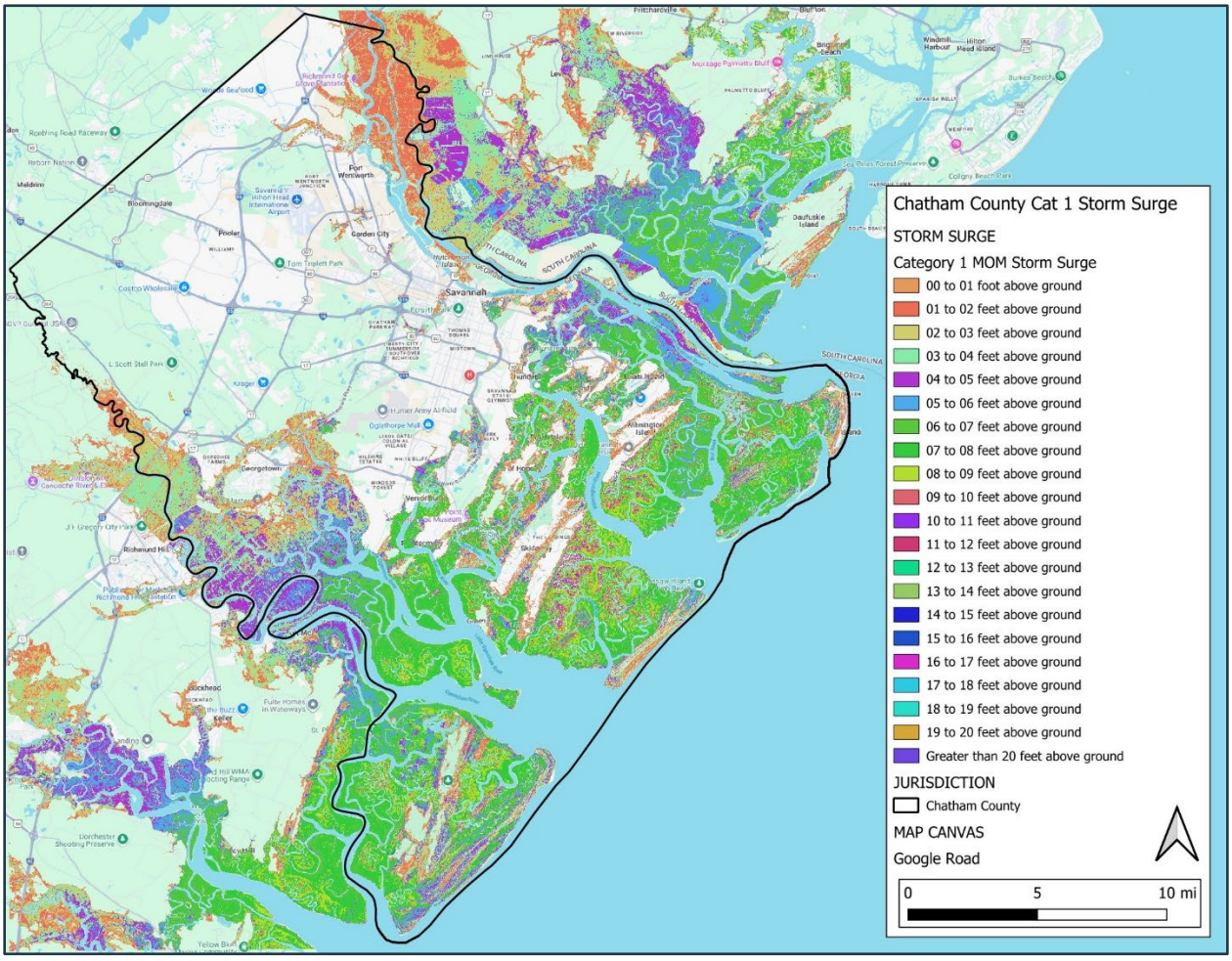
Location

Hurricanes and tropical storms can occur anywhere within the Chatham County planning area. While coastal areas are most vulnerable to hurricanes, their wind and rain impacts can be inland. Storm surge

impacts are more limited, affecting areas along coastal and estuarine shorelines reaching further inland depending on the height of the surge. All of Chatham County is vulnerable to tropical cyclone surge, but to varying degrees, with areas closer to the coast and water bodies that drain into the coast (namely the Savannah and Ogeechee Rivers and their tributaries) facing greater risk than areas further inland.

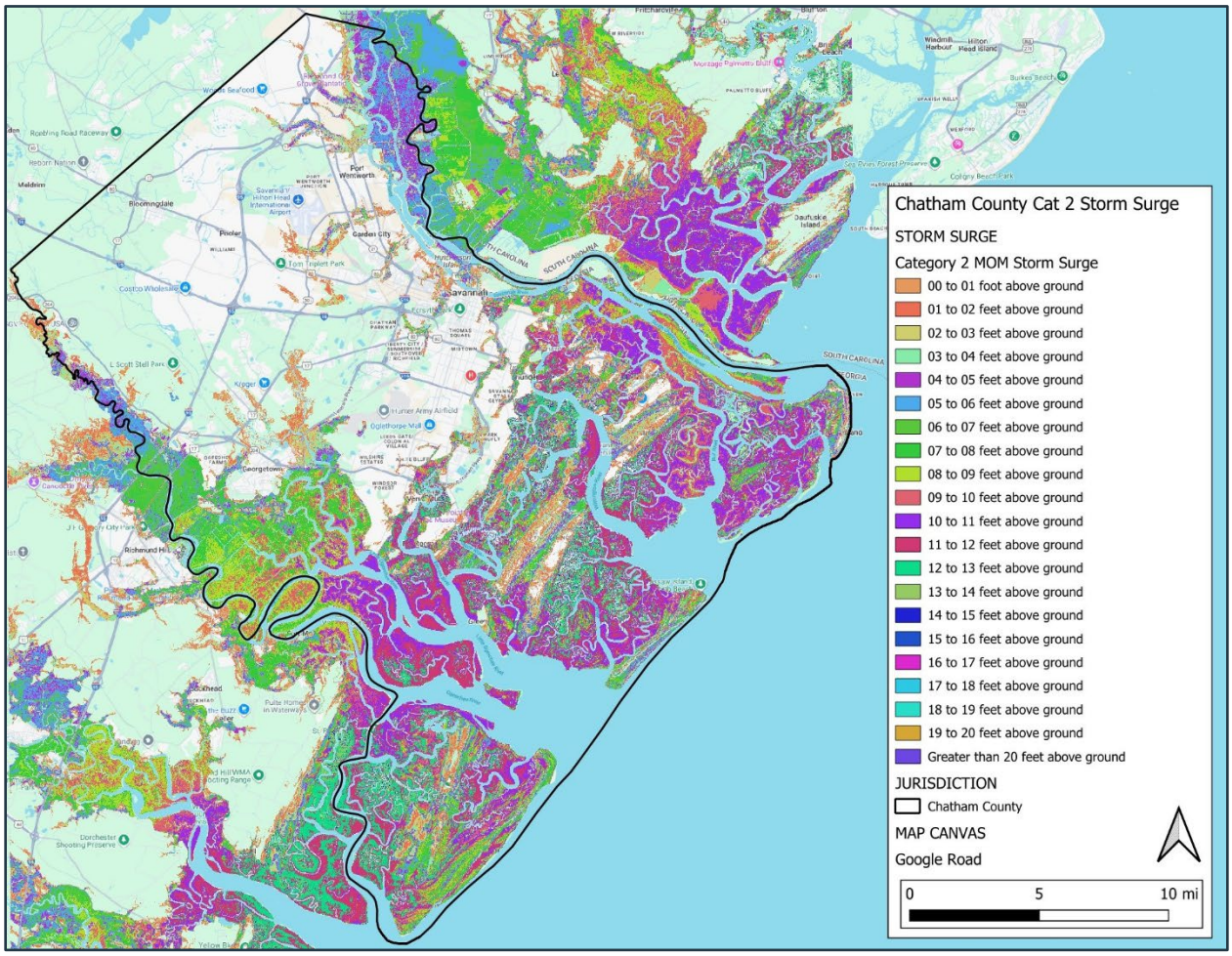
Figure 2-20 through Figure 2-24 show the estimated extent of surge by storm category according to NOAA Sea, Lake, and Overland Surges from Hurricanes (SLOSH) data. the SLOSH model is a computerized numerical model developed by the National Weather Service to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure, size, forward speed, and track data. The model creates output for all different storm simulations from all points of the compass. Each direction has a MEOW (maximum envelope of water) for each category of storm (1-5), and all directions combined result in a MOMs (maximum of maximums) set of data. Note that the MOM does not illustrate the storm surge that will occur from any given storm but rather the full potential extent of surge from all possible storms. As shown in these maps, Chatham County is vulnerable to storm surge impacts from all storm categories.

Figure 2-20 – Category 1 Storm Surge Inundation



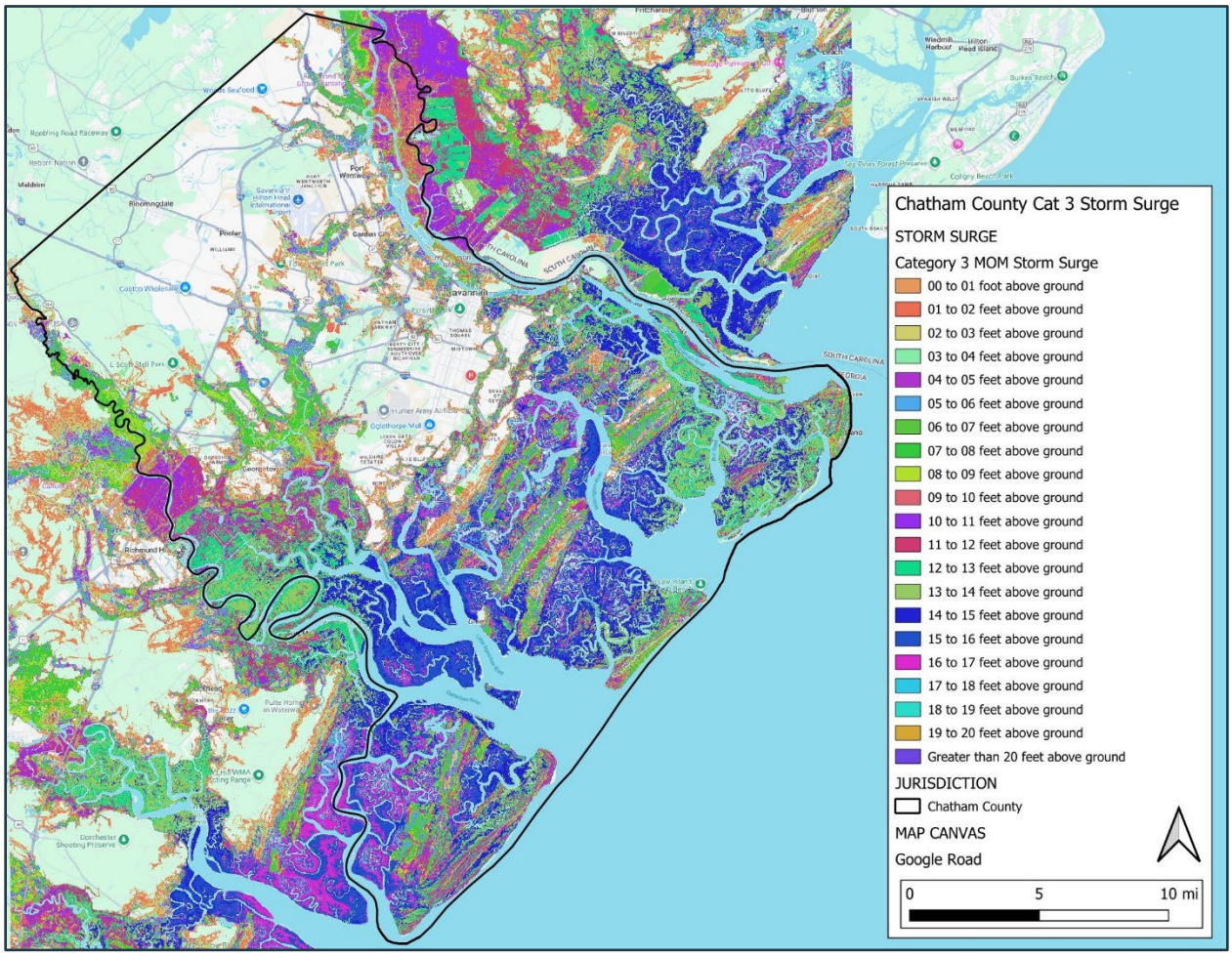
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 2-21 – Category 2 Storm Surge Inundation



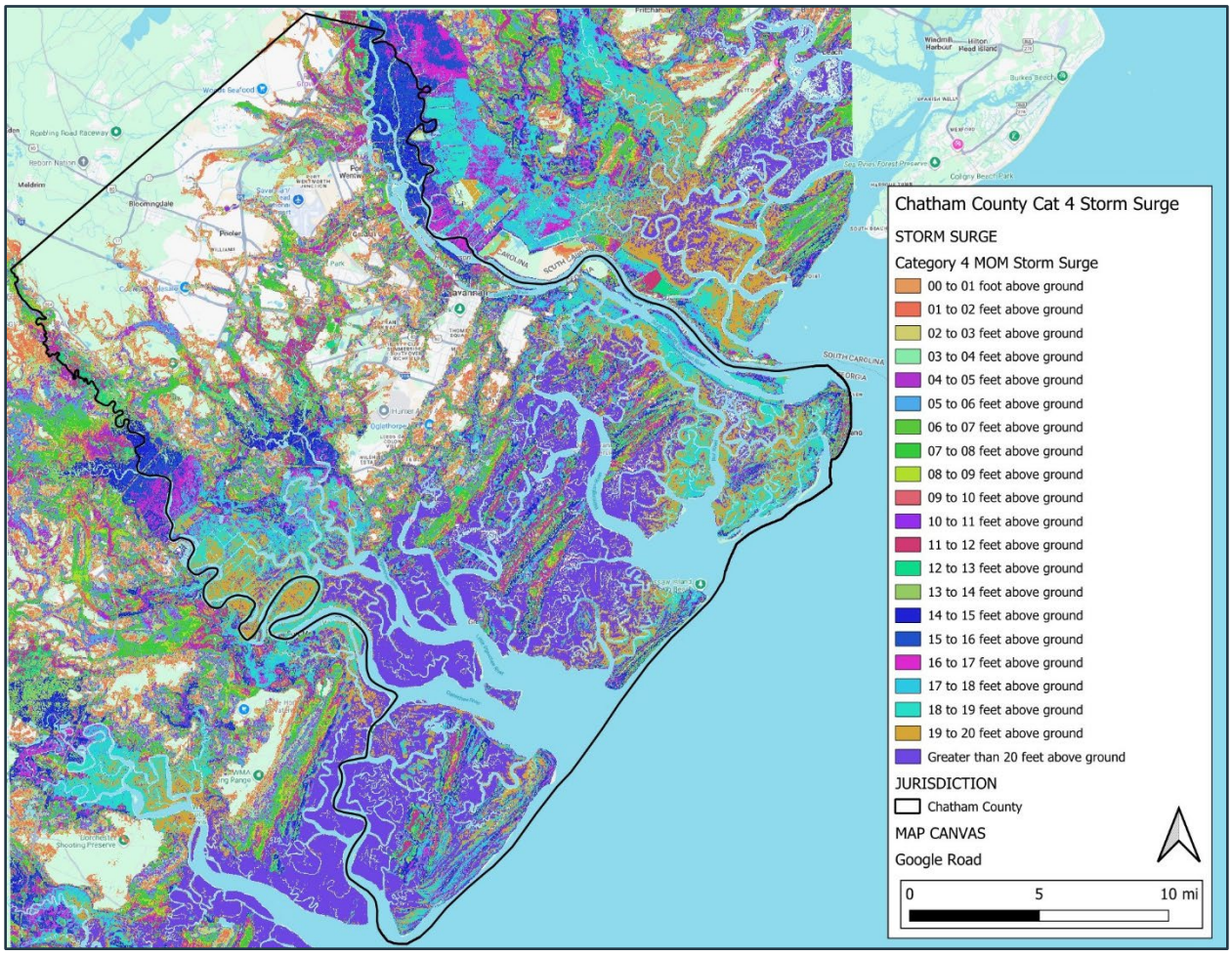
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 2-22 – Category 3 Storm Surge Inundation



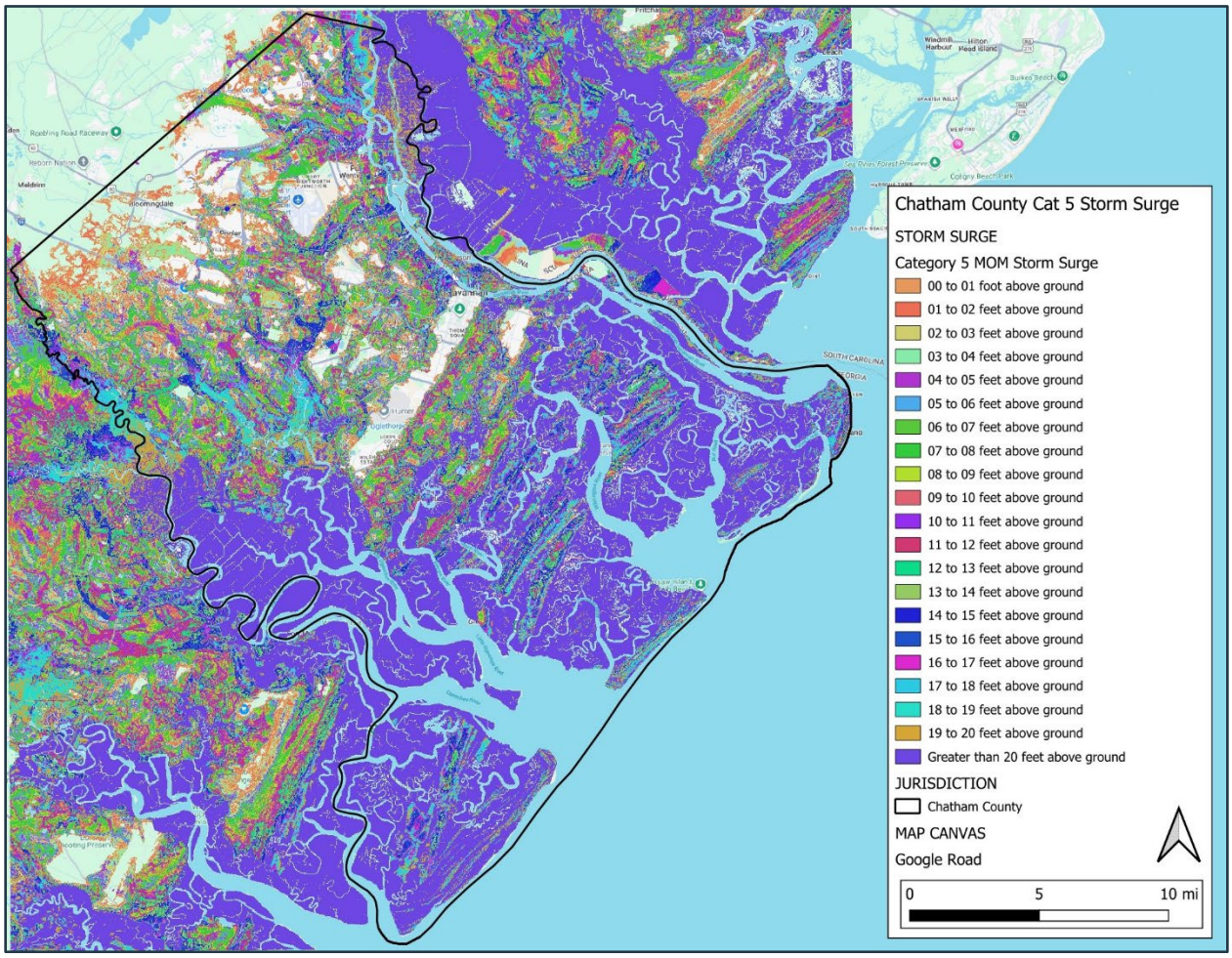
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 2-23 – Category 4 Storm Surge Inundation



Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 2-24 – Category 5 Storm Surge Inundation



Source: NOAA National Storm Surge Hazard Maps – Version 2

Extent

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (Table 2-46), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

Table 2-46 – Saffir-Simpson Scale

Category	Maximum Sustained Wind Speed (MPH)	Types of Damage
1	74–95	Very dangerous winds will produce some damage; Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96–110	Extremely dangerous winds will cause extensive damage; Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111–129	Devastating damage will occur; Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130–156	Catastrophic damage will occur; Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 +	Catastrophic damage will occur; A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as “major” hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. Table 2-47 describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

Table 2-47 – Hurricane Damage Classifications

Storm Category	Damage Level	Description of Damages	Photo Example
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.	
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.	
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland.	
4	EXTREME	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.	
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.	

Source: National Hurricane Center; Federal Emergency Management Agency

The Saffir-Simpson scale provides a measure of extent of a hurricane. The county is susceptible to the full force of every category of hurricane.

Impact: 4 – Catastrophic

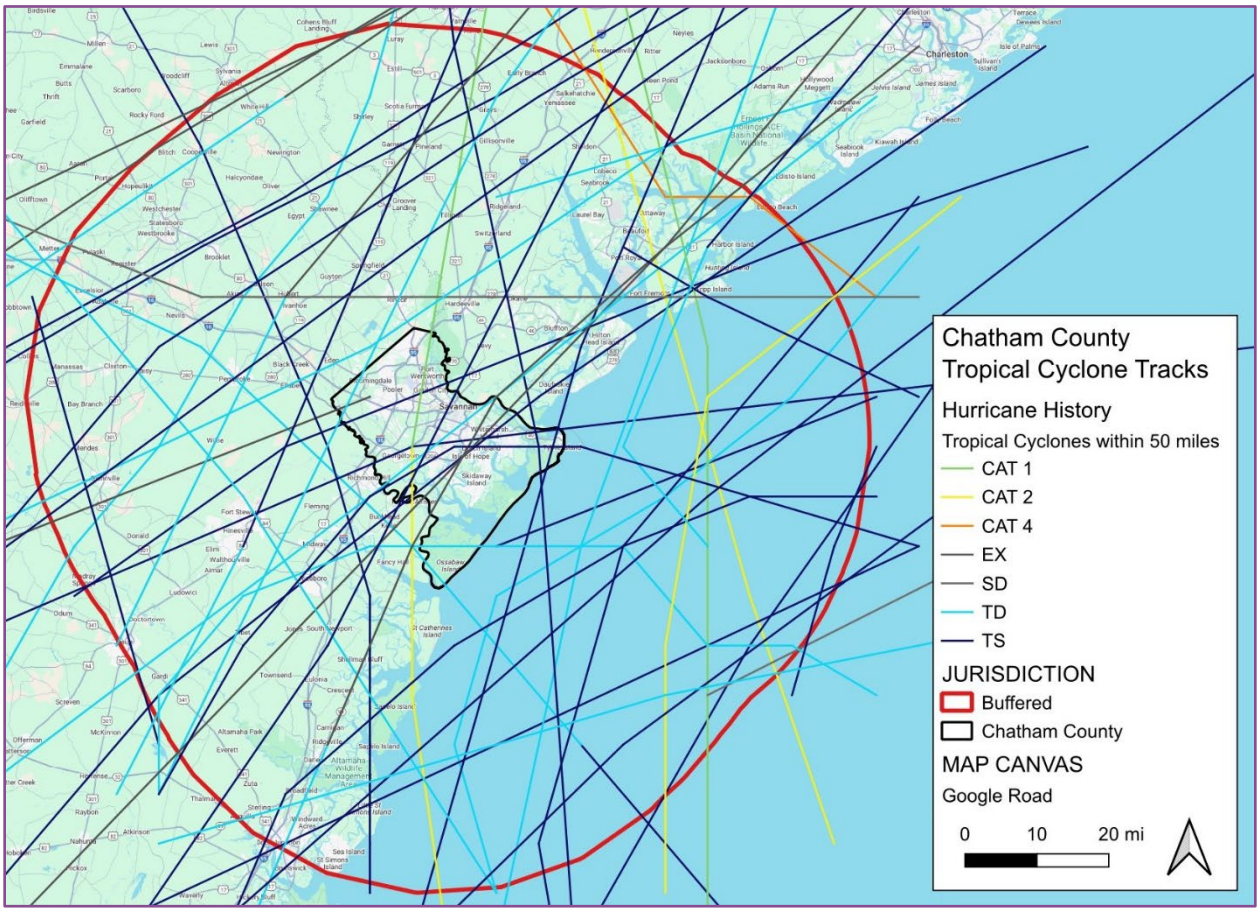
Spatial Extent: 4 – Large

Historical Occurrences

Since 1999, Chatham County has received four FEMA Major Disaster Declarations and four Emergency Declarations for hurricanes and tropical storms. According to the Office of Coastal Management's Tropical Cyclone Storm Segments data, which is a subset of the International Best Track Archive for Climate Stewardship (IBTrACS) dataset, 36 named hurricanes and tropical storms passed within 50 miles of Chatham County between 1950 and 2024. These storm tracks are shown in Figure 2-25.

NOAA's Historical Hurricane Tracks database inventories storm tracks since 1850, but the benchmark for hurricane history is accepted at 1950 when the National Weather Service began naming storms The date, storm name, storm category, and maximum wind speed of storms that have passed within 50 miles of Chatham County since 1950 are detailed in Table 2-48. In total, NOAA has records of 49 storm tracks passing within 50 miles of Chatham County between 1950 and 2024.

Figure 2-25 – Hurricane/Tropical Storm Tracks within 50 miles of Chatham County, 1950-2024



Source: Office of Coastal Management, 2025; Digital Coast; https://www.coast.noaa.gov/digitalcoast/data/

Table 2-48 – Tropical Cyclone Tracks Passing within 50 Miles of Chatham County, 1950-2024

Storm Name	Date	Max Storm Category*	Max Wind Speed (kts)
Love	10/22/1950	Tropical Depression	70
Able	8/31/1952	Category 2	85
Unnamed	9/1/1953	Tropical Storm	35
Florence	9/27/1953	Extratropical Storm	100
Unnamed	7/10/1954	Tropical Storm	45
Flossy	9/26/1956	Extratropical Storm	80
Unnamed	6/9/1957	Tropical Storm	55
Gracie	9/29/1959	Category 4	115
Brenda	7/29/1960	Tropical Storm	60
Cleo	8/29/1964	Tropical Storm	130
Dora	9/13/1964	Tropical Storm	115
Hilda	10/5/1964	Extraterritorial Storm	120
Alma	6/10/1966	Tropical Storm	110
Abby	6/7/1968	Tropical Storm	65
Alma	5/25/1970	Tropical Depression	70
Unnamed	9/11/1971	Tropical Depression	25
Dawn	9/13/1972	Tropical Depression	70
Unnamed	5/24/1976	Tropical Storm	45

Storm Name	Date	Max Storm Category*	Max Wind Speed (kts)
Dottie	8/20/1976	Tropical Storm	45
Unnamed	9/15/1976	Tropical Storm	40
Unnamed	6/16/1979	Tropical Depression	30
David	9/4/1979	Category 2	150
Unnamed	7/3/1981	Tropical Depression	30
Dennis	8/19/1981	Tropical Storm	70
Unnamed	6/18/1982	Tropical Storm	60
Isidore	9/29/1984	Tropical Storm	50
Bob	7/24/1985	Category 1	65
Claudette	8/9/1985	Tropical Depression	75
Isabel	10/11/1985	Tropical Storm	60
Kate	11/22/1985	Category 1	105
Charley	8/15/1986	Tropical Depression	70
Chris	8/28/1988	Tropical Storm	45
Gordon	11/21/1994	Tropical Depression	75
Allison	6/6/1995	Tropical Depression	65
Josephine	10/8/1996	Extratropical Storm	60
Earl	9/3/1998	Tropical Storm	85
Gordon	9/18/2000	Tropical Depression	70
Kyle	10/11/2002	Tropical Storm	40
Unnamed	7/26/2003	Tropical Depression	30
Bonnie	8/13/2004	Tropical Depression	55
Charley	8/14/2004	Category 1	130
Alberto	6/14/2006	Tropical Storm	60
Barry	6/3/2007	Tropical Depression	50
Beryl	5/30/2012	Tropical Storm	60
Andrea	6/7/2013	Tropical Storm	55
Colin	6/7/2016	Tropical Storm	45
Hermine	9/2/2016	Tropical Storm	70
Julia	9/14/2016	Tropical Storm	45
Matthew	10/8/2016	Category 3	135
Unnamed	8/28/2017	Tropical Storm	35
Eta	11/12/2020	Tropical Storm	38
Danny	6/28/2021	Tropical Storm	37
Elsa	06/30/2021	Tropical Storm	40
Mindy	9/9/2021	Tropical Storm	30
Colin	7/1/2022	Tropical Storm	35
Idalia	8/30/2023	Tropical Storm	60
Debby	8/06/2024	Tropical Storm	40

*Reports the most intense category that occurred within 50 miles of Chatham County, not for the storm event overall.
Source: Office of Coastal Management, 2025; Historical Hurricane Tracks

The above map of storms is not an exhaustive list of hurricanes that have affected Chatham County. Several storms have passed further than 50 miles away from the County yet had strong enough wind or rain to cause impacts. NCEI records hurricane and tropical storm events across the region by county and zone; therefore, one event that impacts multiple jurisdictions may be recorded multiple times. During the 25-year period from 1999 through 2024, NCEI recorded 19 hurricanes and tropical storms impacting Chatham County. These events are summarized in Table 2-49. Where property damage estimates were broken out by type, NCEI reports only the value of wind-related damages, however flooding associated

with such events often causes the majority of damage. Event narratives following this table provide a fuller scope of the impacts from selected events.

Table 2-49 – NCEI Recorded Hurricanes and Tropical Storms in Chatham County, 1999-2024

Date	Storm	Deaths/ Injuries	Property Damage	Crop Damage
9/15/1999	Hurricane Floyd	0/0	$0	$0
9/27/2004	Tropical Storm Jeanne	0/0	$0	$0
10/5/2005	Tropical Storm Tammy	0/0	$0	$0
6/12/2006	Tropical Storm Alberto	0/0	$0	$0
8/30/2006	Tropical Storm Ernesto	0/0	$0	$0
8/21/2008	Tropical Storm Fay	0/0	$1,500	$0
5/27/2012	Tropical Storm Beryl	0/0	$1,000	$0
6/6-6/7/2013	Tropical Storm Andrea	0/0	$1,000	$0
9/2/2016	Tropical Storm Hermine	0/0	$0	$0
10/7-10/8/2016	Hurricane Matthew	1/1	$0	$0
9/11/2017	Hurricane Irma	0/0	$5,000,000	$0
10/10/2018	Tropical Storm Michael	0/0	$0	$0
9/4/2019	Tropical Storm Dorian	0/0	$0	$0
6/8/2021	Tropical Storm Claudette	0/0	$0	$0
7/7/2021	Tropical Storm Elsa	0/0	$0	$0
9/29/2022	Tropical Storm Ian	0/0	$0	$0
8/30/2023	Tropical Storm Idalia	0/0	$0	$0
8/5/2024	Tropical Storm Debby	0/0	$0	$0
10/2/2024	Hurricane Helene	0/0	$0	$0
Total		**1/1**	**$5,003,500**	**$0**

Source: NCEI, Captured 6/03/2025

September 15, 1999 – Hurricane Floyd approached from the south but turned more northeast on the afternoon of the 15th and just brushed southeast Georgia. Well over 200,000 citizens in the affected counties evacuated the area. Because Floyd turned to the northeast, damage was minimal and confined mostly to the coastal counties. Scattered trees and a few power lines were down. Highest winds over land were 40 mph with a gust to 53 mph at the Savannah Airport. Maximum tide at Savannah was 12.39 ASL (8.69 MLLW) with a maximum departure of 3.3 feet.

June 6-7, 2013 – Tropical Storm Andrea lifted northeast out of the Gulf of Mexico Thursday night and over southeast Georgia and southeast South Carolina into Friday. Periods of heavy rain and damaging wind gusts occurred with showers and thunderstorms associated with the tropical system as it passed over the area and eventually to the northeastern United States. The storm winds caused many downed trees and limbs. One tree fell and blocked a roadway, and another fell on the corner of a house.

September 2, 2016 – Hermine developed as a Tropical Depression near the north coast of Cuba on August 28th. According to the National Hurricane Center, Hermine made landfall as a Category 1 Hurricane at 1:30 am EDT on September 2nd along the Florida Big Bend coast. Across southeast Georgia and southeast South Carolina, the main impacts from Hermine included heavy rain and wind damage in the form of scattered to numerous trees being blown down. Storm total rainfall amounts generally ranged from 2 to 8 inches across the region. The wind damage produced numerous power outages and even some damage to homes and other structures throughout the area. Hermine spawned 2 tornadoes and produced a 1.5 to 2.5-foot storm surge along the coast, though no flooding was reported. Chatham County Emergency

Management Agency reported trees down throughout the county. At Hunter Army Airfield, trees were blown down across the base with numerous power outages. One tree fell on a house along Florance Street in downtown Savannah which caused significant structural damage. Heavy rain also caused some roofs to leak. The ASOS site at KSAV measured a peak wind gust of 55 miles per hour and the AWOS site at KSVN measured a peak wind gust of 49 miles per hour. One tree fell on a house along Florance Street in downtown Savannah which caused significant structural damage. Mesonet observation sites in the coastal portion of Chatham County measured peak wind gusts ranging from 54 to 63 miles per hour.

September 11, 2017 – Irma first developed into a tropical storm on August 30th about 420 miles west of the Cabo Verde Islands, and within 24 hours strengthened into a hurricane. Irma continued to intensify and officially made landfall at Marco Island, FL at 3:35 pm September 10 as a Category 3 hurricane. Irma steadily weakened 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 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 peak storm total rainfall of 4.74" was recorded at the Savannah-Hilton Head International Airport (KSAV). This 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. Wind speeds were high across the county with gusts of up to 70 mph. Inland, gusts were up to 63 mph with sustained wind speeds as high as 49 mph. The entire southeast Georgia coast was impacted by storm surge generally ranging from 3 to 6 feet. 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 $20,000,000 in Chatham County.

September 4, 2019 – Chatham County Emergency Management Agency reported numerous trees down across the entire county due to strong winds associated with Hurricane Dorian. Some power lines were also down causing isolated to scattered power outages. The Weatherflow site on the north end of Tybee Island measured peak sustained winds of 38 mph and a peak wind gust of 60 mph. The Weatherflow site on the south end of Tybee Island measured peak sustained winds of 41 mph and a peak wind gust of 55 mph. The NOS tide gauge at Fort Pulaski measured peak sustained winds of 44 mph and a peak wind gust of 58 mph.

August 4-9, 2024 – Tropical Storm Debby tracked across Southeast Georgia as a tropical storm (45 mph) before slowly emerging off the Southeast Coast at tropical storm strength (40 mph) near Tybee Island, Georgia on August 6th. Across Southeast Georgia, the main impacts associated with Debby included flash flooding due to widespread heavy rainfall and scattered tree damage associated with near tropical storm force winds. Prolonged heavy rainfall across Southeast Georgia brought widespread flash flooding on August 5th and 6th, additional areas of flash flooding on August 7th and 8th, along with considerable and prolonged flooding of creeks, streams and main stem rivers for several days thereafter. Numerous homes and roads were flooded, leading to rescues and/or evacuations. Storm total rainfall amounts from August 4th to August 9th generally ranged between 5 to 14 inches with highest amounts across inland areas along a stretch from Tattnall County to Screven County and into parts of Evans County and Effingham County. The highest water level at the Fort Pulaski (FPKG1) tide gauge was 1.68 ft MHHW during the evening of

August 5th. Chatham County Emergency Management reported 1 tree down on a house on the east side of Savannah in Coastal Chatham. The county also recorded riverine flooding along the Ogeechee River and its tributaries. A maximum sustained wind of 45 mph and gust of 55 mph occurred at Tybee South (XTYE) during the event.

September 26, 2024 – Chatham County Emergency Management requested a preemptive emergency declaration in preparation for the impacts of Hurricane Helene. By October 2, Helene was declared a Major Disaster for dozens of Georgia counties including Chatham. Helene caused "unprecedented" damages due primarily to high winds and flooding, prompting Georgia's first-ever temporary sheltering program for survivors of the storm. Helene produced extensive damages across the region, even disrupting NOAA's data centers. The storm caused three deaths in Chatham County due to the improper use of a generator during the extensive power outages. Note: Detailed 2024 data from NOAA, including data regarding Hurricane Helene, is not yet available.

In addition to wind impacts, Chatham County is vulnerable to damage from storm surge flooding caused by hurricanes. Historical records of storm surge damages are compiled in Section 2.5.6 Flood.

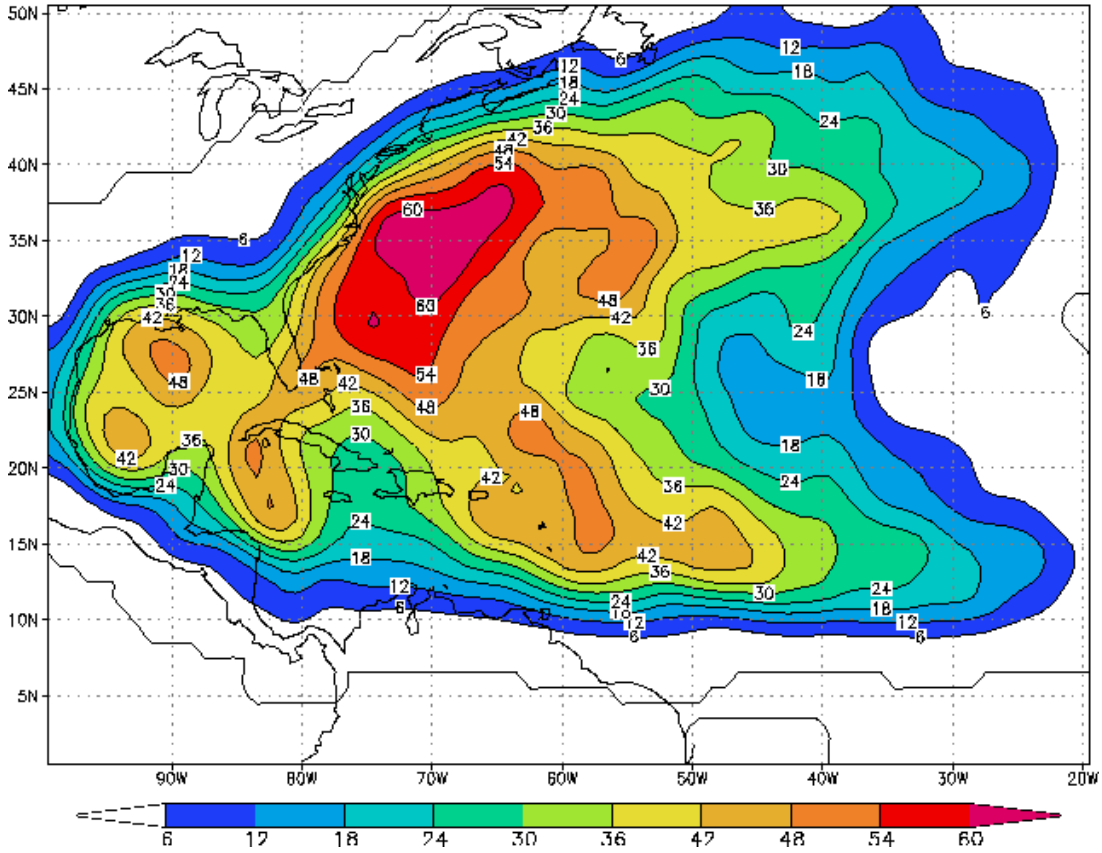
Probability of Future Occurrence

Probability: 3 – Likely

In period from 1999 through 2024, 19 hurricanes and tropical storms have impacted Chatham County, which equates to a 76 percent annualized probability of hurricane or tropical storm force winds impacting the planning area in any given year. This probability does not account for impacts from hurricane rains or storm surge, which may also be severe. The probability of a hurricane or tropical storm impacting Chatham County is likely.

Figure 2-26 shows, for any particular location, the chance of a hurricane or tropical storm affecting the area sometime during the Atlantic hurricane season. The figure was created by the National Oceanic and Atmospheric Administration's (NOAA) Hurricane Research Division, using data from 1944 to 1999. The figure shows the number of times a storm or hurricane was located within approximately 100 miles (165 kilometers) of a given spot in the Atlantic basin.

Figure 2-26 – Empirical Probability of a Named Hurricane or Tropical Storm



Source: National Oceanic and Atmospheric Administration, Hurricane Research Division

Colorado State University's (CSU) Tropical Cyclones, Radar, Atmospheric Modeling, and Software Team (TC-RAMS) calculates the impacts of tropical cyclones for each state and county in the Atlantic and Gulf Coast regions. Their methodology utilizes all named storms, hurricanes, and major hurricanes that have tracked within 50 miles of each land area from 1880-2020. Long-term statistics show that, on average, the more active the overall Atlantic basin hurricane season is, the greater the probability of U.S. hurricane landfall. The CSU tropical cyclone impact probability for Chatham County is provided in Table 2-50.

Table 2-50 – Tropical Cyclone Impact Probabilities for 2025

2025 Forecast Probability of Named Storm Impact	2025 Forecast Probability of Hurricane Impact	2025 Forecast Probability of Major Hurricane Impact	Average Probability of Named Storm Impact	Average Probability of Hurricane Impact
44%	16%	3%	40%	14%

Source: CSU TC-RAMS, https://tropical.colostate.edu/TC_impact.html

Georgia's 100 miles of coastland is shaped in a way that helps hide it from the direct hit of most storms. Direct hits do happen; however, they are less frequent than Florida and North Carolina. The state is still vulnerable to the impacts of hurricanes and tropical storms as detailed in this section. Substantial hurricane damage is typically most likely to be expected in the easternmost counties of the state; however, hurricane and tropical storm-force winds have significantly impacted areas far inland.

Climate Change

Chatham County's coastal location makes it a prime target for hurricane landfalls and changing climate and weather conditions may increase the number and frequency of future hurricane events. Hurricanes and other coastal storms may result in increased flooding, injuries, deaths, and extreme property loss. According to the US Government Accountability Office, national storm losses from changing frequency and intensity of storms are projected to increase anywhere from $4-6 billion in the near future.

According to NOAA, weather extremes will likely cause more frequent, stronger storms in the future due to rising surface temperatures. NOAA models predict that while there may be less frequent, low-category storm events (Tropical Storms, Category 1 Hurricanes), there will be more high-category storm events (Category 4 and 5 Hurricanes) in the future. This means that there may be fewer hurricanes overall in any given year, but when hurricanes form, it is more likely that they will become large storms that can create massive damage.

Vulnerability Assessment

Methodologies and Assumptions

Property at risk to hurricanes was estimated using general building stock information and 2020 Census data in HAZUS. The vulnerability data displayed below is only for wind-related damages. Hurricanes may also cause substantial damages from heavy rains and subsequent flooding, which is addressed in Section 2.5.6 Flood.

People

The very young, the elderly and the disabled are especially vulnerable to harm from hurricanes. For those who are unable to evacuate for medical reasons, there should be provision to take care of special-needs patients and those in hospitals and nursing homes. Many of these patients are either oxygen- dependent, insulin-dependent, or in need of intensive medical care. There is a need to provide ongoing treatment for these vulnerable citizens, either on the coast or by air evacuation to upland hospitals. The stress from disasters such as a hurricane can result in immediate and long-term physical and emotional health problems among victims.

HAZUS-MH estimates the number of households evacuated from buildings with severe damage from high velocity winds as well as the number of people who will require short-term sheltering. The results are listed in Table 2-51.

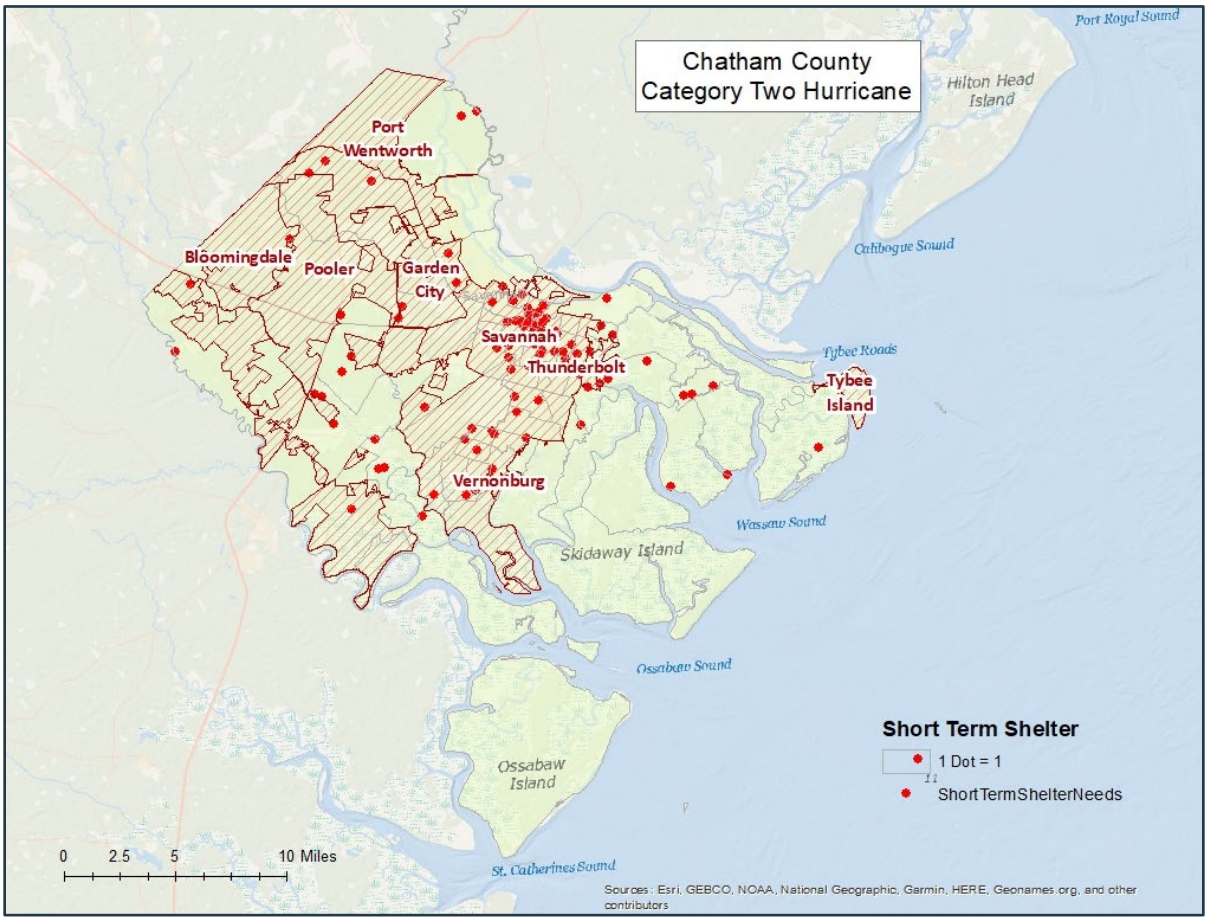
Table 2-51 – Displaced Households and People. Category 2 Hurricane Wind Scenario

Classification	Number of Displaced Households	Number of People Needing Short-Term Shelter
Category Two	360	103

Source: GMIS HAZUS Report, 2025

Figure 2-27 – Shelter Requirements, Category 2 Hurricane Wind Scenario shows a distribution of shelter needs within each census tract. The number of dots in each census tract reflects the number of persons who are anticipated to need short term shelter supplied by the government. Dots are randomly distributed within each census tract. While the figure may be used to understand regional patterns of need, it does not specify the exact location of either the persons needing shelter or the recommended locations of shelters within a census tract.

Figure 2-27 – Shelter Requirements, Category 2 Hurricane Wind Scenario



Storm surge can cause loss of function or habitability of buildings that contain housing units, resulting in approximately predictable numbers of displaced households. These households may need alternative short-term shelter. For units where repairs take longer than a few weeks, long-term alternative housing can be required.

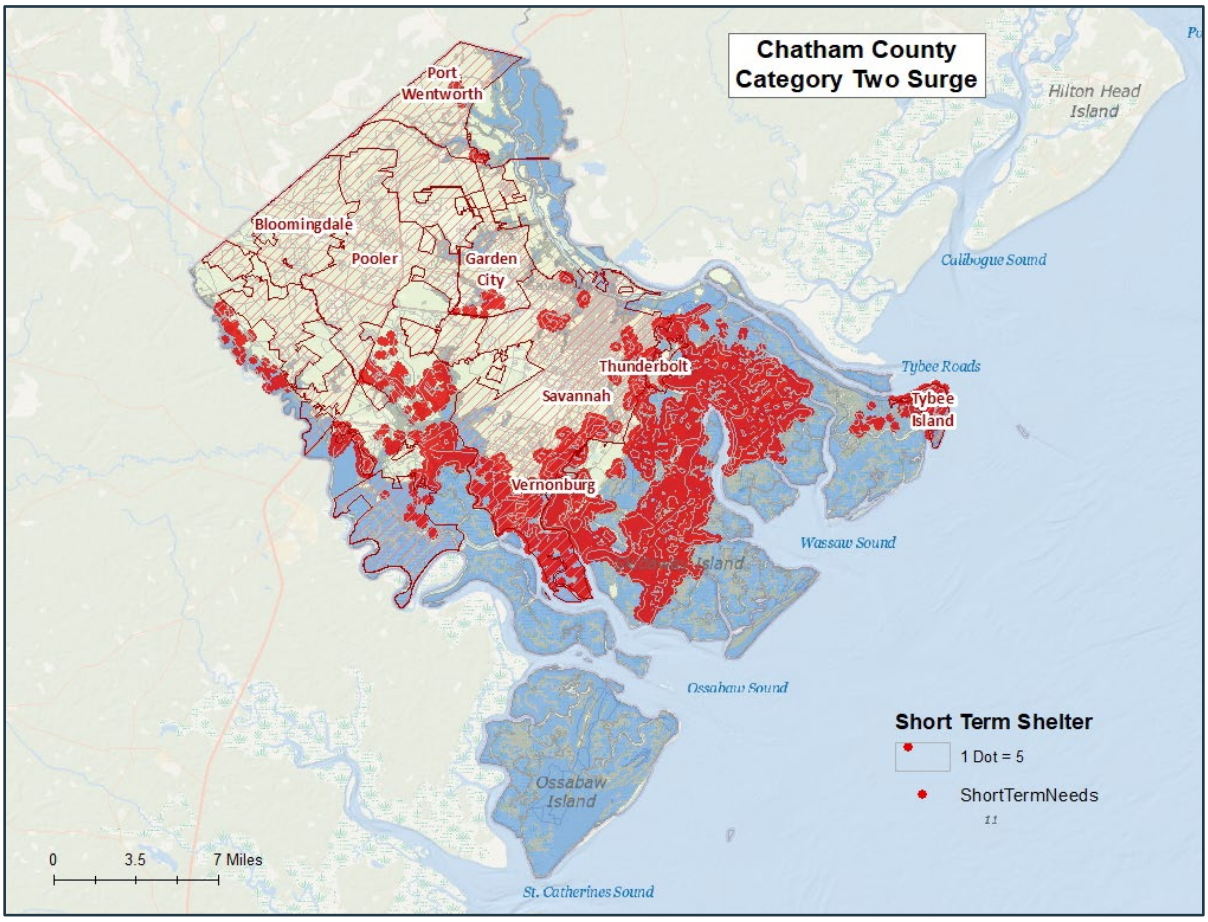
HAZUS estimates the number of people evacuated from buildings with severe damage from storm surge as well as the number of people who will require short-term sheltering in public shelters. The results are listed in Table 2-52 and mapped in Figure 2-28. The points on the map reflect the number of people estimated to require public shelter in a given census tract as opposed to either the location of those people or the locations of shelters that might serve those individuals.

Table 2-52 – Displaced Households and People. Category 2 Storm Surge Scenario

Classification	Number of Displaced Households	Number of People Needing Short-Term Shelter
Category Two	53,536	48,956

Source: GMIS HAZUS Report, 2025

Figure 2-28 – Shelter Requirements, Category 2 Storm Surge Scenario



Individuals in mobile homes are more vulnerable to hurricane winds, especially if their unit does not have tie downs and other wind safety measures. Overall, there are 5,600 mobile home units in Chatham County, detailed in Table 2-53. Over 10 percent of the housing stock in Bloomingdale, Garden City, and Port Wentworth are mobile home units. Additionally, there are over 1,000 mobile home units in unincorporated Chatham County and Savannah. These communities may face more severe impacts from hurricane events as a result.

Table 2-53 – Mobile Home Units by Jurisdiction, 2023

Jurisdiction	Total Housing Units	Mobile Home Units	Mobile Home Units, Percent of Total
Unincorporated Chatham County	40,147	1,882	4.69%
Bloomingdale	1,334	116	8.70%
Garden City	4,708	928	19.71%
Pooler	12,008	508	4.23%
Port Wentworth	4,854	78	1.60%
Savannah	68,153	917	1.35%
Thunderbolt	1,442	84	5.83%
Tybee Island	3,337	0	0%
Vernonburg	63	0	0%
Total	**136,046**	**4,513**	**3.32%**

Source: American Community Survey 2018-2023 5-Year Estimates

Property

Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Hurricanes can produce winds exceeding 157 mph as well as tornadoes and microbursts. Additionally, hurricanes often bring intense rainfall that can result in flash flooding. Floods and flying debris from the excessive winds are often the deadly and most destructive results of hurricanes.

HAZUS was used to determine hurricane risk based on probabilistic parameters for the 100-year and 500-year return periods. This analysis produced estimates of the likelihood of varying levels of damage as well as building-related economic losses. Note that HAZUS only assesses hurricane wind and does not account for any other hazards associated with hurricane.

Buildings in Chatham County are vulnerable to storm events, and the cost to rebuild may have significant consequences for the community. The following table shows a summary of the results of wind-related building damage in Chatham County for the Category Two (100 Year Event) storm. The loss ratio expresses building losses as a percentage of total building replacement cost in the county. Figure 2-29 illustrates the building loss ratios of the modeled Category Two storm. It is important to note that wind damaged buildings are not reported by jurisdiction. This is due to the fact that census tract boundaries – upon which hurricane building losses are based – do not closely coincide with jurisdiction boundaries.

Table 2-54 provides building wind damage estimates for the scenario.

Figure 2-29 – Building Loss Ratio

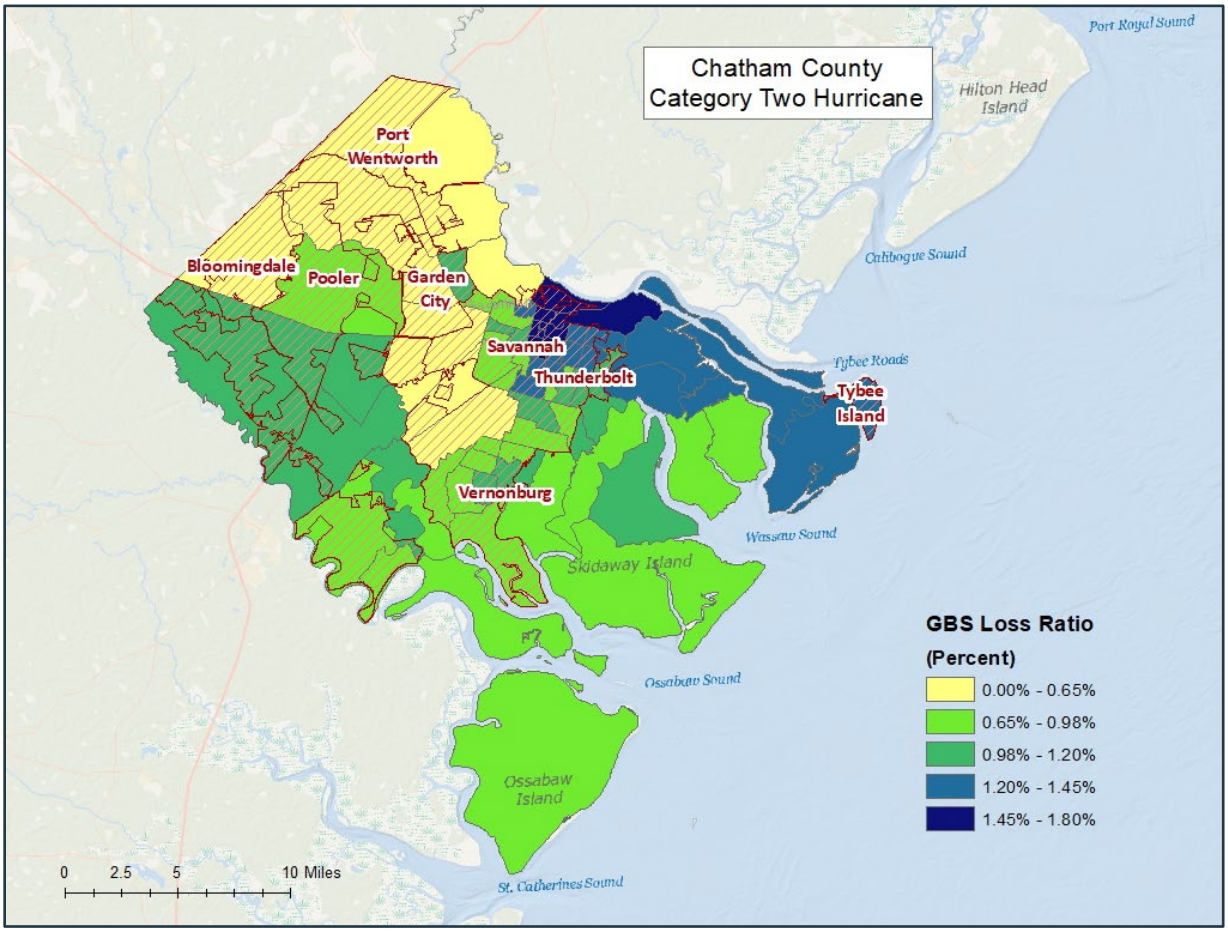


Table 2-54 – Hurricane Wind Building Damage – Category 2 Hurricane Scenario

Classification	Number of Buildings Damaged	Total Building Damage	Total Economic Loss	Loss Ratio
Category Two	16,055	$402,209,870	$628,238,370	0.99%

Source: GMIS HAZUS Report, 2025

Essential facilities are also vulnerable to tropical cyclone wind, and the potential loss of functionality may have significant consequences for the community. HAZUS identified the essential facilities that may be moderately or severely damaged by winds. The results are compiled in Table 2-55.

Table 2-55 – Hurricane Wind Essential Facility Damage – Category 2 Hurricane Scenario

Classification	Facilities at Least Moderately Damaged > 50%	Facilities Completely Damaged >50%	Facilities with Expected Loss of Use (<1 Day)
Category Two	3	o	200

Source: GMIS HAZUS Report, 2025

Table 2-56 provides the likelihood of damage at varying levels of severity by occupancy type. During the probabilistic Category 2 hurricane scenario, it's estimated that less than 18.87% of buildings in the county are likely to sustain damages.

Table 2-56 – Storm Surge Building Losses – Category Two Hurricane Scenario

Occupancy	Total Buildings in the Jurisdiction	Total Buildings Damaged in the Jurisdiction	Total Building Exposure in the Jurisdiction	Total Losses to Buildings in the Jurisdiction	Loss Ratio of Buildings to Damaged Buildings in the Jurisdiction
Garden City					
Residential	1,845	69	$273,757,865	$1,919,328	0.70%
Commercial	322	16	$199,350,721	$212,445	0.11%
Industrial	204	6	$690,091,190	$181,755	0.03%
Pooler					
Residential	9,282	1	$2,694,143,053	$25,499	0.001%
Port Wentworth					
Industrial	50	2	$635,651,416	$1,203,432	0.19%
Residential	3,959	21	$755,813,567	$581,340	0.08%
Commercial	96	2	$190,543,319	$149,907	0.08%
Savannah					
Agricultural	9	2	$38,708,479	$86,825	0.22%
Religious	349	10	$87,422,931	$130,171	0.15%
Residential	45,121	2,670	$11,487,549,681	$134,400,085	1.17%
Commercial	3,059	52	$2,821,840,981	$18,445,754	0.65%
Education	109	1	$647,027,450	$46,399	0.01%
Industrial	637	51	$2,149,012,666	$1,881,616	0.09%
Thunderbolt					
Industrial	46	36	$14,088,544	$3,240,693	23.00%
Residential	879	242	$192,081,912	$18,902,088	9.84%
Education	4	1	$17,186,600	$8,825	0.05%

Occupancy	Total Buildings in the Jurisdiction	Total Buildings Damaged in the Jurisdiction	Total Building Exposure in the Jurisdiction	Total Losses to Buildings in the Jurisdiction	Loss Ratio of Buildings to Damaged Buildings in the Jurisdiction
Commercial	47	29	$26,208,218	$3,519,441	13.43%
Tybee Island					
Commercial	81	50	$28,809,862	$1,352,311	4.69%
Government	2	2	$699,260	$58,150	8.32%
Religious	3	3	$227,582	$26,543	11.66%
Residential	3,276	2,846	$1,026,249,628	$206,623,439	20.13%
Industrial	6	5	$374,723	$86,706	23.14%
Vernonburg					
Residential	66	35	$48,807,676	$5,408,640	11.08%
Unincorporated Chatham County					
Religious	61	9	$24,660,245	$572,396	2.32%
Residential	32,316	13,023	$9,717,023,077	$1,157,030,503	11.91%
Industrial	224	62	$2,399,899,758	$5,078,126	0.21%
Government	16	2	$56,104,525	$2,357	0.004%
Commercial	490	109	$732,496,488	$23,314,410	3.18%
Education	18	4	$144,587,298	$1,710,076	1.18%
County Total					
	102,577	**19,361**	**$37,100,418,713**	**$1,586,199,260**	**4.28%**

Source: GMIS HAZUS, 2025

Estimated property damages for the Category 2 hurricane storm surge event total $1,586,199,260, which equates to a loss ratio of 4.28 percent. FEMA considers a loss ratio of 10 percent or more to be an indicator that a community will have significant difficulty recovering from an event. Damages from an actual hurricane event would likely also involve flood impacts that would raise the damage total and likely be above FEMA's 10 percent loss ratio. Therefore, a Category Two hurricane and storm surge event may cause more serious damages that what is reported here from HAZUS.

Further GIS analysis was used to understand the compound risk associated with hurricanes due to storm surge. Table 2-57 below summarizes the number of parcels and their fair-market building value at risk from storm surge by category and jurisdiction. In total, a storm surge caused by a Category 1 hurricane could potentially impact 14,325 buildings and more than $7.5 billion in damages. A category 5 storm could lead to a storm surge potentially damaging 95,629 buildings and causing over $30.3 billion in damages.

Table 2-57 – Buildings at Risk to Storm Surge by Category

Jurisdiction	Category 1	Category 2	Category 3	Category 4	Category 5
Bloomingdale					
# Parcels	0	0	0	42	243
Total Value	--	--	--	$3,873,000	$369,837,560
Garden City					
# Parcels s	1310	434	1132	2092	2798
Total Value	$93,995,263	$299,801,163	$647,604,424	$925,132,596	$1,066,933,401
Pooler					
# Parcels	0	28	172	1861	7038
Total Value	--	$279,330,359	$330,689,614	$1,121,392,212	#3,365,573,049
Port Wentworth					
# Parcels	92	184	505	1,311	3328

Jurisdiction	Category 1	Category 2	Category 3	Category 4	Category 5
Total Value	$178,851,330	$273,576,1602	$353,976,966	765,388,383	$1,314,305,337
Savannah					
# Parcels	1806	6,555	15,438	34,166	41,428
Total Value	$618,122,562	$2,748,427,575	$5,283,287,249	$10,711,676,650	$12,930,442,370
Thunderbolt					
# Parcels	382	511	728	1,240	1.240
Total Value	$131,184,825	$154,452,425	$190,660,725	$286,744,325	$286,744,325
Tybee Island					
# Parcels	2.953	3,665	3,879	3,890	3,890
Total Value	$861,866,498	$1,097,926,783	$1,147,203,783	$1,148,883,733	$1,148,883,733
Vernonburg					
# Parcels	74	81	90	90	90
Total Value	$32,147,250	$33,223,440	$33,463,240	$33,463,240	$33,463,240
Unincorporated Chatham County					
# Parcels	10,658	18,796	26,092	34,069	36,813
Total Value	$5,600,727,484	$8,272,595,505	$10,116,091,175	$12,476,556,017	13,178,201,110

Source: SAGIS 2024 Parcel Data, GIS Analysis, NOAA SLOSH Data

Given equal vulnerability to hurricane winds across all of Chatham County, all critical facilities are considered to be at risk. Certain buildings may perform better than others based on their age and construction, among other factors. Depending on their locations, critical facilities may also be at risk of storm surge flooding.

Aside from an overall increase in exposure due to development throughout the planning area, there have been no significant changes in development in the planning area that could affect vulnerability to hurricane in Chatham County.

Environment

Aquatic species within the lake may either be displaced or destroyed. The velocity of the flood wave will likely destroy riparian and instream vegetation and destroy wetland function. The flood wave will likely cause erosion within and adjacent to streams and the coast. Deposition of eroded deposits may choke instream habitat or disrupt riparian areas. Sediments within the lake bottom and any low oxygen water from within the lake will be dispersed, potentially causing fish kills or releasing heavy metals found in the lake sediment layers.

Consequence Analysis

Table 2-58 summarizes the potential negative consequences of hurricanes and tropical storms.

Table 2-58 – Consequence Analysis – Hurricane and Tropical Storm

Category	Consequences
Public	Impacts include injury or death, loss of property, outbreak of diseases, mental trauma and loss of livelihoods. Power outages and flooding are likely to displace people from their homes. Water can become polluted such that if consumed, diseases and infection can be easily spread. Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed, resulting in cascading impacts on the public.

Category	Consequences
Responders	Localized impact expected to limit damage to personnel in the inundation area at the time of the incident. Responders may also be residential victims of hazard impacts, which could limit their ability to work or respond to calls to duty.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel from flooding or wind may require temporary relocation of some operations. Operations may be interrupted by power outages. Disruption of roads and/or utilities may postpone delivery of some services. Regulatory waivers may be needed locally. Fulfillment of some contracts may be difficult. Impact may reduce deliveries.
Property, Facilities and Infrastructure	Structural damage to buildings may occur; loss of glass windows and doors by high winds and debris; loss of roof coverings, partial wall collapses, and other damages requiring significant repairs are possible in a major (category 3 to 5) hurricane. Flooding from storm surge may also negatively impact facilities and infrastructure.
Environment	Hurricanes can devastate wooded ecosystems and remove all the foliation from forest canopies, and they can change habitats so drastically that the indigenous animal populations suffer as a result. Specific foods can be taken away as high winds will often strip fruits, seeds and berries from bushes and trees. Secondary impacts may occur; for example, high winds and debris may result in damage to an above-ground fuel tank, resulting in a significant chemical spill. Saltwater intrusion and flash flooding from hurricane-related storm surge and rain may also cause erosion, damage to vegetation, and relocation of wildlife.
Economic Condition of the Jurisdiction	Local economy and finances are adversely affected, possibly for an extended period of time, depending on damages. Intangible impacts are also likely, including business interruption and additional living expenses.
Public Confidence in the Jurisdiction's Governance	Likely to impact public confidence due to possibility of major event requiring substantial response and long-term recovery effort.

Hazard Summary by Jurisdiction

The following table summarizes tropical cyclone hazard risk by jurisdiction. Due to its coastal geography, the entire county is susceptible to the impacts of hurricanes, tropical storms, and the associated storm surges and flooding. While hurricanes have the possibility of being catastrophic across all jurisdictions, certain areas have higher vulnerability. Impacts may be greater in more highly developed areas with greater amounts of impervious surface and higher exposure in terms of both property and population density. Areas with more mobile homes are also more vulnerable to damage, while areas with higher property values have greater overall financial exposure and potential for damages. Despite these differences, all jurisdictions have the possibility for catastrophic impacts.

Table 2-59 –Tropical Cyclone Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	4	4	4	1	3	3.3	H
Bloomingdale	4	4	4	1	3	3.3	H
Garden City	4	4	4	1	3	3.3	H
Pooler	4	4	4	1	3	3.3	H
Port Wentworth	4	4	4	1	3	3.3	H
Savannah	4	4	4	1	3	3.3	H
Thunderbolt	4	4	4	1	3	3.3	H
Tybee Island	4	4	4	1	3	3.3	H
Vernonburg	4	4	4	1	3	3.3	H

2.5.8 Sea Level Rise

Hazard Background

Sea level rise is the increase in sea levels as a result of atmospheric and oceanic warming which causes water expansion as well as ice melt from ice sheets and glaciers. Sea level rise is a result of global climate change. Climate change may be due to natural internal processes or external forces such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC, 2023). Climate change is a natural occurrence in which the earth has warmed and cooled periodically over geologic time. The recent and rapid warming of the earth over the past century has been cause for concern, as this warming is very likely due to the accumulation of human-caused greenhouse gases, primarily from the burning fossil fuels and changes in land use since the pre-industrial period (IPCC, 2023). This warming is occurring almost everywhere in the world which suggests a global cause rather than changes in localized weather patterns. In 2023, IPCC reported with high confidence that Climate change has reduced food security and affected water security, hindering efforts to meet Sustainable Development Goals, with related negative impacts mainly in mid-and low latitude regions.

There are generally two separate mechanics involved in global sea level rise. The first is directly attributed to global temperature increases, which warm the oceans waters and cause them to expand. The second is attributed to the melting of ice over land which simply adds water to the oceans. Global sea level rise is likely caused by a combination of these two mechanics and can be exasperated on the local level by factors such as erosion and subsidence. The rate of sea level rise has varied throughout geologic history, and studies have shown that global temperature and sea level are strongly correlated.

Due to sea-level rise projected throughout the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion. Hazards and associated risks expected in the near term include an increase in heat-related human mortality and morbidity, food-borne, water-borne, and vector-borne diseases, mental health challenges, flooding in coastal and other low-lying cities and regions, biodiversity loss in land, freshwater and ocean ecosystems, and a decrease in food production in some regions (IPCC, 2023). Coastal Chatham County is particularly vulnerable to the effects of sea level rise due to its coastal location, subtropical environment, low topography and tourism economy.

Warning Time: 1 – More than 24 hours

Duration: 4 – More than one week

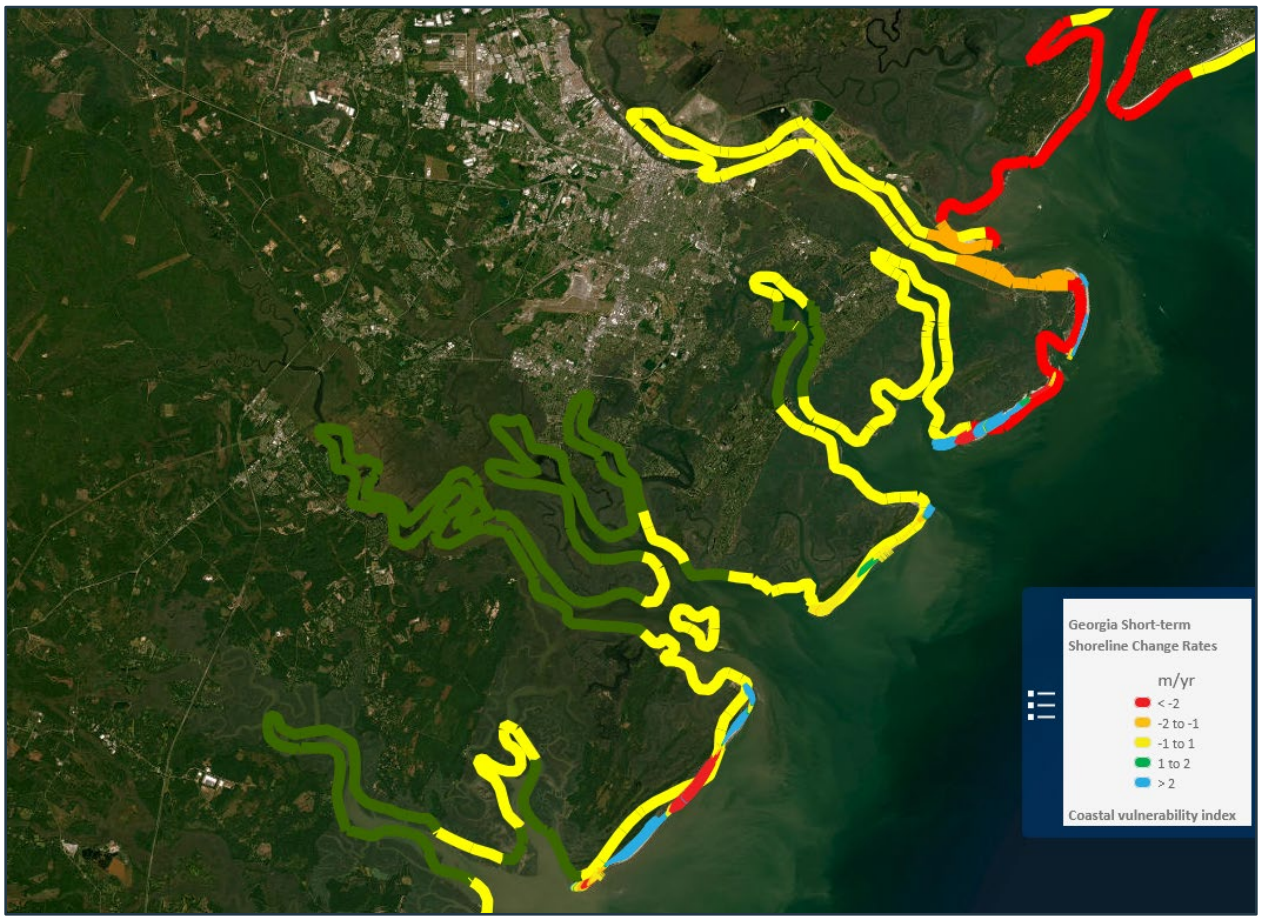
Location

Sea level rise can occur anywhere along the coast and along major waterways in Chatham County. The Coastal Vulnerability Index (CVI), developed by United States Geological Survey (USGS), provides a preliminary overview of the relative susceptibility of the United States coast to sea level rise. The CVI is based on geomorphology, regional coastal slope, tide range, wave height, relative sea level rise, and shoreline erosion and acceleration rates. For each study area, each variable is scored on a 1-5 scale based on defined parameters, where “1” indicates low contribution to coastal vulnerability and “5” indicates high contribution to vulnerability. These scores are then aggregated into a single index through a mathematical formula. The resulting index gives an overview of where physical changes may occur due to sea-level rise.

Figure 2-30 shows the CVI for Chatham County. The Atlantic Coastline at Tybee Island is the most vulnerable area in the region, rated very high. Shorelines along the Savannah River, on the border

between Georgia and South Carolina as well as the remainder of the Atlantic Coastline are all rated moderate to high vulnerability.

Figure 2-30 – Coastal Vulnerability Index, Chatham County

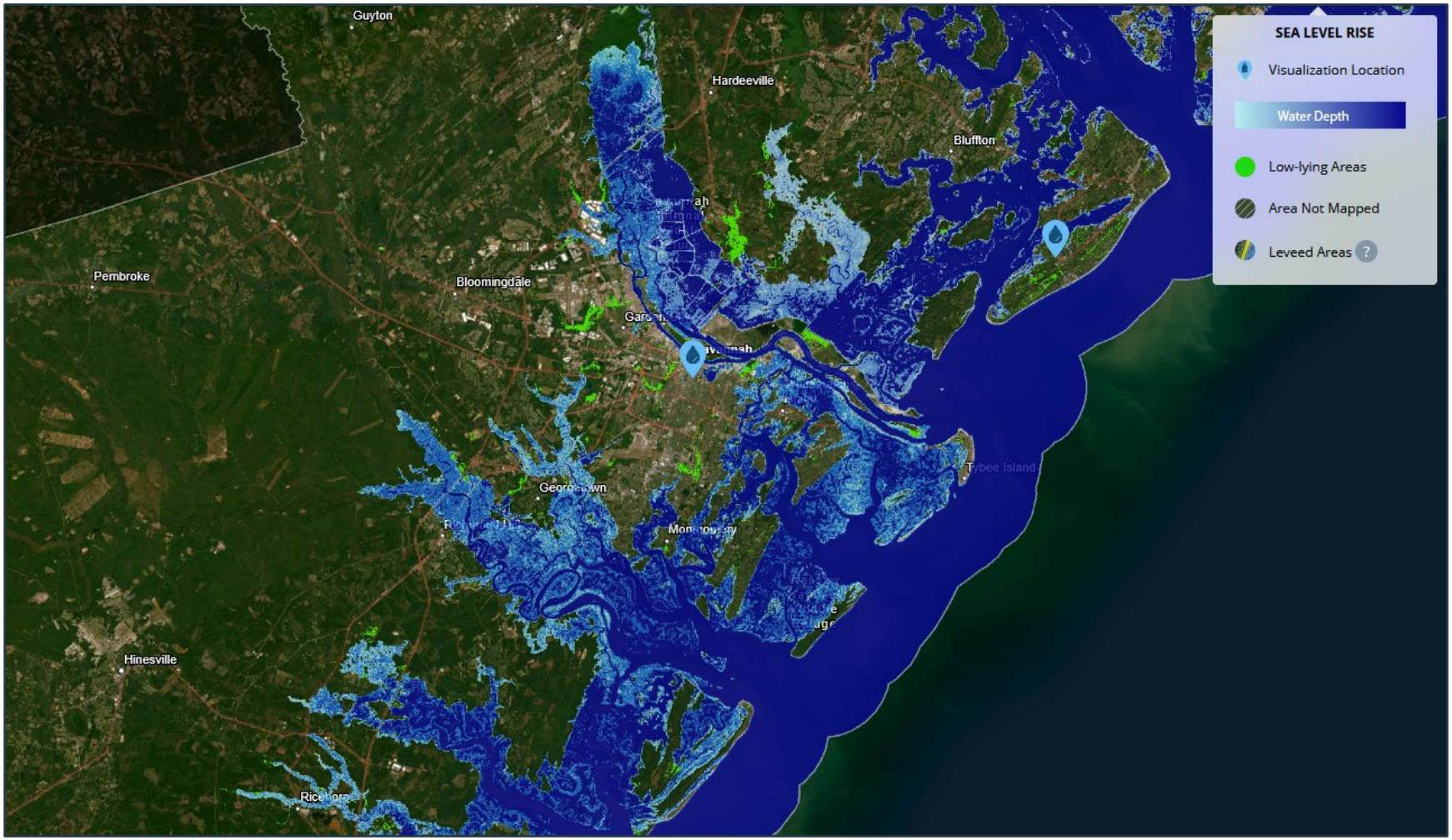


Source: USGS Coastal Change Hazards Portal

Extent

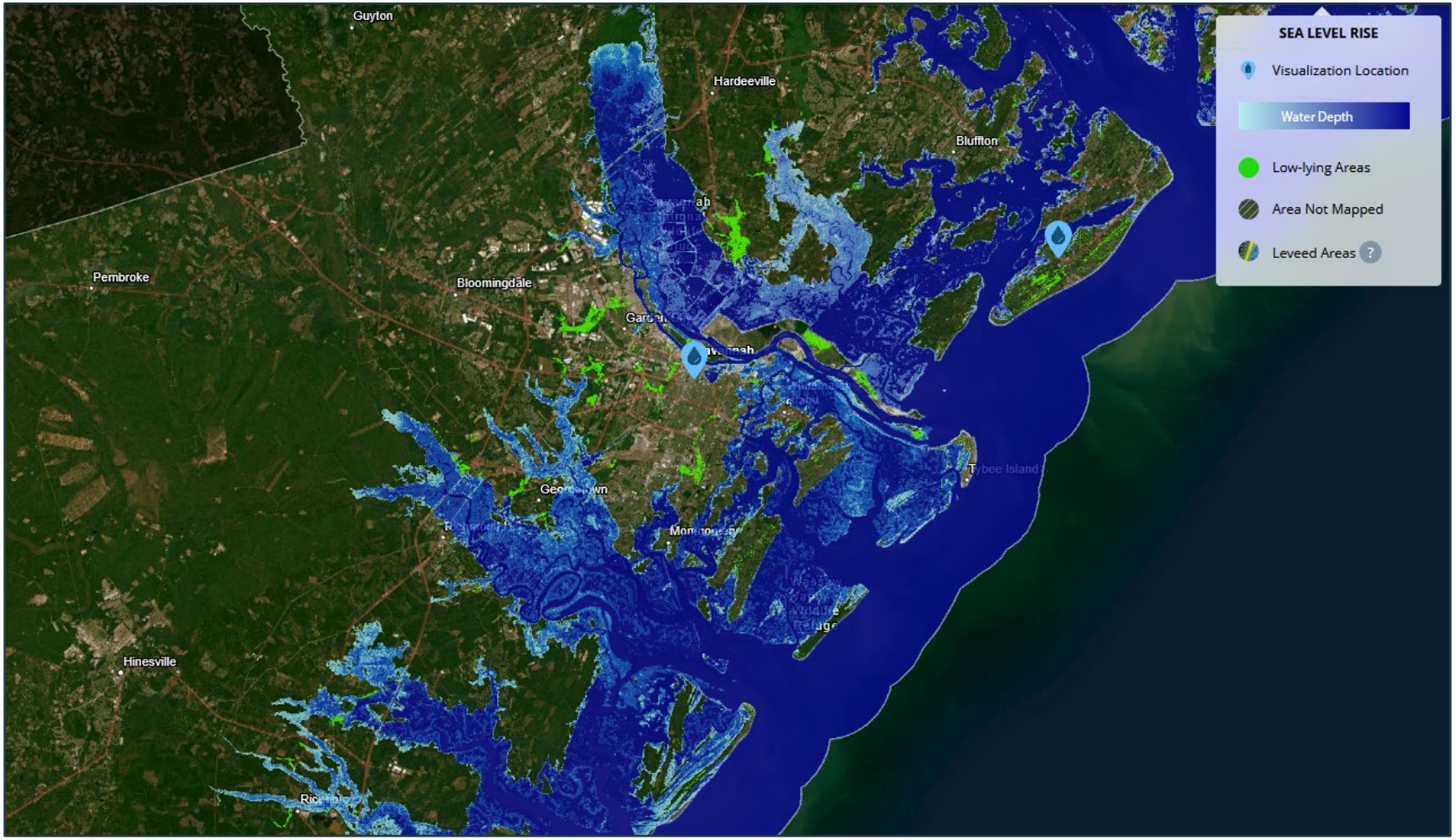
Sea level rise is measured by the number of feet of relative rise and the areas that such rise would inundate. The estimated impacts of 1-foot, 2-foot, and 3-foot, sea level rise (SLR) are shown in Figure 2-31 through Figure 2-33. The SLR estimate maps show inundation above mean higher high water (the average of each day's higher high tide line). SLR will likely affect coastal marsh lands as well as land along the Ogeechee and Savannah rivers and their tributaries. Additionally, SLR will likely increase future risk of flooding from the other flood hazards discussed later in this plan, as more land will have a lower elevation relative to sea level. For example, with much of the barrier islands and wetlands inundated, inland areas will lose their natural protection and may become susceptible to coastal flooding with velocity wave action.

Figure 2-31 – Estimated Impact of 1 Foot SLR on Chatham County



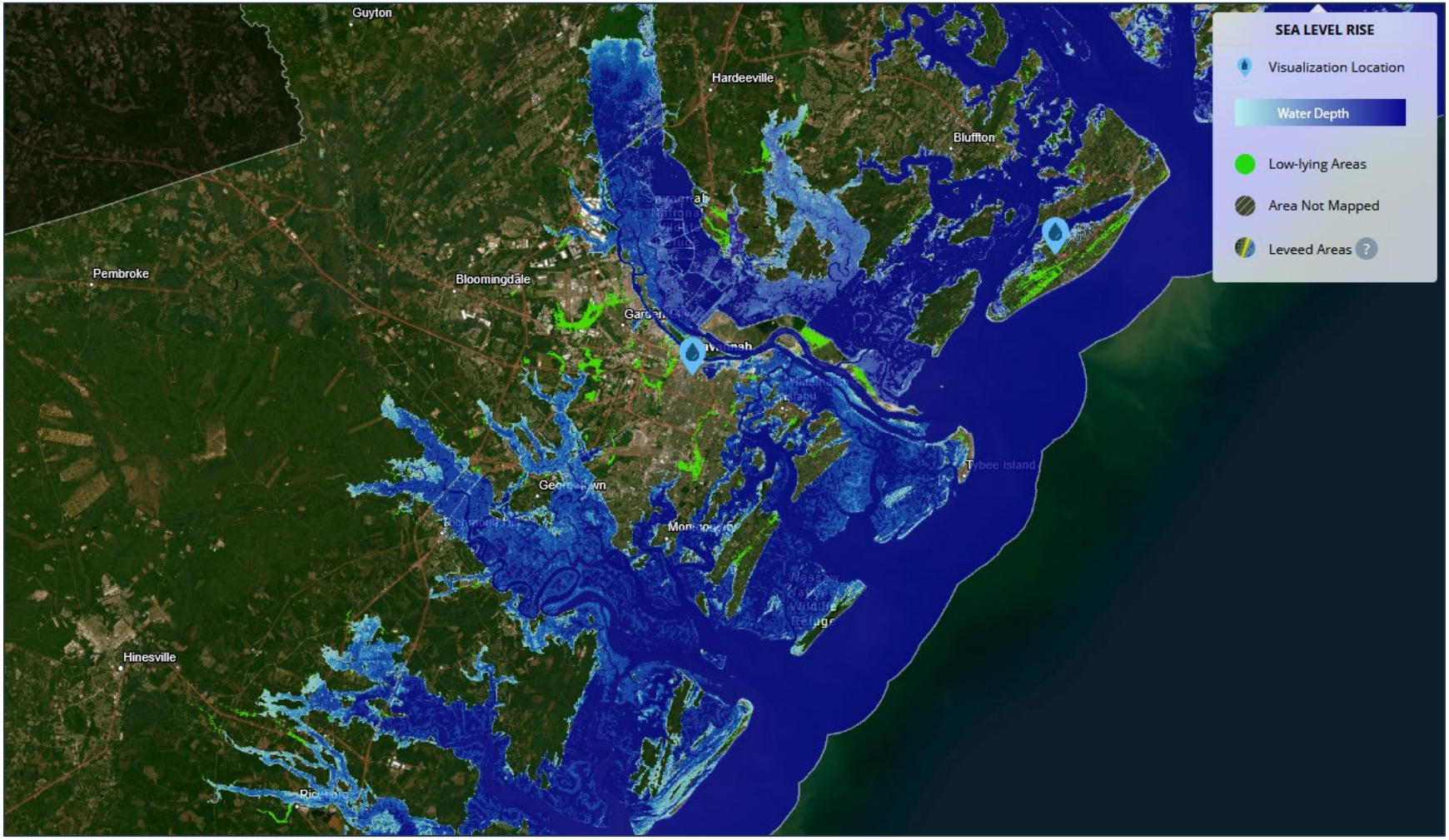
Source: NOAA Sea Level Rise Viewer

Figure 2-32 – Estimated Impact of 2 Foot SLR on Chatham County



Source: NOAA Sea Level Rise Viewer

Figure 2-33 – Estimated Impact of 3 Foot SLR on Chatham County



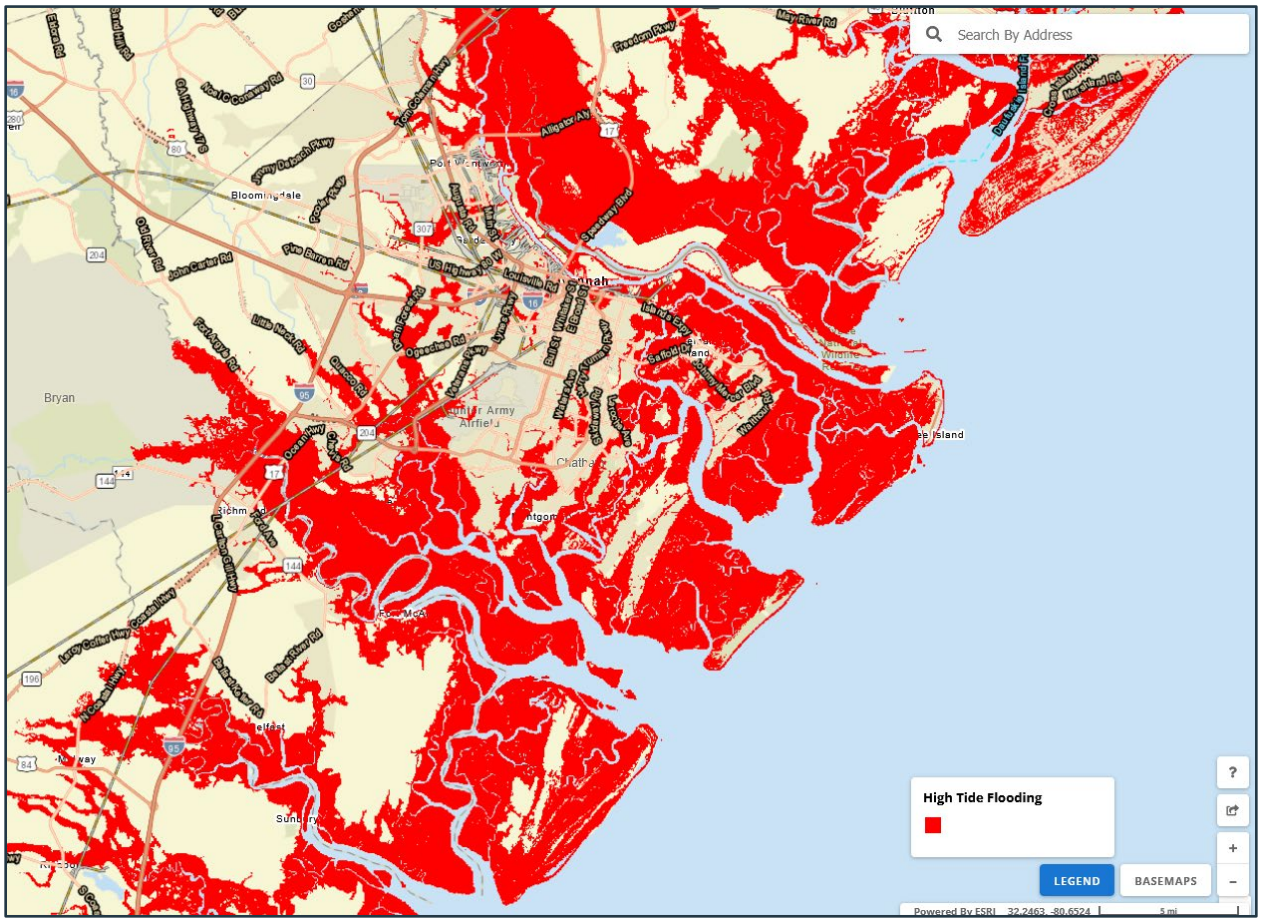
Source: NOAA Sea Level Rise Viewer

Sea level rise is a slow onset hazard, and because the full extent of anticipated sea level rise has not yet been realized, the effects of sea level rise have not yet been fully felt. However, sea level rise has already begun to cause "clear sky" or "nuisance" flooding, which is brought on by high tidewaters rather than storm or rain events. Tidal flooding causes temporary inundation of low-lying areas during high-tide events. While tidal flooding is not caused by sea level rise itself, NOAA notes that tidal flood rates are steadily increasing, and daily highest tides surpass fixed elevations increasingly frequently, due in part to sea level rise. According to NOAA, annual occurrences of high tide flooding have increased 5- to 10-fold since the 1960s. Sea level rise may cause flooding to occur more frequently and last for longer durations of time. According to Climate Central, Fort Pulaski, GA, on Tybee Island, experienced 121 total coastal flood days between 2015 through 2024 down from 152 between 2005-2014. Of these days, 90 percent would not have occurred without climate change and the resulting sea level rise. As sea level continues to rise, tidal flooding will continue to occur more frequently and over a greater inland area. Figure 2-34 shows areas in Chatham County that are susceptible to high tide flooding.

Impact: 3 – Critical

Spatial Extent: 3 – Moderate

Figure 2-34 – Areas Susceptible to High Tide Flooding, Chatham County

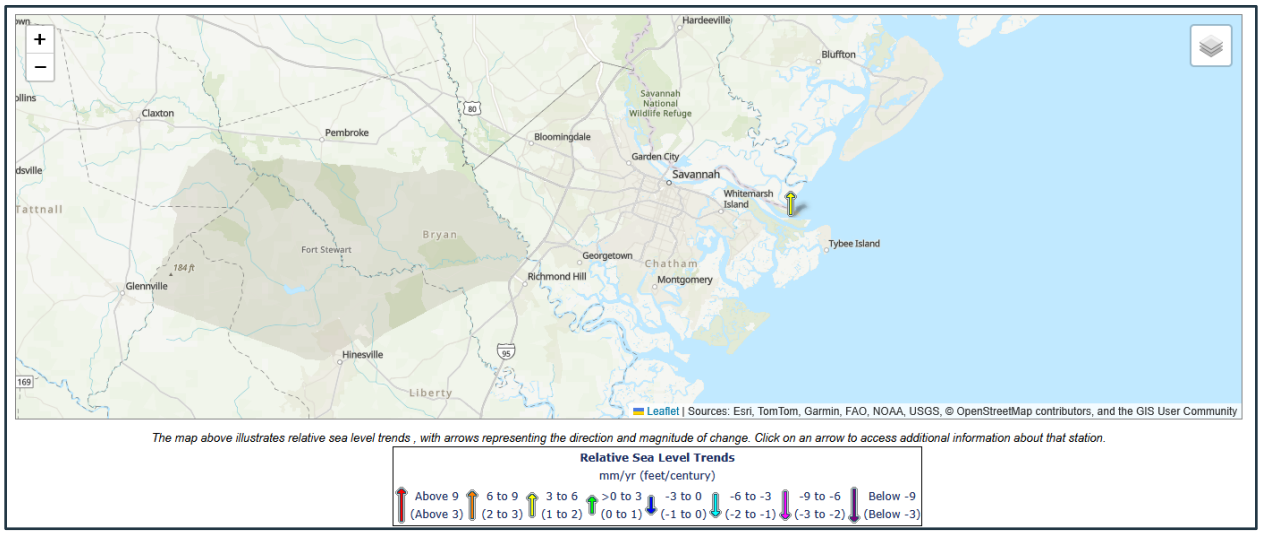


Source: NOAA Coastal Flood Exposure Mapper

Historical Occurrences

Historic trends in local mean sea level (MSL) are best determined from tide gauge records. The Center for Operational Oceanographic Products and Services (CO-OPS) has been measuring sea level for over 150 years, with tide stations operating on all U.S. coasts. Changes in MSL, either a sea level rise or sea level fall, have been computed at 128 long-term water level stations using a minimum span of 30 years of observations at each location. These measurements have been averaged by month to remove the effect of higher frequency phenomena (e.g. storm surge) in order to compute an accurate linear sea level trend. Figure 2-35 illustrates regional trends in sea level from NOAA. At the Fort Pulaski, GA station (indicated by the yellow arrow), the relative sea level trend is 3.66 mm/year with a 95% confidence interval of +/- 0.27 mm/year based on monthly mean sea level data from 1935 to 2024 which is equivalent to a change of 1.20 feet in 100 years.

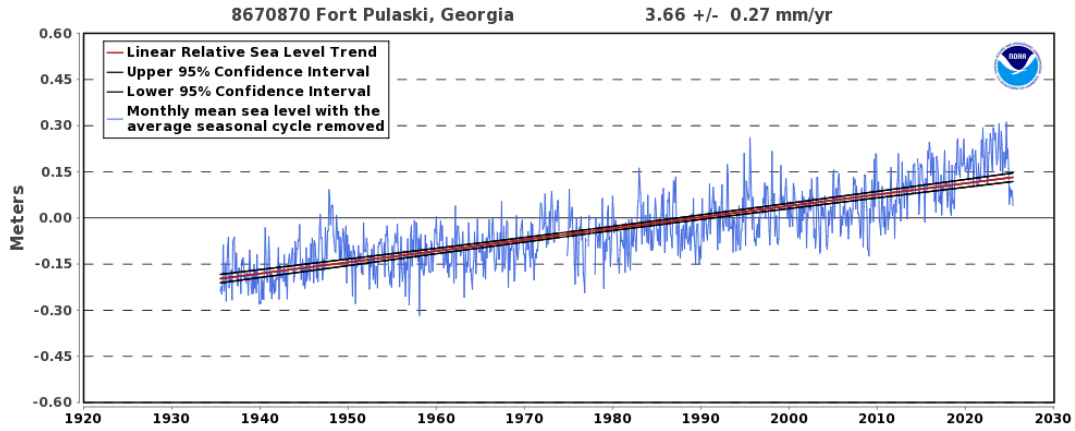
Figure 2-35 – Sea Level Trends, Chatham County



Source: NOAA Tides and Currents, August 2025

Figure 2-36 shows the monthly mean sea level at NOAA's Fort Pulaski, GA station without the regular seasonal fluctuations due to coastal ocean temperatures, salinities, winds, atmospheric pressures, and ocean currents. The long-term linear trend is also shown, including its 95% confidence interval. The plotted values are relative to the most recent Mean Sea Level datum established by CO-OPS.

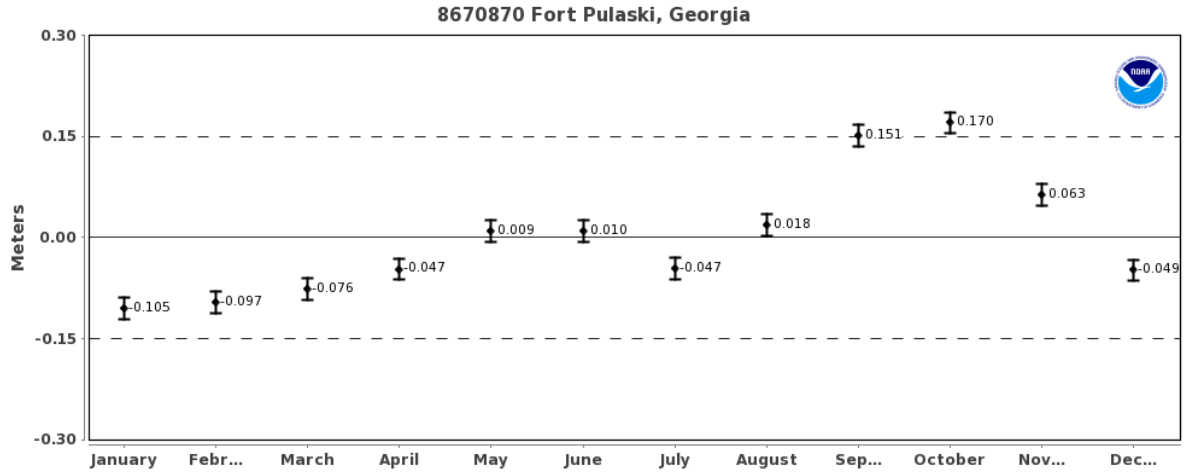
Figure 2-36 – Mean Sea Level Trends, Fort Pulaski, GA



Source: NOAA Tides and Currents, August 2025

Figure 2-37 shows the average seasonal cycle of MSL, caused by regular fluctuations in coastal temperatures, salinities, winds, atmospheric pressures, and ocean currents. It is shown along with each month's 95% confidence interval.

Figure 2-37 – Average Seasonal Cycle for Fort Pulaski, GA



Source: NOAA Tides and Currents, August 2025

Probability of Future Occurrence

The U.S. Army Corps of Engineers (USACE) has provided guidance to evaluate designs over a project's life cycle in order to account for the rise of global mean sea level. The USACE guidance is based on original guidance by the National Research Council (NRC, 1987). The 1987 NRC report recommended that feasibility studies for coastal projects consider the high probability of accelerating global mean sea level (GMSL) rise and provided three different acceleration scenarios through the year 2100. The NRC committee provided an equation for calculating sea level rise and recommended "projections be updated approximately every decade to incorporate additional data."

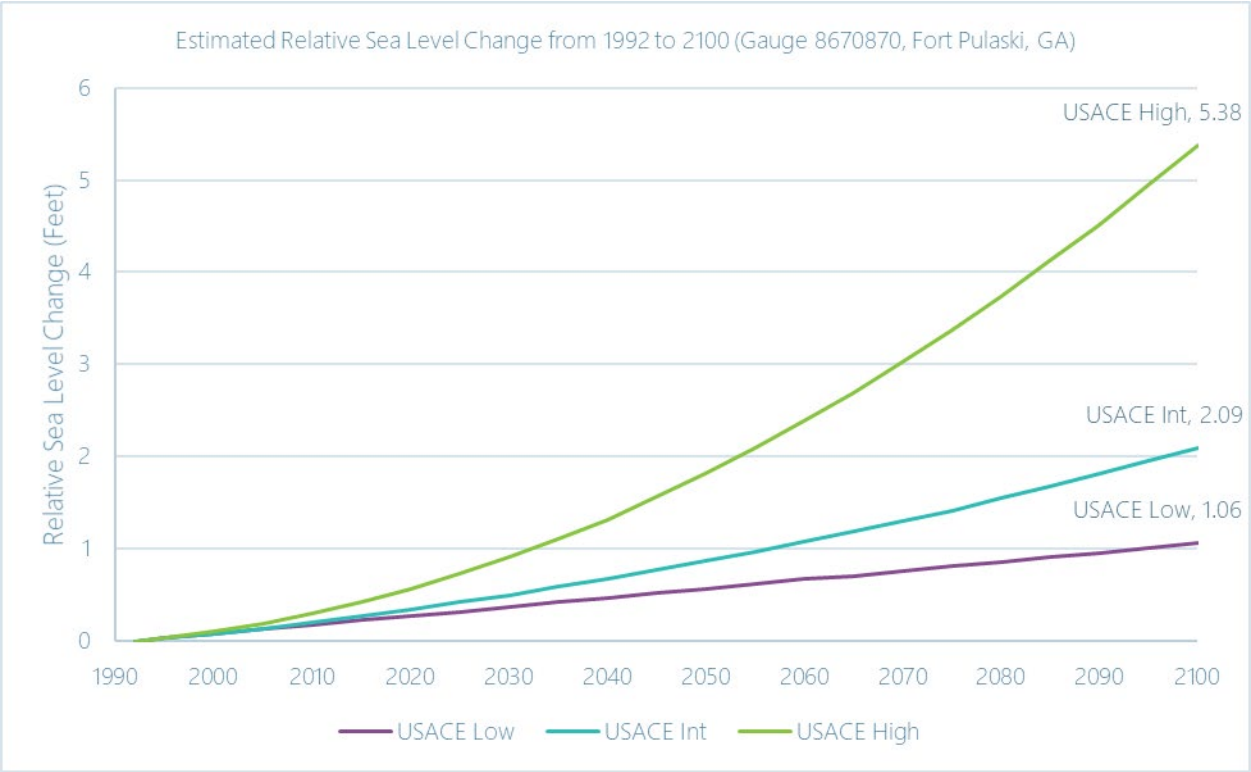
The USACE guidance adjusted the NRC equation to include the historic GMSL change rate of 1.7 mm/year as presented by the IPCC (IPCC, 2007) and the start date of 1992 (which corresponds to the midpoint of the National Tidal Datum Epoch of 1983-2001), instead of 1986 (the start date for NRC's equation). These changes resulted in values for the variable *b* being equal to 2.71E-5 for modified NRC Curve I, 7.00E-5 for modified NRC Curve II, and 1.13E-4 for modified NRC Curve III. The resulting equation is as follows:

$$E(t) = 0.0017m/yr*t + bt^2$$

In the above equation, t represents years, b is a constant, and E(t) is the relative sea-level change, in meters, as a function of t. The three updated GMSL rise acceleration scenarios are depicted in Figure 2-38.

Based on the USACE guidance and data from the Oregon Inlet Marina, NC NOAA gauge, a projected sea level rise to be used for future planning decisions can be calculated. Figure 2-38 shows sea level rise projections for three scenarios from the USACE. The USACE Low curve uses the historic rate of sea level change as the rate, the USACE Intermediate curve uses the NRC Curve I modified by recent IPCC low emissions projections and the local rate of vertical land movement, and the USACE High curve uses the NRC Curve II modified by recent IPCC higher emissions projections and the local rate of vertical land movement. Given that the USACE Low curve does not consider further climate change, the USACE Intermediate and High curves are more likely. However, which of the curves is the more likely scenario depends on future emissions levels. Based on the more conservative estimate of the Intermediate curve, Chatham County should plan for 0.87 feet of sea level rise from 1992 levels by 2050.

Figure 2-38 – Sea Level Rise Projections for Chatham County (1992-2100)



Source: USACE, 2014

Probability: 3 – Likely

Climate Change

Sea level rise is a direct result of global climate change. Estimates for sea level rise are based on projected greenhouse gas emission levels and their associated impacts on global temperature change. Most sea level rise models do not fully account for ice melt, and therefore actual sea level rise may be significantly higher than current estimates suggest. As such, these projections contain substantial variability but are nonetheless important to consider when planning for coastal areas because they indicate where flooding can be expected should actual sea level rise meet estimated levels.

Vulnerability Assessment

Methodologies and Assumptions

Vulnerability to Sea Level Rise was assessed using Climate Central's Surging Seas Risk Finder using estimated sea level rise of 4 feet above Mean Higher High Water (MHHW). This estimate was chosen as it is in alignment with the National Climate Assessment's intermediate high sea level rise scenario, which projects a local rise of 4.2 feet by 2100, from a 1992 baseline. Risk is estimated using sea level rise projections as well as data from the NOAA water level station at Fort Pulaski, GA. Note that this assessment assumes future storms will be similar in magnitude to current storms, isolating impacts of sea level rise. Additional assessment is based on past occurrences nationally and internationally as well as data from NOAA, USGS, the Intergovernmental Panel on Climate Change (IPCC), and other sources.

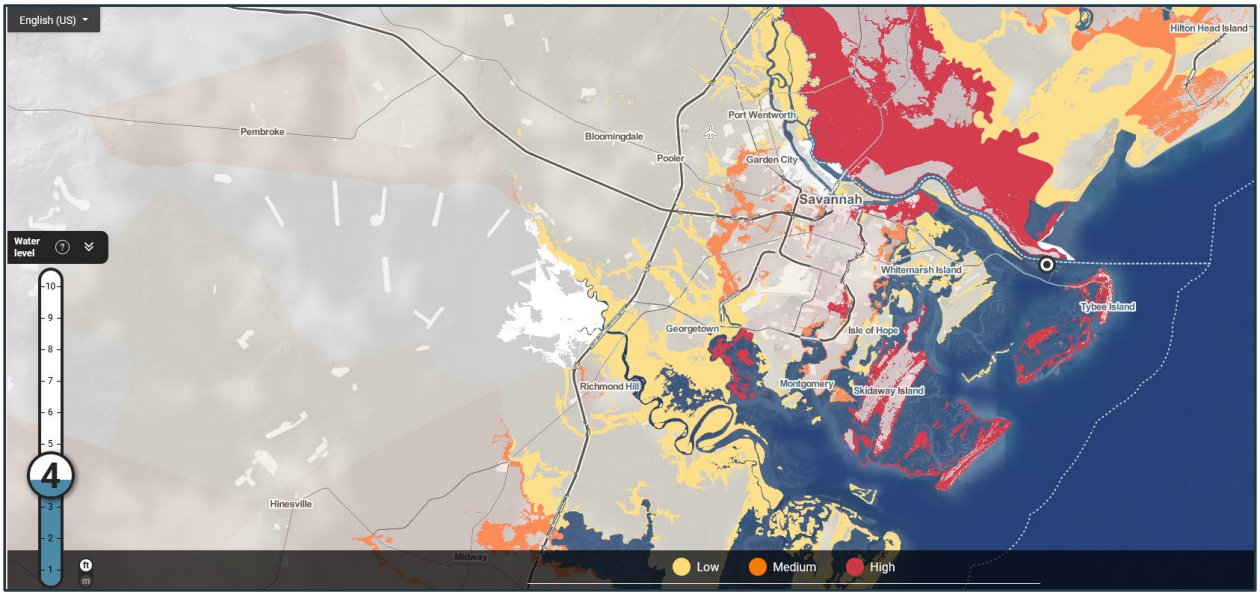
In addition to the data presented below, the forthcoming Southeast Coastal Assessment from the United States Army Corps of Engineers (USACE) South Atlantic Division will provide supplementary data and details through a comprehensive coastal shoreline risks and needs assessment. This tool will look at four

hazards (hurricanes and storms, long-term erosion, flooding, and potential sea level rise) and how they will impact population, the built environment, and the natural environment.

People

Sea level rise will lead to increased flooding and the associated harms to humans, such as illness, or injury or death from driving into flooded waters and drowning. Though sea level rise impacts will likely affect the entire county, people living along the coast will be most impacted, particularly burdening lower income, elderly, minority, or otherwise disproportionately vulnerable individuals. Figure 2-39 below illustrates Chatham County's social vulnerability to sea level rise.

Figure 2-39 – Social Vulnerability to Sea Level Rise, Chatham County



Source: Climate Central
Note: This map uses the Hazards and Vulnerability Research Institute (HVRI)'s Social Vulnerability Index.

As reported by climate central, approximately 17,393 in Chatham County people currently live in areas expected to be impacted by 4-feet of sea level rise. Table 2-60 below breaks down the social vulnerability categories in Figure 2-39.

Table 2-60 – Population at Risk to Sea Level Rise by Social Vulnerability Category

Social Vulnerability Category	Population at Risk	Percent of Total Population
Low Social Vulnerability	8,492	7.9%
Medium Social Vulnerability	3,768	5.0%
High Social Vulnerability	5,133	8.5%
Total	**17,393**	--

Source: Climate Central

Property

The increased number of flood days and general encroachment of shoreline associated with sea level rise will likely cause property damage, although it is unclear exactly what this will look like. Homes, businesses and vehicles will be susceptible to increased water damage. Homes within the areas that may be inundated will potentially be uninhabitable. Additionally, rising seas, and associated increased flood days,

can overwhelm and undermine the effectiveness of stormwater drainage system and other infrastructure, such as roads and bridges.

According to Climate Central for 2050, 2,568 homes comprising of $1.3 billion in home value currently exist in areas that would be underwater given 4 feet of sea level rise. $958 million of this value exists in Savannah alone.

Of the total buildings at risk, Climate Central estimates 8,590 are homes, four are houses of worship, three are government buildings, three are libraries, two are public safety facilities, and one is a school.

No significant changes in development have occurred to affect the county's vulnerability to sea level rise.

Environment

Sea level rise can have numerous negative consequences on the environment including increased erosion and all impacts associated with that. Another concern is the inundation of normally dry land, which could lead to the loss of marshes and wetlands and the positive benefits associated with those areas. These areas buffer against waves and storm surge, protect from erosion and even encourage accretion, and provide natural wildlife habitats. Finally, sea level rise may lead to saltwater intrusion as the groundwater table may also rise, potentially leading to contaminated drinking and agriculture water.

Consequence Analysis

Table 2-61 summarizes the potential negative consequences of Sea Level Rise.

Table 2-61 – Consequence Analysis – Sea Level Rise

Category	Consequences
Public	Sea Level Rise may cause increased flooding which may lead to illness, injury, or death. Additionally, sea level rise may cause psychological stress from loss of home, economy, and culture.
Responders	Sea Level Rise induced flooding may cause increased burden on responders.
Continuity of Operations (including Continued Delivery of Services)	As sea levels rise and cause more regular, chronic flooding, continuity of operations, such as delivery of services may be interrupted due to localized disruption of roads, facilities, and/or utilities.
Property, Facilities and Infrastructure	Sea level rise can cause damage to property as flooding becomes more regular in the short term and as sea levels continue to rise in the long term. SLR can also compromise infrastructure such as drainage systems and roads.
Environment	Sea level rise can lead to increased erosion, salt water intrusion, and inundation of wetlands and previous dry land.
Economic Condition of the Jurisdiction	Sea level rise can severely disrupt the economy, particularly in a region that relies so heavily on tourism.
Public Confidence in the Jurisdiction's Governance	Sea level rise is unlikely to impact public confidence.

Hazard Summary by Jurisdiction

Table 2-62 summarizes sea level rise risk by jurisdiction. Most jurisdictions face at least some risk from sea level rise, but coastal and waterfront areas have greater exposure. Impact and spatial extent varied by jurisdiction depending on the area exposed to sea level rise impacts.

Table 2-62 –Sea Level Rise Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	3	3	1	4	2.9	H
Bloomingdale	3	2	1	1	4	2.2	M
Garden City	3	2	2	1	4	2.4	M
Pooler	3	2	1	1	4	2.2	M
Port Wentworth	3	3	2	1	4	2.7	H
Savannah	3	3	3	1	4	2.9	H
Thunderbolt	3	3	3	1	4	2.9	H
Tybee Island	3	3	4	1	4	3.1	H
Vernonburg	3	3	3	1	4	2.9	H

2.5.9 Severe Weather (Thunderstorm Wind, Lightning, Hail)

Hazard Background

Thunderstorm Winds

Thunderstorms result from the rapid upward movement of warm, moist air and can occur inside warm, moist air masses and at fronts. As the air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at earth's surface and causes strong winds associated with thunderstorms.

There are four ways in which thunderstorms can organize: single cell, multi-cell cluster, multi-cell lines (squall lines), and supercells. Even though supercell thunderstorms are most frequently associated with severe weather phenomena, thunderstorms most frequently organize into clusters or lines. Warm, humid conditions are favorable for the development of thunderstorms. The average single cell thunderstorm is approximately 15 miles in diameter and lasts less than 30 minutes at a single location. However, thunderstorms, especially when organized into clusters or lines, can travel intact for distances exceeding 600 miles.

Thunderstorms are responsible for the development and formation of many severe weather phenomena, posing great hazards to the population and landscape. Damage that results from thunderstorms is mainly inflicted by lightning, downburst winds, large hailstones, and flash flooding caused by heavy precipitation. Stronger thunderstorms are capable of producing tornadoes and waterspouts. While conditions for thunderstorm conditions may be anticipated within a few hours, severe conditions are difficult to predict. Regardless of severity, storms generally pass within a few hours.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

Lightning

Lightning is a sudden electrical discharge released from the atmosphere that follows a course from cloud to ground, cloud to cloud, or cloud to surrounding air, with light illuminating its path. Lightning's unpredictable nature causes it to be one of the most feared weather elements.

All thunderstorms produce lightning, which often strikes outside of the area where it is raining and is known to fall more than 10 miles away from the rainfall area. When lightning strikes, electricity shoots through the air and causes vibrations, creating the sound of thunder. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start building fires and wildland fires, and damage electrical systems and equipment.

The watch/warning time for a given storm is usually a few hours. There is no warning time for any given lightning strike. Lightning strikes are instantaneous. Storms that cause lightning usually pass within a few hours.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

Hail

According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere causing them to freeze. The raindrops form into small frozen droplets and then continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen rain droplet can continue to grow and form hail. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow.

At the time when the updraft can no longer support the hailstone, it will fall down to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 mph, while a 2 ¾" diameter or baseball sized hail requires an updraft of 81 mph. The largest hailstone recorded in the United States was found in Vivian, South Dakota on July 23, 2010; it measured eight inches in diameter, almost the size of a soccer ball. While soccer-ball-sized hail is the exception, even small pea sized hail can do damage.

Hailstorms in Georgia cause damage to property, crops, and the environment, and kill and injure livestock. According to NOAA, hail damage in the United States totaled over $1 billion. Crops are most vulnerable to hail. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are the other things most commonly damaged by hail. Hail has been known to cause injury to humans; occasionally, these injuries can be fatal.

The onset of thunderstorms with hail is generally rapid. However, advancements in meteorological forecasting allow for some warning. Storms usually pass in a few hours.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

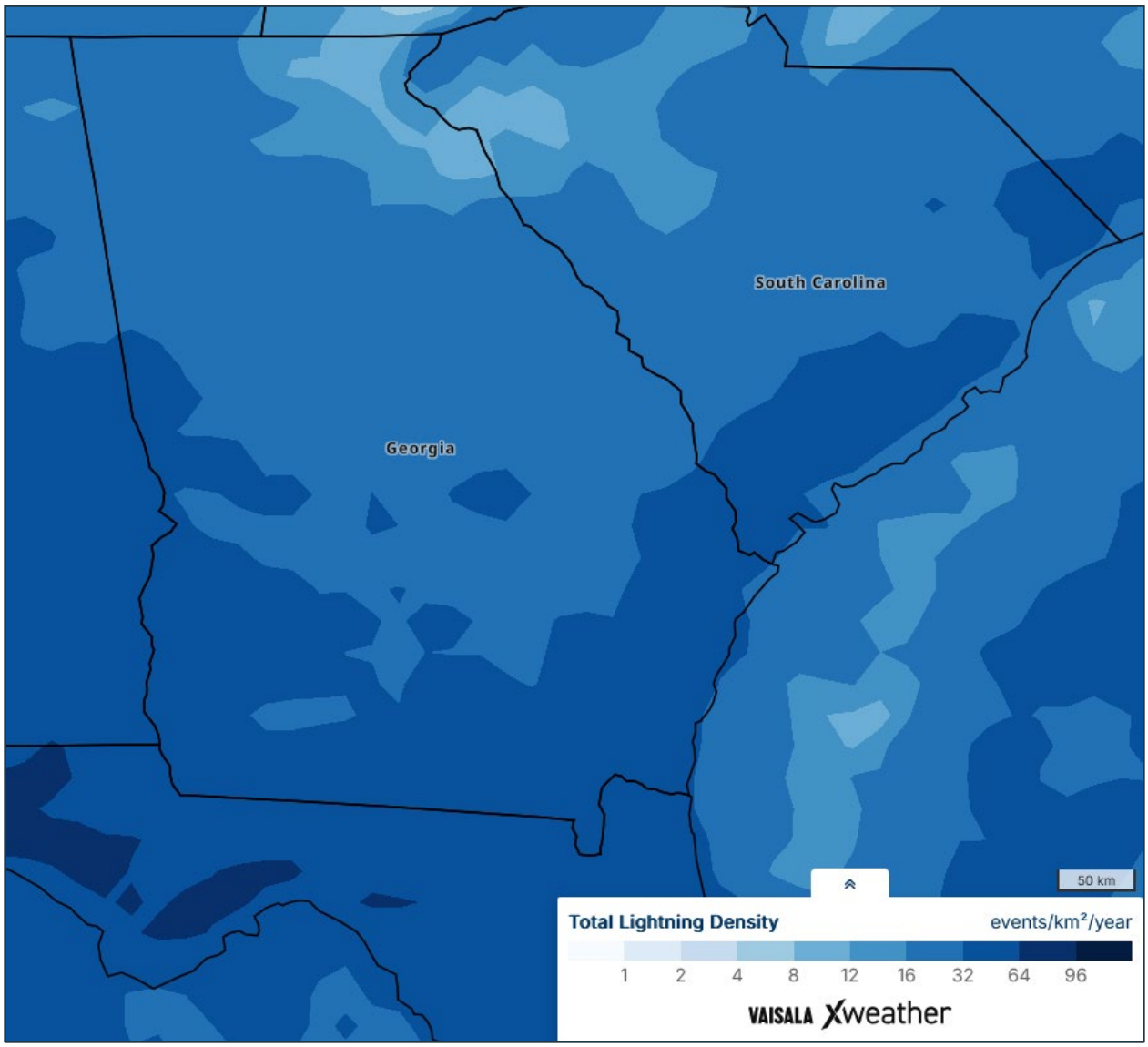
Location

Thunderstorm wind, lightning, and hail events do not have a defined vulnerability zone. The scope of lightning and hail is generally confined to the footprint of its associated thunderstorm. The entirety of Chatham County shares equal risk to the threat of severe weather.

According to the Vaisala 2024 Annual Lightning Report, Georgia ranked ninth in the United Stated for highest lightning count (7,489,998) and flash density per square mile (48.6/km^2). According to Vaisala's flash density map, shown in Figure 2-40, the majority of Chatham County is located in an area that experiences 24 to 48 lightning flashes/km^2 per year.

It should be noted that future lightning occurrences may exceed these figures.

Figure 2-40 – Lightning Flash Density (2016-2024)



Source: Vaisala Lightning Map

Extent

Thunderstorm Winds

The magnitude of a thunderstorm event can be defined by the storm's maximum wind speed and its impacts. NCEI divides wind events into several types including High Wind, Strong Wind, Thunderstorm Wind, Tornado and Hurricane. For this severe weather risk assessment, High Wind, Strong Wind and Thunderstorm Wind data were collected. Hurricane Wind and Tornadoes are addressed as individual hazards. The following definitions come from the NCEI Storm Data Preparation document.

- **High Wind** – Sustained non-convective winds of 40 mph or greater lasting for one hour or longer or winds (sustained or gusts) of 58 mph for any duration on a widespread or localized basis.
- **Strong Wind** – Non-convective winds gusting less than 58 mph, or sustained winds less than 40 mph, resulting in a fatality, injury, or damage.

- **Thunderstorm Wind** – Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 58 mph, or winds of any speed (non-severe thunderstorm winds below 58 mph) producing a fatality, injury or damage.

The strongest recorded thunderstorm wind event in the county occurred on April 25, 2015, with a measured gust of 91 mph on a crane at the Georgia Port Authority and 81 mph gusts at the airport. The event reportedly caused no fatalities, injuries, or damages. Since 1999, thunderstorm winds have been directly attributed to 2 deaths, 6 injuries, and $683,800 in property damages. Eight indirect injuries were reported for the same period; seven of those were attributed to multiple vehicles running into a tree on Bloomingdale Road, June 10, 2013.

Impact: 3 – Critical

Spatial Extent: 4 – Large

Lightning

Lightning is measured by the Lightning Activity Level (LAL) scale, created by the National Weather Service to define lightning activity into a specific categorical scale. The LAL, shown in Table 2-63, is a common parameter that is part of fire weather forecasts nationwide.

Table 2-63 – Lightning Activity Level Scale

Lightning Activity Level Scale	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground lightning strikes in a five-minute period
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a five-minute period
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a five-minute period
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a five-minute period
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag warning

Source: National Weather Service

With the right conditions in place, the entire county is susceptible to each lightning activity level as defined by the LAL. Most lightning strikes cause limited damage to specific structures in a limited area, and cause very few injuries or fatalities, and minimal disruption to quality of life.

Impact: 1 – Minor

While the total area vulnerable to a lightning strike corresponds to the footprint of a given thunderstorm, a specific lightning strike is usually a localized event and occurs randomly. It should be noted that while lightning is most often affiliated with severe thunderstorms, it may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall. All of Chatham County is uniformly exposed to the threat of lightning.

Spatial Extent: 2 – Small

Hail

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 2-64 indicates the hailstone measurements utilized by the National Weather Service.

Table 2-64 – Hailstone Measurement Comparison Chart

Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf ball
2.0 inch	Hen egg
2.5 inch	Tennis ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

The Tornado and Storm Research Organization (TORRO) has further described hail sizes by their typical damage impacts. Table 2-65 describes typical intensity and damage impacts of the various sizes of hail.

Table 2-65 – Tornado and Storm Research Organization Hailstorm Intensity Scale

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > softball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: Tornado and Storm Research Organisation (TORRO), Department of Geography, Oxford Brookes University
Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity.

The average hailstone size recorded between 1999 and 2024 in Chatham County was 1.09" in diameter; the most common recorded hail stone size for the period was 1.0". According to NCEI records, the largest hailstone recorded in the county was 3.5", recorded on April 4, 1993, in Savannah.

Impact: 1 – Minor

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. Chatham County is uniformly exposed to severe thunderstorms; therefore, the entire planning area is equally exposed to hail which may be produced by such storms. However, large-scale hail tends to occur in a more localized area within the storm.

Spatial Extent: 2 – Small

Historical Occurrences

Thunderstorm Winds

Between 1999 and 2024, NCEI recorded 358 separate incidents of thunderstorm wind with an average recorded wind speed of 50.92 mph. These events caused $607,050 recorded property damage, $1,000 in crop damages, 12 direct and indirect injuries and 2 fatalities. Of these events, two caused fatalities, five caused injuries, 160 caused property damage, and one caused crop damage.

In addition to recorded thunderstorm wind events, NCEI recorded 7 high wind events and 18 strong wind events occurring from 1999 through 2024. These events are detailed in Table 2-66 and Table 2-67, respectively.

Table 2-66 – NCEI Recorded High Winds Events, Chatham County, 1999-2024

Location	Date	Wind Speed (kts)	Fatalities	Injuries	Property Damage
COASTAL CHATHAM (ZONE)	9/6/2004	50	0	0	0
INLAND CHATHAM (ZONE)	2/27/2005	50	0	0	0
COASTAL CHATHAM (ZONE)	11/21/2005	50	0	0	0
COASTAL CHATHAM (ZONE)	3/8/2008	50	0	0	0
COASTAL CHATHAM (ZONE)	10/24/2008	55	0	0	4000
COASTAL CHATHAM (ZONE)	4/21/2013	43	0	0	8000
COASTAL CHATHAM (ZONE)	1/9/2024	50	0	0	10000
		Total	**0**	**0**	**$22,000**

Source: NCEI

Table 2-67 – NCEI Recorded Strong Winds Events, Chatham County, 1999-2024

Location	Date	Wind Speed (kts)	Fatalities	Injuries	Property Damage
COASTAL CHATHAM (ZONE)	2/25/2007	43	0	0	$10,000
COASTAL CHATHAM (ZONE)	6/2/2007	45	0	0	$2,000
COASTAL CHATHAM (ZONE)	7/2/2010	30	0	1	$4,000
COASTAL CHATHAM (ZONE)	10/9/2011	35	0	0	$3,750
COASTAL CHATHAM (ZONE)	10/10/2011	40	0	0	$3,500
COASTAL CHATHAM (ZONE)	12/7/2011	35	0	0	$3,000
COASTAL CHATHAM (ZONE)	5/3/2013	35	0	0	$2,500
COASTAL CHATHAM (ZONE)	3/6/2014	40	0	0	$2,250
INLAND CHATHAM (ZONE)	1/26/2015	35	0	0	$5,000
COASTAL CHATHAM (ZONE)	2/24/2016	40	0	0	$4,500
COASTAL CHATHAM (ZONE)	5/1/2017	35	0	0	$3,000
COASTAL CHATHAM (ZONE)	10/19/2019	40	0	0	$1,000
INLAND CHATHAM (ZONE)	10/19/2019	40	0	0	$2,250
COASTAL CHATHAM (ZONE)	1/16/2022	35	0	0	$0
INLAND CHATHAM (ZONE)	3/12/2022	45	0	0	$10,000

Location	Date	Wind Speed (kts)	Fatalities	Injuries	Property Damage
COASTAL CHATHAM (ZONE)	3/31/2022	40	0	0	$10,000
COASTAL CHATHAM (ZONE)	12/17/2023	45	0	0	$0
INLAND CHATHAM (ZONE)	1/9/2024	45	0	1	$10,000
		Total	**0**	**2**	**$76,750**

Source: NCEI

Of all wind events recorded during the period from 1999-2024, there was 1 incident that directly caused injury and one event that indirectly caused injury.

The County received FEMA Major Disaster Declarations in 1995 and 1998 for severe storms that included heavy rains and high winds.

Lightning

According to NCEI data, there were 41 lightning strikes reported between 1999 and 2024, reported in Table 2-68. Of these, 32 involved property damage. Damage from lighting strikes in this time period totaled over $4.68 million, which was mostly recorded as fire damage ignited by lightning. The highest rate of property damage recorded for a single incident was $2,000,000 on August 24, 2019. Two events caused 2 fatalities, and ten events caused a total of 18 injuries. Event narratives indicate in some cases that property damage occurred but was not estimated; therefore, actual property damage amounts are likely higher. No crop damage was recorded by these strikes. It should be noted that lightning events recorded by the NCEI are only those that are reported.

Table 2-68 – NCEI Recorded Lightning Strikes, Chatham County, 1999-2024

Location	Date	Time	Fatalities	Injuries	Property Damage
SAVANNAH	8/22/1999	1945	0	2	$0
COUNTYWIDE	8/11/2000	1414	0	0	$0
SAVANNAH	6/25/2001	1155	1	1	$0
WILMINGTON IS	6/22/2004	1600	0	0	$2,000,000
POOLER	4/19/2006	1440	0	0	$0
WILLIAMS	7/14/2007	1518	0	0	$15,000
TYBEE ISLAND	7/30/2007	1730	0	1	$0
CENTRAL JCT	7/30/2007	1930	0	1	$0
(SAV)SAVANNAH INTL A	10/9/2008	1245	0	0	$500
SAVANNAH	6/16/2009	1935	0	0	$10,000
WILLIAMS	7/31/2009	1630	0	0	$25,000
SAVANNAH	8/5/2009	1420	0	0	$10,000
POOLER	7/12/2010	1600	0	4	$0
BONA BELLA	7/14/2011	1329	0	0	$10,000
SAVANNAH	7/29/2012	1513	0	0	$10,000
POOLER	7/2/2013	1450	0	0	$20,000
MEINHARD	7/2/2013	1450	0	1	$0
TYBEE ISLAND	7/3/2014	1800	0	3	$0
SANDFLY	6/28/2015	1508	0	0	$5,000
SAVANNAH	7/7/2015	1443	0	0	$15,000
SANDFLY	7/15/2015	1605	0	0	$15,000
BURROUGHS	8/6/2015	1316	0	0	$20,000
WILLIAMS	7/15/2017	1240	0	0	$200,000

Location	Date	Time	Fatalities	Injuries	Property Damage
THUNDERBOLT	7/28/2018	1530	0	0	$5,000
TYBEE ISLAND	6/22/2019	1515	0	0	$75,000
LIBERTY CITY	8/14/2019	1356	0	0	$4,000
(SVN)HUNTER AAF SAVA	8/14/2019	1401	0	0	$15,000
FAIRWAY OAKS	8/24/2019	1250	0	3	$2,000,000
THUNDERBOLT	7/28/2020	1820	0	0	$20,000
FT SCREVEN	9/5/2020	1710	0	0	$10,000
FT SCREVEN	9/5/2020	1715	0	1	$0
WILLIAMS	9/5/2020	1837	0	0	$10,000
FT SCREVEN	9/5/2020	1917	0	0	$20,000
TYBEE ISLAND	6/12/2021	1430	1	1	$0
OLEARY	6/28/2021	1727	0	0	$1,000
MEINHARD	8/17/2021	1345	0	0	$40,000
POOLER	6/9/2022	1530	0	0	$1,000
SAVANNAH	7/17/2023	1345	0	0	$100,000
FT SCREVEN	5/14/2024	822	0	0	$10,000
SAVANNAH	7/26/2024	1740	0	0	$1,000
PARADISE PARK	7/26/2024	1750	0	0	$10,000
(SVN)HUNTER AAF SAVA	7/26/2024	1830	0	0	$10,000
		Total	**2**	**18**	**$4,687,500**

Source: NCEI

The following are a selection of narrative descriptions recorded in NCEI for significant historical lightning events that occurred in Chatham County:

June 25, 2001 – A construction foreman was killed while trying to clear his crew from a construction site. After the bolt struck the foreman, it traveled through the ground and struck another worker, coming up through the ground into the leg of a 43-year-old male worker.

June 22, 2004 – Lightning struck a 7400 square foot home which sparked a fire causing millions of dollars in damage. The storm also knocked out power to 18,000 residents.

July 12, 2010 – Thunderstorms developed along a weak frontal boundary aided by a weak shortwave trough, and advanced eastward into an unstable and weakly sheared environment over southern South Carolina and southeast Georgia. Broadcast media reported that four residents of an apartment complex felt lightning go right through their building. The Pooler Fire Department said the residents were inside a building at the Carlisle when the lightning hit their units at 385 Godley Station Boulevard. They said no one was seriously injured.

July 15, 2017 – Scattered thunderstorms developed in the afternoon hours along the sea breeze. These thunderstorms produced damaging wind gusts and lightning strikes that led to structure fires. A lightning strike started a house fire on Sussex Retreat in the Savannah Quarters neighborhood. The fire caused significant damage to much of the roof and second level of the home.

August 24, 2019 – Deep moisture building ahead of an approaching cold front led to several thunderstorms across Southeast Georgia. A fire was initiated by lightning at an apartment complex located along the 5000 Block of Garrard Avenue. The roof and 3rd floor of the 1300 apartment building were primarily involved in the fire, but the entire building was considered a complete loss. Three firefighters had indirect injuries associated with the fire, one from a roof collapse, one from second

degree burns and another from third degree burns. All are expected to make a full recovery. Thirty residents were also left without a home.

July 17, 2023 – Isolated thunderstorms developed in the early afternoon hours on the sea breeze along the southeast Georgia coast. One thunderstorm produced frequent lightning, striking a building in Savannah. A lightning strike at Central Missionary Baptist Church in Savannah produced a fire in the building and caused a large portion of the roof to collapse.

May 14, 2024 - A large cluster of thunderstorms developed near an inland advancing warm front in the morning hours along the southeast Georgia coast. These thunderstorms produced a few damaging wind gusts. Chatham County Emergency Management Agency reported lightning struck a shed on Sandnettles Drive and caused a fire.

Hail

NCEI records 99 hail incidents between 1999 and 2024 in Chatham County. Of these, one was reported to have caused vehicle property damage in the amount of $500, and none caused death, injury or crop damage. According to NCEI records, the largest diameter hail recorded in the County was 3.5 inches, which occurred on April 5, 1993, in Savannah. The average hail size of all events in the County was just over one inch in diameter. Table 2-69 summarizes hail events by location. In some cases, hail was reported for multiple locations on the same day.

Table 2-69 – NCEI Hail Events, Chatham County, 1999-2024

Location	Date	Diameter (in.)	Deaths	Injuries	Property Damage
SAVANNAH	5/6/1999	1.75	0	0	0
PORT WENTWORTH	8/10/2000	1.75	0	0	0
HUNTER AFB	3/29/2001	1	0	0	0
SAVANNAH	3/26/2002	1.75	0	0	0
THUNDERBOLT	8/18/2002	0.88	0	0	0
SAVANNAH	8/18/2002	1.25	0	0	0
BURROUGHS	3/19/2003	1	0	0	0
SAVANNAH	3/20/2003	0.88	0	0	0
SAVANNAH	5/17/2005	1.75	0	0	0
BLOOMINGDALE	5/20/2005	0.88	0	0	0
SAVANNAH	7/13/2005	1	0	0	0
BLOOMINGDALE	4/8/2006	1	0	0	0
POOLER	4/8/2006	1.75	0	0	0
SAVANNAH	4/8/2006	0.75	0	0	0
PORT WENTWORTH	5/14/2006	2	0	0	0
GARDEN CITY	9/19/2006	0.75	0	0	0
WILSHIRE	3/2/2007	0.75	0	0	0
WILSHIRE	7/1/2007	1.75	0	0	0
VERNONBURG	7/26/2007	1	0	0	0
PORT WENTWORTH	3/15/2008	1	0	0	0
SAVANNAH	5/24/2008	1	0	0	0
SAVANNAH	5/24/2008	1.25	0	0	$500

Location	Date	Diameter (in.)	Deaths	Injuries	Property Damage
THUNDERBOLT	6/15/2008	1	0	0	0
SAVANNAH	6/19/2008	1.75	0	0	0
BURNSIDE	6/21/2008	1	0	0	0
BLOOMINGDALE	6/25/2008	0.88	0	0	0
SAVANNAH	6/26/2008	0.75	0	0	0
WILLIAM HILL	8/8/2008	0.75	0	0	0
BLOOMINGDALE	3/1/2009	1.75	0	0	0
POOLER	3/1/2009	0.88	0	0	0
TYBEE ISLAND	3/28/2009	1	0	0	0
THUNDERBOLT	5/5/2009	0.88	0	0	0
WILMINGTON IS	5/11/2009	1	0	0	0
SANDFLY	5/11/2009	1.75	0	0	0
SAVANNAH	5/17/2009	1	0	0	0
OLEARY	5/29/2009	0.75	0	0	0
VERNONBURG	6/13/2009	0.88	0	0	0
WILMINGTON IS	6/16/2009	0.88	0	0	0
SAVANNAH	6/16/2009	0.75	0	0	0
WILMINGTON IS	6/26/2009	0.75	0	0	0
BLOOMINGDALE	7/20/2009	1	0	0	0
PORT WENTWORTH	7/27/2009	0.75	0	0	0
SAVANNAH STATE COLLE	8/5/2009	0.88	0	0	0
POOLER	6/27/2010	0.75	0	0	0
BONA BELLA	6/27/2010	1	0	0	0
BURROUGHS	8/24/2010	0.88	0	0	0
FERNWOOD	8/26/2010	0.75	0	0	0
SAVANNAH	3/27/2011	0.88	0	0	0
WILMINGTON IS	3/27/2011	1	0	0	0
FT SCREVEN	3/27/2011	2	0	0	0
PARKERSBURG	3/27/2011	1.5	0	0	0
THUNDERBOLT	3/27/2011	1.75	0	0	0
TYBEE ISLAND	3/27/2011	1	0	0	0
SANDFLY	3/27/2011	0.88	0	0	0
POOLER	5/27/2011	0.75	0	0	0
THUNDERBOLT	6/15/2011	0.75	0	0	0
BLOOMINGDALE	6/18/2011	0.75	0	0	0
THUNDERBOLT	6/23/2011	0.75	0	0	0
THUNDERBOLT	8/6/2011	1	0	0	0
(SAV)SAVANNAH INTL A	5/15/2012	1.75	0	0	0
BURROUGHS	5/15/2012	1	0	0	0
(SAV)SAVANNAH INTL A	5/15/2012	1.5	0	0	0

Location	Date	Diameter (in.)	Deaths	Injuries	Property Damage
CENTRAL JCT	5/15/2012	1.75	0	0	0
BONA BELLA	5/15/2012	1	0	0	0
PORT WENTWORTH	5/15/2012	1.75	0	0	0
PORT WENTWORTH	5/31/2012	1	0	0	0
BLOOMINGDALE	3/18/2013	1	0	0	0
FAIRWAY OAKS	3/24/2013	0.88	0	0	0
BONA BELLA	5/28/2014	0.88	0	0	0
(SAV)SAVANNAH INTL A	6/11/2014	1	0	0	0
SAVANNAH	6/14/2014	1	0	0	0
WILLIAMS	8/8/2014	0.88	0	0	0
BURROUGHS	6/2/2015	1	0	0	0
WILLIAM HILL	6/3/2015	0.88	0	0	0
OLEARY	6/22/2015	1	0	0	0
TYBEE ISLAND	4/5/2017	1.5	0	0	0
TYBEE ISLAND	4/5/2017	1.75	0	0	0
PORT WENTWORTH	5/22/2017	0.88	0	0	0
MULBERRY GROVE	5/22/2017	1	0	0	0
WILMINGTON IS	6/2/2018	0.88	0	0	0
BONA BELLA	6/25/2018	0.88	0	0	0
PORT WENTWORTH	6/25/2018	0.88	0	0	0
PORT WENTWORTH	8/14/2018	0.75	0	0	0
MEINHARD	8/14/2018	1	0	0	0
POOLER	3/5/2020	0.75	0	0	0
POOLER	2/15/2021	1.5	0	0	0
PORT WENTWORTH	7/14/2022	0.88	0	0	0
MEINHARD	4/26/2023	1	0	0	0
POOLER	4/26/2023	1	0	0	0
WILLIAM HILL	4/26/2023	1.75	0	0	0
BLOOMINGDALE	6/8/2023	0.75	0	0	0
WILLIAM HILL	6/8/2023	1	0	0	0
VERNONBURG	6/8/2023	1	0	0	0
WILLIAM HILL	8/8/2023	0.75	0	0	0
POOLER	5/19/2024	0.88	0	0	0
WILSHIRE	5/24/2024	1	0	0	0
WILSHIRE	5/24/2024	1	0	0	0
WILMINGTON IS	5/24/2024	1.75	0	0	0
OLEARY	7/15/2024	0.75	0	0	0
		Total	**0**	**0**	**$500**

Source: NCEI

The following narratives provide detail on select hailstorms from the above list of NCEI recorded events:

May 14, 2006 – 2" diameter hail was reported in Port Wentworth near the intersection of Highway 21 and Plantation Road.

May 24, 2008 – A cold front pushed southward through southern South Carolina and southeast Georgia and interacted with the sea breeze to produce scattered severe thunderstorms. Slightly larger than quarter size hail was reported in Savannah, Georgia. The hail resulted in a broken windshield of a car on Burroughs Street.

March 27, 2011 – A frontal boundary in combination with modest instability and strong deep layer shear, resulted in scattered strong to severe thunderstorm development across southern South Carolina and southeast Georgia. A CoCoRaHS observer reported golf ball to hen egg size hail, 2 miles north-northeast of Wilmington Island, Georgia. The public reported quarter size hail breaking car windows, 1 mile south of Savannah, Georgia.

April 5, 2017 – Moderately unstable conditions and a highly sheared environment developed ahead of a strong cold front sweeping through the Southeast United States. As this occurred, a squall line of severe thunderstorms tracked over the region and produced 1.75" hail and damaging straight-line winds.

May 24, 2024 – Scattered to numerous thunderstorms developed in the afternoon hours across portions of southeast Georgia. These storms produced several instances of large hail and damaging wind gusts through the late afternoon hours. Golf ball sized hail was reported near Skidaway Island by an NWS employee.

Probability of Future Occurrence

Based on historical occurrences recorded by NCEI for the 25-year period from 1999 through 2024, Chatham County averaged one annualized wind events per year. It is therefore a reasonable conclusion that the County will experience thunderstorm winds in any given year.

Over the 25-year period from 1999 through 2024, 39 of the 41 lightning strike events were reported as having caused death, injury, or property damage, which equates to an average of 1.56 damaging lightning strikes per year. It is therefore quite likely that damaging lightning strikes will occur at least once in any given year in the County.

The average hail storm in Chatham County occurs in the afternoon and has a hail stone with a diameter of just over one inch. Over the 24-year period from 1999 through 2024, Chatham County experienced 99 reported hail incidents; this averages to 3.96 events per year with reported incidents somewhere in the planning area, making it quite likely that the County will experience a hail incident in any given year.

Based on these historical occurrences, severe weather occurs in the County each year. The probability of damaging impacts is highly likely.

Probability: 4 – Highly Likely

Climate Change

Climate Change may increase intensity of thunderstorm winds with more frequent high-wind gusts from downbursts/outflows. Studies show that the geographic area impacted by damaging thunderstorm winds has increased, and that stronger winds in severe storms are more likely when Convective Available Potential Energy (CAPE) increases.

Some studies suggest that the number of days with large hail aloft will increase in many places. However, in warm, humid zones like coastal Georgia, more melting of smaller hailstones on the way down is

possible, so smaller hail less likely to reach the ground. The net effect may be fewer small hail events but when hail does occur, it could be more damaging.

Lighting increases are expected. More moisture and stronger uplift tends to favor more electrical charging in storms.

Vulnerability Assessment

People

People and populations exposed to the elements are most vulnerable to severe weather. A common hazard associated with wind events is falling trees and branches. The risk of being struck by lightning is greater in open areas, at higher elevations, and on the water.

Lightning can also cause cascading hazards, including power loss. Loss of power could critically impact those relying on energy to service, including those that need powered medical devices. Additionally, the ignition of fires is always a concern with lightning strikes.

The availability of sheltered locations such as basements, buildings constructed using hail-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. Residents living in mobile homes are more vulnerable to high wind and hail events due to the lack of shelter locations and the vulnerability of the housing unit to damages. Individuals who work or play outdoors may also face increased risk.

Since 1999, the NCEI records two fatalities and 16 injuries attributed directly or indirectly to lightning in Chatham County. NCEI records one injury attributed to wind events in Chatham County. There are no injuries or fatalities attributed to hail.

Property

Property damage caused by lightning usually occurs in one of two ways – either by direct damages through fires ignited by lightning, or by secondary impacts due to power surge or loss. According to data collected on lightning strikes in Chatham County, the vast majority of recorded property damage was due to structure fires.

NCEI records provided 41 lightning-related incidents over 25 years (1999-2024), with $4,688,500 in property damage recorded (no incidents were recorded in 2002, 2003, 2005, or 2016). Based on these records, the planning area experiences an annualized loss of $187,540 in property damage.

General damages to property from hail are direct, including destroyed windows, dented cars, and building, roof, and siding damage in areas exposed to hail. Hail damage can total a vehicle. The level of damage is commensurate with both a material's ability to withstand hail impacts and the size of the hailstones that are falling. Construction practices and building codes can help maximize structural resistance to damage. Large amounts of hail may need to be physically cleared from roadways and sidewalks, depending on accumulation. Hail can cause other cascading impacts, including power loss.

During a 25-year span from 1999 through 2024 in Chatham County, NCEI recorded 99 incidents with a total of c $500 in property damage as a direct result of hail. This equates to an annualized loss of $20. This damage was caused by a storm, which was recorded in Svannah on May 24, 2008. It should be noted that property damage due to hail is usually insured loss, with damages covered under most major comprehensive insurance plans. Because of this, hail losses are notoriously underreported by the NCEI. While NCEI data is still used to form a baseline of incident occurrence and general losses, it is important to note that national average hail claim losses, according to State Farm Insurance 2020 reports (most recent available), homeowner's claims averaged $12,000 and vehicle claims averaged $4,300.

Seven wind events reported in NCEI for the 25-year period from 1999 through 2024 totaled $22,000 in property damage, which equates to an annualized loss of $880 across the planning area.

Aside from an overall increase in exposure due to development throughout the planning area, there have been no significant changes in development in the planning area that could affect vulnerability to severe weather in Chatham County.

Environment

The main environmental impact from wind is damage to trees or crops. Wind can cause other environmental impacts including the distribution of trash and debris, soil erosion, and spreading of pollutive elements. Wind events can also bring down power lines, which could cause a fire and result in even greater environmental impacts. Lightning may also result in the ignition of wildfires. This is part of a natural process, however, and the environment will return to its original state in time.

Hail can cause extensive damage to the natural environment, pelting animals, trees and vegetation with hailstones. Melting hail can also increase both river and flash flood risk.

Consequence Analysis

Table 2-70 summarizes the potential negative consequences of severe weather.

Table 2-70 – Consequence Analysis – Severe Weather (Thunderstorm Winds, Lightning, and Hail)

Category	Consequences
Public	Injuries; fatalities
Responders	Injuries; fatalities; potential impacts to response capabilities due to storm impacts
Continuity of Operations (including Continued Delivery of Services)	Potential impacts to continuity of operations due to storm impacts; delays in providing services
Property, Facilities and Infrastructure	Possibility of structure fire ignition; potential for disruptions in power and communications infrastructure; destruction and/or damage to any exposed property, especially windows, cars and siding; mobile homes see increased risk
Environment	Potential fire ignition from lightning; hail damage to wildlife and foliage
Economic Condition of the Jurisdiction	Lightning damage contingent on target; can severely impact/destroy critical infrastructure and other economic drivers
Public Confidence in the Jurisdiction's Governance	Public confidence is not generally affected by severe weather events.

Hazard Summary by Jurisdiction

The following table summarizes severe weather hazard risk by jurisdiction. Most aspects of severe weather risk do not vary substantially by jurisdiction; however, mobile home units are more vulnerable to wind damage. Over 10 percent of the housing stock in Bloomingdale, Garden City, and Port Wentworth is comprised of mobile home units. Additionally, there are over 2,000 mobile home units in unincorporated Chatham County and Savannah. These communities may therefore face more severe impacts from wind. Where priority ratings vary between thunderstorm wind, lightning, and hail for impact and spatial extent, these scores represent an average rating with greater weight given to thunderstorm wind because it occurs much more frequently.

Table 2-71 – Severe Weather (Thunderstorm Winds, Lightning, and Hail) Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	4	3	3	4	1	3.2	H
Bloomingdale	4	3	3	4	1	3.2	H
Garden City	4	3	3	4	1	3.2	H
Pooler	4	3	3	4	1	3.2	H
Port Wentworth	4	3	3	4	1	3.2	H
Savannah	4	3	3	4	1	3.2	H
Thunderbolt	4	3	3	4	1	3.2	H
Tybee Island	4	3	3	4	1	3.2	H
Vernonburg	4	3	3	4	1	3.2	H

2.5.10 Severe Winter Weather

Hazard Background

A winter storm can range from moderate snowfall over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Some winter storms might be large enough to affect several states, while others might affect only localized areas. Occasionally, heavy snow might also cause significant property damages, such as roof collapses on older buildings.

All winter storm events have the potential to present dangerous conditions to the affected area. Larger snowfalls pose a greater risk, reducing visibility due to blowing snow and making driving conditions treacherous. A heavy snow event is defined by the National Weather Service as an accumulation of 4 or more inches in 12 hours or less. A blizzard is the most severe form of winter storm. It combines low temperatures, heavy snow, and winds of 35 miles per hour or more, which reduces visibility to a quarter mile or less for at least 3 hours. Winter storms are often accompanied by sleet, freezing rain, or an ice storm. Such freeze events are particularly hazardous as they create treacherous surfaces.

Ice storms are defined as storms with significant amounts of freezing rain and are a result of cold air damming (CAD). CAD is a shallow, surface-based layer of relatively cold, stably-stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then becomes either super-cooled (liquid below the melting point of water) or re-freezes. In the former case, super-cooled droplets can freeze on impact (freezing rain), while in the latter case, the re-frozen water particles are ice pellets (or sleet). Sleet is defined as partially frozen raindrops or refrozen snowflakes that form into small ice pellets before reaching the ground. They typically bounce when they hit the ground and do not stick to the surface. However, it does accumulate like snow, posing similar problems and has the potential to accumulate into a layer of ice on surfaces. Freezing rain, conversely, usually sticks to the ground, creating a sheet of ice on the roadways and other surfaces. All of the winter storm elements – snow, low temperatures, sleet, ice, etcetera – have the potential to cause significant hazard to a community. Even small accumulations can down power lines and tree limbs and create hazardous driving conditions and disrupt communication and power for days.

Advancements in meteorology and forecasting usually allow for mostly accurate forecasting a few days in advance of an impending storm. Most storms have a duration of a few hours; however, impacts can last a few days after the initial incident until cleanup is completed.

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than 1 week

Location

Severe winter weather is usually a countywide or regional hazard, impacting most or the entire county at the same time. The risk of severe winter weather occurring is uniform across Chatham County.

Extent

The National Oceanic and Atmospheric Administration (NOAA) uses the Regional Snowfall Index (RSI), shown in Table 2-72 for the Chatham County region, to assess the societal impact of winter storms in the six easternmost regions in the United States. The index makes use of population and regional differences to assess the impact of snowfall. For example, areas which receive very little snowfall on average may be more adversely affected than other regions, resulting in a higher severity. The County may experience any level on the RSI scale. Per the 2015 plan, the greatest snowfall amounts to impact Chatham County have been between 4-6 inches. Per NCEI data, the snowstorm of January 3-5, 2018, produced 2-4 inches of

snow across inland portions of the county. Pooler and Port Wentworth recorded three inches; Garden City recorded four inches. and the event was classified as a Category 1 on the RSI scale. It is possible that more severe events and impacts could be felt in the future.

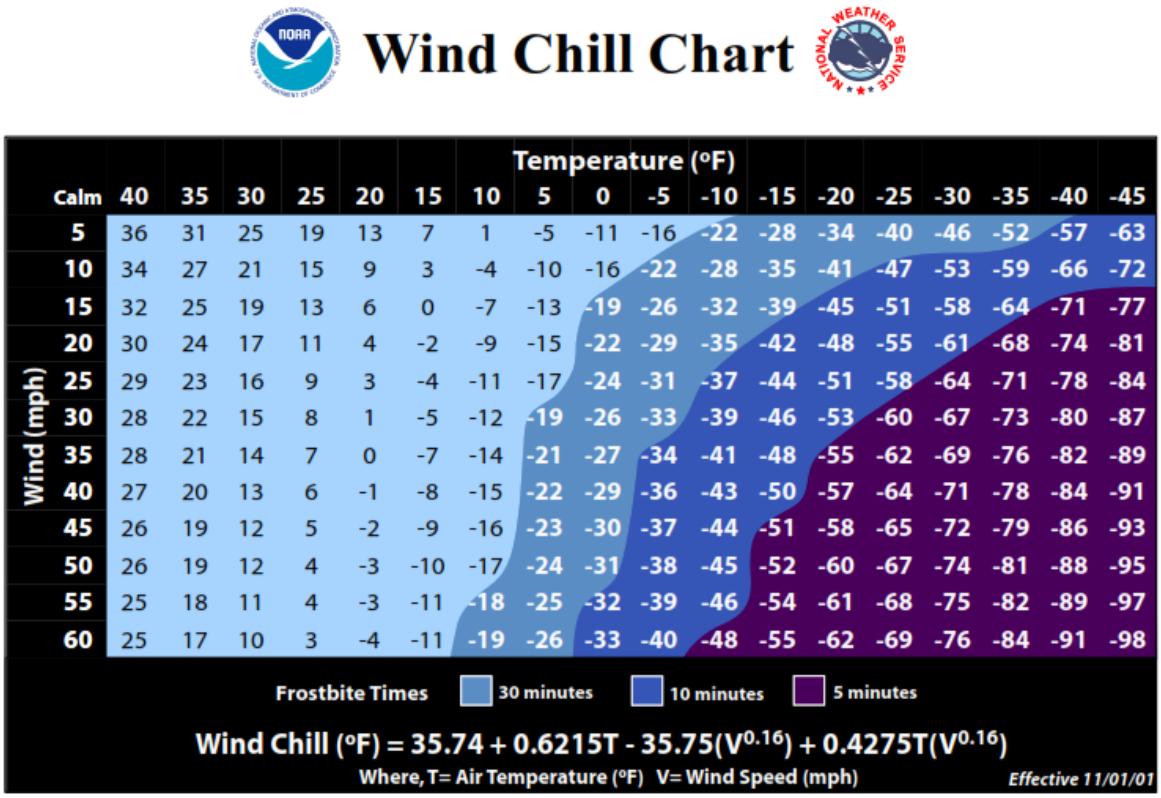
Table 2-72 – Regional Snowfall Index (RSI) Values

Category	RSI Value	Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18+	Extreme

Source: NOAA

Severe winter weather often involves a mix of hazardous weather conditions. The magnitude of an event can be defined based on the severity of each of the involved factors, including precipitation type, precipitation accumulation amounts, temperature, and wind. The NWS Wind Chill Temperature Index, shown in Figure 2-41, provides a formula for calculating the dangers of winter winds and freezing temperatures.

Figure 2-41 – NWS Wind Chill Temperature Index



Source: https://www.weather.gov/safety/cold-wind-chill-chart

The most significant recorded snow depths over the last 20 years took place in January 2018, with recorded depths of up to four inches in the county, and a winter storm event in January 2025 left snow and sleet accumulations on two to four inches across the coastal portion of the county.

Impact: 2 – Limited

Spatial Extent: 4 – Large

The entirety of Georgia is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Chatham County is accustomed to smaller scale severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire County has uniform exposure to a winter storm.

Historical Occurrences

To get a full picture of the range of impacts of a severe winter weather, data for the following weather types as defined by the National Weather Service (NWS) and tracked by NCEI were collected:

- **Blizzard** – A winter storm which produces the following conditions for 3 consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile.
- **Cold/Wind Chill** – Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory conditions of 0°F to -14°F with wind speeds 10 mph (9 kt) or greater.
- **Extreme Cold/Wind Chill** – A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria, defined as wind chill -15°F or lower with wind speeds 10 mph (9 kt) or greater.
- **Frost/Freeze** – A surface air temperature of 32°F or lower, or the formation of ice crystals on the ground or other surfaces, for a period of time long enough to cause human or economic impact, during the locally defined growing season.
- **Heavy Snow** – Snow accumulation meeting or exceeding 12 and/or 24-hour warning criteria of 3 and 4 inches, respectively.
- **Ice Storm** – Ice accretion meeting or exceeding locally/regionally defined warning criteria of ¼ inch or greater resulting in significant, widespread power outages, tree damage and dangerous travel. Issued only in those rare instances where just heavy freezing rain is expected and there will be no "mixed bag" precipitation meaning no snow, sleet or rain.
- **Sleet** – Sleet accumulations meeting or exceeding locally/regionally defined warning criteria of ½ inch or more.
- **Winter Storm** – A winter weather event that has more than one significant hazard and meets or exceeds locally/regionally defined 12 and/or 24-hour warning criteria for at least one of the precipitation elements. Defined by NWS Raleigh Forecast Office as snow accumulations 3 inches or greater in 12 hours (4 inches or more in 24 hours); Freezing rain accumulations ¼ inch (6 mm) or greater; Sleet accumulations ½ inch (13 mm) or more. Issued when there is at least a 60% forecast confidence of any one of the three criteria being met.
- **Winter Weather** – A winter precipitation event that causes a death, injury, or a significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria.

The County has received a Major Disaster Declaration for a freeze event in 1977 and for Severe Snowfall in 1993.

According to the NCEI Storm Events Database, there were two frost/freeze events, two heavy snow event, and one ice storm in the 24-year period from 1999 through 2024. A winter storm event occurred in January 2025. As reported in NCEI, severe winter weather did not cause any fatalities, injuries, property damage,

or crop damage, though these types of impacts may not have been reported and are possible in future events. Severe winter weather related events in Chatham County are recorded in Table 2-73. Note that all events were recorded for both the Inland Chatham County and Coastal Chatham County zones.

Table 2-73 – Recorded Severe Winter Weather Events in Chatham County, 1999-2024

Location(s)	Date	Event Type	Fatalities	Injuries	Property Damage	Crop Damage
Coastal Chatham, Inland Chatham	4/8/2007	Frost/Freeze	0	0	$0	$0
Inland Chatham	2/12/2010	Heavy Snow	0	0	$0	$0
Coastal Chatham, Inland Chatham	1/28/2014	Ice Storm	0	0	$0	$0
Coastal Chatham, Inland Chatham	1/3/2018	Heavy Snow	0	0	$0	$0
Coastal Chatham	12/25/2022	Frost/Freeze	0	0	$0	$0
Coastal Chatham, Inland Chatham	1/21/2025	Winter Storm	0	0	$0	$0
		Total	**0**	**0**	**0**	**$0**

Source: NCEI

Winter Storm impacts from NCEI are summarized below:

April 8, 2007 – A late season cold snap produced widespread frost and freezing temperatures across much of Georgia. Overall damage to the state was at least a 100-million-dollar loss due to damaged fruit and vegetable plants. Temperatures dipped down into the 20s most areas which produced widespread damage to crops and fruit trees. Total monetary losses are unknown but significant.

February 12, 2010 – A strong storm system tracked across northern Florida and then northeastward off the Georgia and South Carolina coast. Precipitation initially fell in the form of rain but quickly changed over to snow in the late afternoon and evening hours as winds shifted to the north and allowed colder air to wrap back into the region. Heavy snow accumulated across much of southeast Georgia. A trained weather spotter measured 2.0 inches of snow accumulation near Pooler, Georgia.

January 28, 2014 – A strong but shallow arctic cold front pushed through the region early in the day. By that evening, a strong cold air damming regime prevailed as northerly surface winds pushed temperatures to around freezing across nearly all of southeast Georgia. Above the shallow freezing layer, a prominent elevated warm layer developed which resulted in the predominant precipitation type being freezing rain for the event. Strong synoptic forcing produced widespread precipitation through the event. Storm total ice accumulations ranged up to one quarter of an inch around Tybee Island and downtown Savannah. The ice caused significant travel hazardous and county law enforcement had to close several bridges including the Sam Varnadoe Bridge, the Islands Expressway Bridge, and the Thunderbolt Bridge which provide access to Wilmington and Tybee Islands.

January 3, 2018 – A developing surface low pressure system offshore and an amplifying upper-level trough approaching from the west combined with unusually cold air to produce widespread significant winter precipitation across southeast Georgia. Most of the precipitation fell as snow, with amounts ranging in coastal areas from 1 to 2 inches and inland areas from 2 to 4 inches. The event began as rain for many areas before changing over to snow, with a period of freezing rain along the coast where up to a quarter of an inch of ice accumulation occurred. The ice did cause some bridges around the coastal portion of the county to be closed due to hazardous travel conditions. The official storm total snowfall for the day at the Savannah-Hilton Head International Airport was 1.2 inches which ranks as the 7th highest one day snowfall on record, dating back to 1871. Elsewhere in the county, measurements included 2 inches Meinhard, 3 inches in Pooler, 3 inches in Port Wentworth, and 4 inches near Garden City. The event caused significant disruption to travel, with many businesses and schools closed the day of the event as well as

the following day. Black ice was also an issue following the event, as well as several days of frigid wind chills.

December 25, 2022 – Arctic high pressure entrenched across the Southeast United States led to an extended period of sub-freezing temperatures across Southeast Georgia. Emergency management reported the city of Savannah receiving 100+ calls to shut off water due to busted pipes in or under homes due to cold weather conditions over the Christmas holiday. Six major water main breaks also occurred which have been repaired. The volume of calls to shut off water was rapidly increasing as warmer temperatures returned and residents discovered leaks or breaks. The coldest temps dropped into the upper teens per observations at both the Savannah International Airport and Hunter Army Airfield.

January 21, 2025 – A prolonged period of widespread precipitation fell across southeast Georgia in the presence of an arctic airmass, beginning in the early evening hours and continuing after sunrise the following morning. The setup resulted in a rare winter storm across the region, with all of southeast Georgia being impacted by significant accumulations of snow and sleet. Temperatures remained cold for several days following the end of the winter weather, so impacts continued for an extended period of time. Hazardous travel conditions persisted for several days as well, causing significant disruptions across the region. Storm total snow/sleet accumulations of 2.0-4.0 inches were reported at various locations across the coastal portion of the county. These reports include observations of 3.3 inches in Coffee Bluff, 3.0 inches on Skidaway Island, 3.2 inches near Isle of Hope, 3.0 inches on Skidaway Island, 2.5 inches near Savannah, 3.0 inches on Tybee Island, and 3.8 inches on Burnside Island.

Chatham County received one emergency declaration and one disaster declaration since 1968 for incidents related to severe winter weather, detailed in Table 2-74.

Table 2-74 – Emergency & Disaster Declarations in Chatham County due to Severe Winter Weather

Disaster Number	Date	Incident Type	Declaration Title
536	6/2/1977	Freezing	Shrimp Loss Due to Cold Weather
3097	3/15/1993	Snow	Severe Snowfall, Winter Storm

Source: FEMA, August 21, 2025

Probability of Future Occurrence

NCEI records six severe winter weather related events during the 26-year period from 1999 through January 2025, which equates to a 23 percent annualized probability in any given year.

Probability: 3 – Likely

Climate Change

Climate change may make Chatham County warmer in winter. It may also change the type and timing of winter hazards and make some winter impacts worse, particularly through increased precipitation intensity, more frequent freeze-thaw cycles with mixed precipitation, and by worsening coastal and compound flooding because of sea-level rise.

Vulnerability Assessment

People

The National Weather Service notes that the leading cause of death during winter storms is from automobile or other transportation accidents due to poor visibility and/or slippery roads. About 70% of ice- and snow-related deaths occur in automobiles; another estimated 25% are people caught out in the storm. Additionally, exhaustion and heart attacks caused by overexertion may result from winter storms

as residents unaccustomed to hard labor endeavor to shovel driveways and sidewalks, free vehicles from snow, and perform other strenuous and relatively unusual tasks.

Power outages during very cold winter storm conditions can also create dangerous situations. Elderly people account for the largest percentage of hypothermia victims. In addition, if the power is out for an extended period, residents tend to seek alternative means to heat their homes. Danger arises from carbon monoxide released from improperly ventilated heating sources such as space or kerosene heaters, furnaces, and blocked chimneys. House fires also occur more frequently in the winter due to lack of proper safety precautions when using an alternative heating source. About 20% of cold-temperature exposure related deaths occur inside the home.

Property

No property damage was reported in association with any winter weather events recorded by the NCEI between 1999 and January 2025 for Chatham County. Therefore, no annualized loss estimate could be calculated for this hazard.

Aside from an overall increase in exposure due to development throughout the planning area, there have been no significant changes in development in the planning area that could affect vulnerability to severe winter weather in Chatham County.

Environment

Winter storm events may include ice or snow accumulation on trees which can cause large limbs, or even whole trees, to snap and fall. Additionally, the cold weather associated with winter storms can cause water to freeze, impacting plants and wildlife.

Consequence Analysis

Table 2-75 summarizes the potential consequences of severe winter weather.

Table 2-75 – Consequence Analysis – Severe Winter Weather

Category	Consequences
Public	Localized impact expected to be severe for affected areas and moderate to light for other less affected areas.
Responders	Adverse impact expected to be severe for unprotected personnel and moderate to light for trained, equipped, and protected personnel.
Continuity of Operations (including Continued Delivery of Services)	Localized disruption of roads and/or utilities caused by incident may postpone delivery of some services.
Property, Facilities and Infrastructure	Localized impact to facilities and infrastructure in the areas of the incident. Power lines and roads are most adversely affected.
Environment	Environmental damage to trees, bushes, etc.
Economic Condition of the Jurisdiction	Local economy and finances may be adversely affected, depending on damage.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective.

Hazard Summary by Jurisdiction

The following table summarizes severe winter weather hazard risk by jurisdiction. Severe winter weather risk does not vary substantially by jurisdiction because these events are typically regional in nature.

Table 2-76 –Severe Winter Weather Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	2	4	1	3	2.7	H
Bloomingdale	3	2	4	1	3	2.7	H
Garden City	3	2	4	1	3	2.7	H
Pooler	3	2	4	1	3	2.7	H
Port Wentworth	3	2	4	1	3	2.7	H
Savannah	3	2	4	1	3	2.7	H
Thunderbolt	3	2	4	1	3	2.7	H
Tybee Island	3	2	4	1	3	2.7	H
Vernonburg	3	2	4	1	3	2.7	H

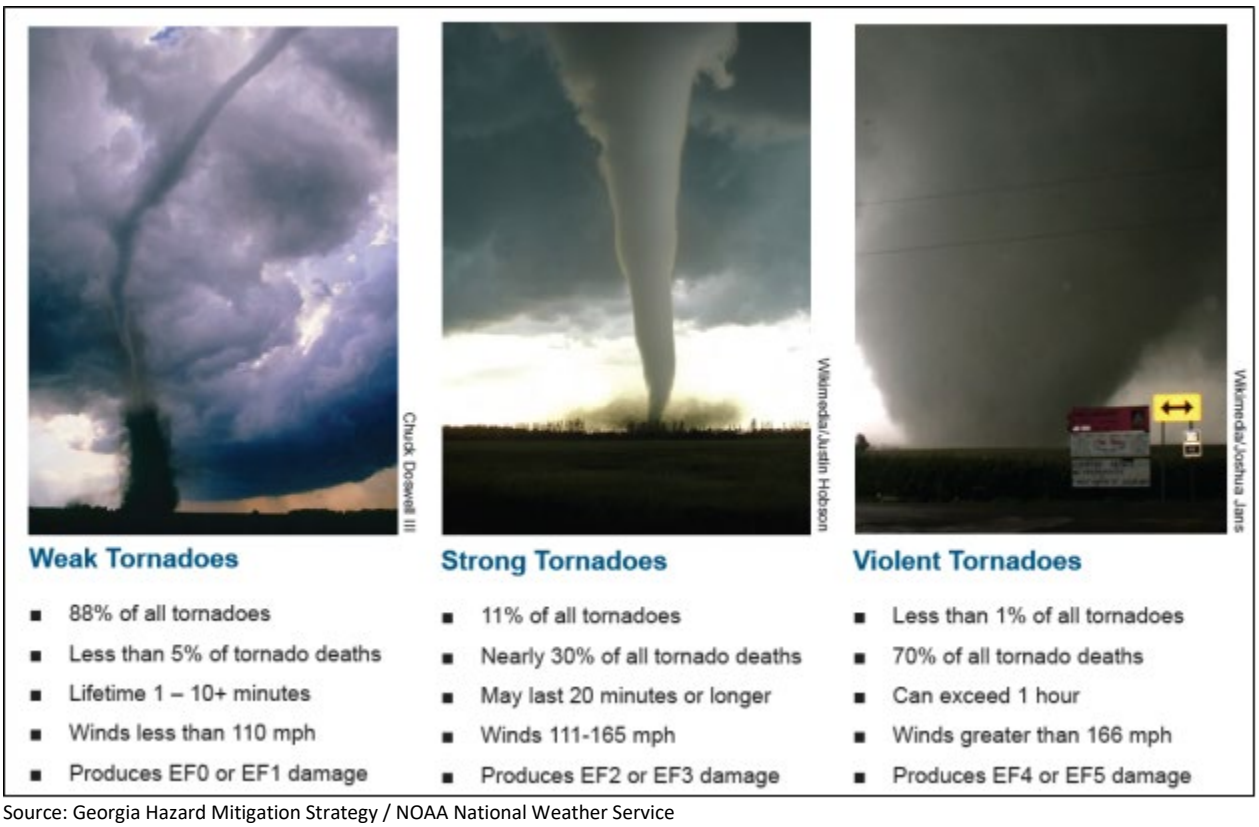
2.5.11 Tornado

Hazard Background

According to the Glossary of Meteorology (AMS 2000), a tornado is "a violently rotating column of air, pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud." Tornadoes can appear from any direction. Most move from southwest to northeast, or west to east. Some tornadoes have changed direction amid path or even backtracked.

Tornadoes are commonly produced by land falling tropical cyclones. Those making landfall along the Gulf coast traditionally produce more tornadoes than those making landfall along the Atlantic coast. Tornadoes that form within hurricanes are more common in the right front quadrant with respect to the forward direction but can occur in other areas as well. According to the NHC, about 10% of the tropical cyclone-related fatalities are caused by tornadoes. Tornadoes are more likely to be spawned within 24 hours of landfall and are usually within 30 miles of the tropical cyclone's center.

Tornadoes have the potential to produce winds in excess of 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive – some in the Great Plains have exceeded two miles in width. Tornadoes associated with tropical cyclones, however, tend to be of lower intensity (EF0 to EF2) and much smaller in size than ones that form in the Great Plains.



Source: Georgia Hazard Mitigation Strategy / NOAA National Weather Service

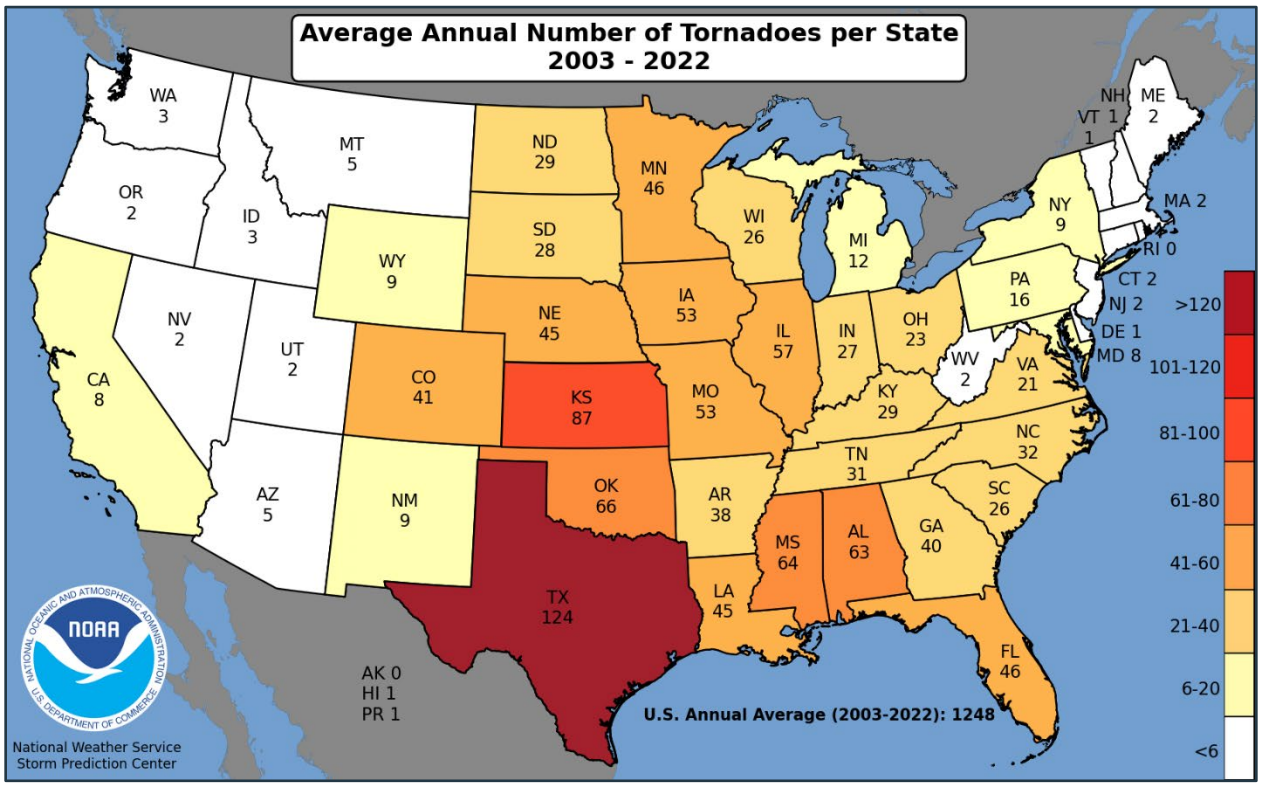
Warning Time: 4 – Less than 6 hours

Duration: 1 – Less than 6 hours

According to the NOAA Storm Prediction Center (SPC), the United States experiences an average of 1248 tornadoes per year with the highest concentration in Texas (124) and Kansas (87). Per the same data set,

Georgia experiences an average of 40 tornadoes per year, and nearby neighboring South Carolina sees an average of 26. Figure 2-42 shows average annual tornado activity by state between 2003 and 2022.

Figure 2-42 – Tornado Activity in the U.S., 2003-2022.

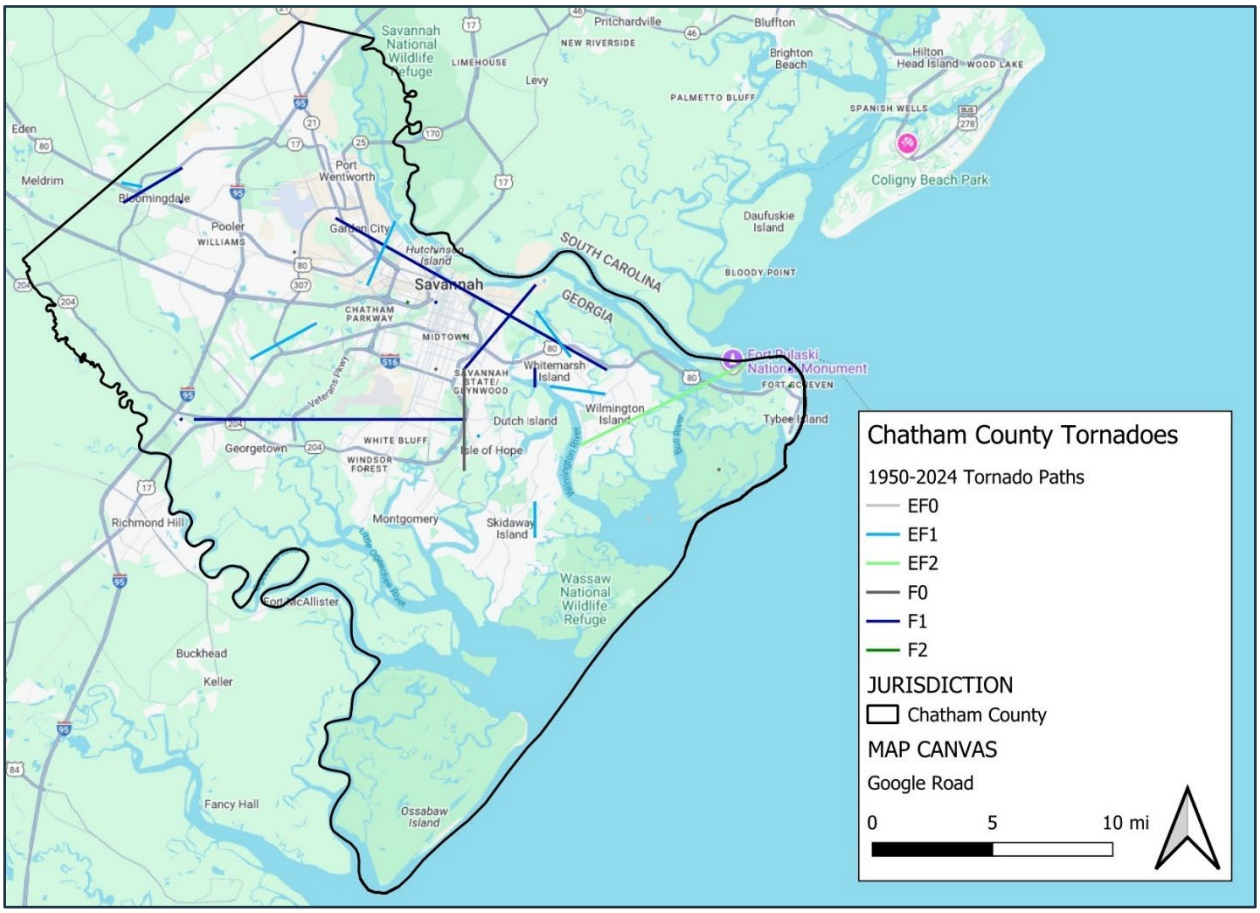


Source: American Society of Civil Engineers

Location

Figure 2-43 reflects the tracks of past tornados that passed through Chatham County from 1950 through 2024 according to data from the NOAA/National Weather Service Storm Prediction Center.

Figure 2-43 – Tornado Paths Through Chatham County, 1950-2024



Source: NOAA/NWS Storm Prediction Center SVRGIS

Tornados can occur anywhere in the County. Tornadoes typically impact a small area, but damage may be extensive. Tornado locations are completely random, meaning risk to tornado isn't increased in one area of the county versus another. All of Chatham County is uniformly exposed to this hazard.

Extent

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita (EF) scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected, and the construction of structures damaged by a tornado. Table 2-77 shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different levels of intensity.

Table 2-77 – Enhanced Fujita Scale

EF Number	3 Second Gust (mph)	Damage
0	65-85	**Light damage.** Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
1	96-110	**Moderate damage.** Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
2	111-135	**Considerable damage.** Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	136-165	**Severe damage.** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
4	166-200	**Devastating damage.** Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
5	Over 200	**Incredible damage.** Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m; high-rise buildings have significant structural deformation; incredible phenomena will occur.

The most intense tornado to pass through Chatham County in the past 20 years was an EF2 on Wilmington Island on May 23, 2017. While NCEI reports no property damage occurred, Chatham County Emergency Management Agency reported damage to 30 homes ranging from moderate to major, with at least one home taking direct damage. The tornado was 7.49 miles long and 300 yards wide.

Impact: 3 – Critical

Spatial Extent: 2 – Small

Historical Occurrences

According to NOAA's Storm Prediction Center, Chatham County experienced 13 tornado incidents between 1999 and 2024, causing six injuries, $3.6 million in property damage and no fatalities or crop damage. However, this damage estimate may be under reported, as damage was reported in the narratives of many events but was not recorded in terms of a monetary value. It is likely that there have been several tornados that occurred but went unreported. Table 2-78 shows historical tornadoes in Chatham County during this time period.

Table 2-78 – Recorded Tornadoes in Chatham County, 1999-2024

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Thunderbolt	9/6/2004	1002	F1	0	0	$0	$0
Wilmington Is	5/20/2005	1700	F0	0	0	$0	$0
Thunderbolt	6/13/2006	1215	F1	0	0	$500,000	$0
Sandfly	6/19/2008	1437	EF1	0	0	$3,100,000	$0
Burroughs	1/4/2015	1503	EF1	0	0	$0	$0
Bloomingdale	5/17/2016	1509	EF1	0	0	$0	$0
Montgomery	7/4/2016	1618	EF0	0	0	$0	$0
Wilmington Is	7/22/2016	1010	EF0	0	0	$0	$0
Wilshire	9/2/2016	412	EF1	0	0	$0	$0
Central Jct	5/4/2017	1650	EF1	0	5	$0	$0

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Wilmington Is	5/23/2017	1653	EF2	0	0	$0	$0
Savannah	7/27/2018	1449	EF1	0	0	$0	$0
Parkersburg	5/4/2019	1553	EF1	0	1	$0	$0
Total				**0**	**6**	**$3,600,000**	**$0**

Source: NOAA/NWS Storm Prediction Center SVRGIS, NCEI

Narratives from NCEI illustrate that damage occurred in many of these incidents even if a monetary value was not recorded. Specific incidents with some level of impact include:

June 13, 2006 – NWS damage survey confirmed a tornado touched down 1.5 miles south of Riverside at 1:15 PM. The tornado lifted and touched down a couple of times before finally lifting about 1 mile south of Riverside at 1:17 PM. The tornado occurred in the Bradley Point subdivision. It snapped off huge oak trees and large branches causing damage to 15 to 20 homes and several vehicles. The path length was about 1/2 mile with a maximum width of 175 yards. The tornado was rated F1 with winds estimated in the 100 to 110 mph range.

June 19, 2008 – A weak trough of low pressure in combination with the sea breeze in a well sheared and highly unstable environment, resulted in numerous thunderstorms across southern South Carolina and southeast Georgia. The National Weather Service Office in Charleston, South Carolina determined that an EF-1 Tornado occurred with a maximum width of about 100 yards, and maximum sustained winds estimated at 90 to 100 mph. This Tornado damaged a fire station and uprooted and snapped off numerous trees. The vast majority of the damage was caused by at least 5 strong downbursts. Downburst winds knocked the steeple off a church and knocked down or snapped off thousands of trees. Tree limbs and large branches damaged 40 to 50 homes, with about a dozen of the homes sustaining major damage, and a dozen vehicles. The winds knocked down power poles and power lines, resulting in thousands of people without power.

May 17, 2016 – A National Weather Service storm survey team confirmed an EF-1 tornado near Bloomingdale, Georgia. The tornado first touched down with EF-0 intensity near a mobile home on Pop Shearhouse Road. Most of the roof of the mobile home was blown off and some tree damage occurred. As the tornado progressed eastward, it intensified and snapped trees along Stagecoach Road. Roof fascia was also ripped off of a home. The degree of tree damage in this area was consistent with an EF-1 tornado with maximum winds estimated to be 90-95 miles per hour. The tornado continued eastward to Cheyenne Road where the damage pattern became more sporadic. Here, trees were uprooted and damage to the roof of an RV and outbuilding occurred. The tornado continued to produce isolated tree damage as it moved eastward before dissipating near Jimmy DeLoach Parkway.

May 4, 2017 – A National Weather Service storm survey team confirmed that an EF1 tornado occurred in Chatham County near Garden City. The tornado began near the intersection of Seaboard Coastline Drive and Telfair Road with damage limited to snapped trees and minor wind damage to some mobile office trailers. The tornado continued northward along Alfred Street, just east of Market Street causing snapped trees and minor damage to one home. About one third of the metal roof of an industrial building just north of Market Street was damaged. In the more industrial and commercial area just south of Highway 80, the tornado caused significant damage to an Advanced Auto Parts store where three walls collapsed, and the roof was heavily damaged and shifted halfway off the remaining rear wall. Five people were injured inside the store and at least 5 cars were heavily damaged when the front wall of the store fell on them. At this point, the tornado had its strongest winds, estimated to be around 110 mph. The tornado finally terminated at the Port of Savannah-Garden City, where it pushed over some shipping containers

and did minor damage to some container tanks in the area before moving into the Savannah River and dissipating.

May 23, 2017 – A National Weather Service storm survey team confirmed an EF2 tornado across Wilmington Island in Chatham County. The tornado touched down on the southern end of Wilmington Island and was rated EF1 in strength, with maximum winds of up to 100 to 110 mph. Across southern Wilmington Island, the bulk of the damage was in the form of large snapped and uprooted trees. Approximately 30 homes sustained damage, ranging from minor shingle loss to moderate or major damage due to trees or large limbs hitting the homes. At least one home surveyed along Walthour Road sustained direct structural damage from the tornado, with the roof to a sunroom being torn off. The tornado strengthened to a low end EF2 as it approached Fort Pulaski, where it caused the concrete walls and roof structure of the visitor center to shift and buckle. A smaller building next to the main visitor center had similar damage. There were many hardwood trees snapped close to the base of their trunks all around the complex of Fort Pulaski, along with at least two mid-sized vehicles in the parking lot that were pushed and rolled over. The tornado then progressed across the parking lot, just north of Fort Pulaski, where it exited into the Atlantic Ocean as a strong waterspout.

In 1995, Chatham County received a Major Disaster Declaration for an October 1994 severe storm event that included tornadoes.

Probability of Future Occurrence

Probability of future occurrence was calculated based on past occurrences and was assumed to be uniform across the county.

In a 25-year span from 1999 through 2024, Chatham County experienced 13 separate tornado incidents. This correlates to a 52 percent annualized probability that the planning area will experience a tornado somewhere in its boundaries. Only one of these past tornado events was a magnitude F2/EF2 or greater; therefore, the annual probability of a significant tornado event is approximately four percent.

Probability: 3 – Likely

Climate Change

Climate change is projected to increase the potential for strong and frequent tornado outbreaks by providing more energy in the atmosphere through warmer, moist air, though the overall impact on frequency is complex and still being studied. A weakening jet stream may lead to increased "helicity," a measure of the atmosphere's tendency to spin, enhancing conditions for tornado formation. There's also evidence of an eastward shift in tornado activity, with more frequent outbreaks in the Southeast, and a potential for more nocturnal tornadoes, which poses a greater risk due to reduced visibility and fewer warning hours, according to the National Weather Service and the National Oceanic and Atmospheric Administration (NOAA).

Vulnerability Assessment

The 2025 HAZUS-MH Risk Assessment Analysis provided insight into a hypothetical EF-3 tornado scenario that crosses through parts of Savannah and a small portion of the unincorporated county. Chatham County has never experienced an F3/EF3 tornado. The HAZUS analysis is available in Appendix E for studies and future reference if probabilistic tornadic strength increases in the region.

People

People and populations exposed to the elements are most vulnerable to tornados. The availability of sheltered locations such as basements, buildings constructed using tornado-resistant materials and

methods, and public storm shelters, all reduce the exposure of the population. Mobile homes and their occupants have a disproportionate risk to tornado damage. According to the 2023 American Community Survey (ACS) 5-Year Estimates, 4,513 occupied housing units (3.3 percent) in Chatham County are classified as "mobile homes or other types of housing." Using the 2024 ACS persons per household estimate of 2.35, the population at risk due to their housing type was estimated at 10,606 residents. Individuals who work and play outdoors may also face increased risk.

Since 1999, the NCEI database has recorded no fatalities and 6 injuries attributed to tornadoes in Chatham County.

Property

General damages to property are both direct (what the tornado physically destroys) and indirect, which focuses on additional costs, damages and losses attributed to secondary hazards spawned by the tornado, or due to the damages caused by the tornado. Depending on the size of the tornado and its path, a tornado is capable of damaging and eventually destroying almost anything. Construction practices and building codes can help maximize the resistance of the structures to damage.

Secondary impacts of tornado damage often result from damage to infrastructure. Downed power and communications transmission lines, coupled with disruptions to transportation, create difficulties in reporting and responding to emergencies. These indirect impacts of a tornado put tremendous strain on a community. In the immediate aftermath, the focus is on emergency services and the restoration of essential services and utilities.

Since 1999, damaging tornadoes in the County are directly responsible for $3.6 million worth of damage to property according to NCEI data. This equates to an annualized loss of $144,000.

Aside from an overall increase in exposure due to development throughout the planning area, there have been no significant changes in development in the planning area that would affect vulnerability to tornado in Chatham County.

Environment

Tornadoes can cause massive damage to the natural environment, uprooting trees and other debris within the tornado's path. This is part of a natural process, however, and not of concern with the possible exception of hazardous materials releases or pollution/litter/debris spread by tornado winds.

Consequence Analysis

Table 2-79 summarizes the potential negative consequences of tornado.

Table 2-79 – Consequence Analysis - Tornado

Category	Consequences
Public	Injuries; fatalities
Responders	Injuries; fatalities; potential impacts to response capabilities due to storm impacts
Continuity of Operations (including Continued Delivery of Services)	Potential impacts to continuity of operations due to storm impacts; delays in providing services
Property, Facilities and Infrastructure	The weakest tornadoes, EF0, can cause minor roof damage, while strong tornadoes can destroy frame buildings and even badly damage steel reinforced concrete structures. Buildings are vulnerable to direct impact from tornadoes and

Category	Consequences
	also from wind borne debris. Mobile homes are particularly susceptible to damage during tornadoes.
Environment	Hazardous materials releases, litter, debris.
Economic Condition of the Jurisdiction	Contingent on tornado's path can severely impact/destroy critical infrastructure and other economic drivers.
Public Confidence in the Jurisdiction's Governance	Public confidence in the jurisdiction's governance may be influenced by severe tornado events if response and recovery are not timely and effective.

Hazard Summary by Jurisdiction

The following table summarizes tornado hazard risk by jurisdiction. Tornado hazard risk does not vary substantially by jurisdiction.

Table 2-80 –Tornado Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	3	2	4	1	2.7	H
Bloomingdale	3	3	2	4	1	2.7	H
Garden City	3	3	2	4	1	2.7	H
Pooler	3	3	2	4	1	2.7	H
Port Wentworth	3	3	2	4	1	2.7	H
Savannah	3	3	2	4	1	2.7	H
Thunderbolt	3	3	2	4	1	2.7	H
Tybee Island	3	3	2	4	1	2.7	H
Vernonburg	3	3	2	4	1	2.7	H

2.5.12 Tsunami

Hazard Background

Tsunamis are a series of long-period waves generated primarily by undersea earthquakes, volcanic eruptions, or submarine landslides. Although the U.S. Southeast coast is not adjacent to a major subduction zone, distant sources such as the Puerto Rico Trench, the Azores–Gibraltar (Lisbon) region, and submarine slope failures on the Atlantic margin present a low-probability but potentially high-consequence hazard for coastal Georgia.

The broad continental shelf along Georgia's coastline tends to reduce tsunami wave heights but can still allow hazardous currents, flooding, and damage to vessels, port facilities, and low-lying development. NOAA and the National Tsunami Hazard Mitigation Program (NTHMP) have modeled potential impacts for the Savannah–Tybee area, and inundation maps are available for planning and evacuation purposes.

Warning Time: 4 – Less than 6 hours

Duration: 1 – Less than 6 hours

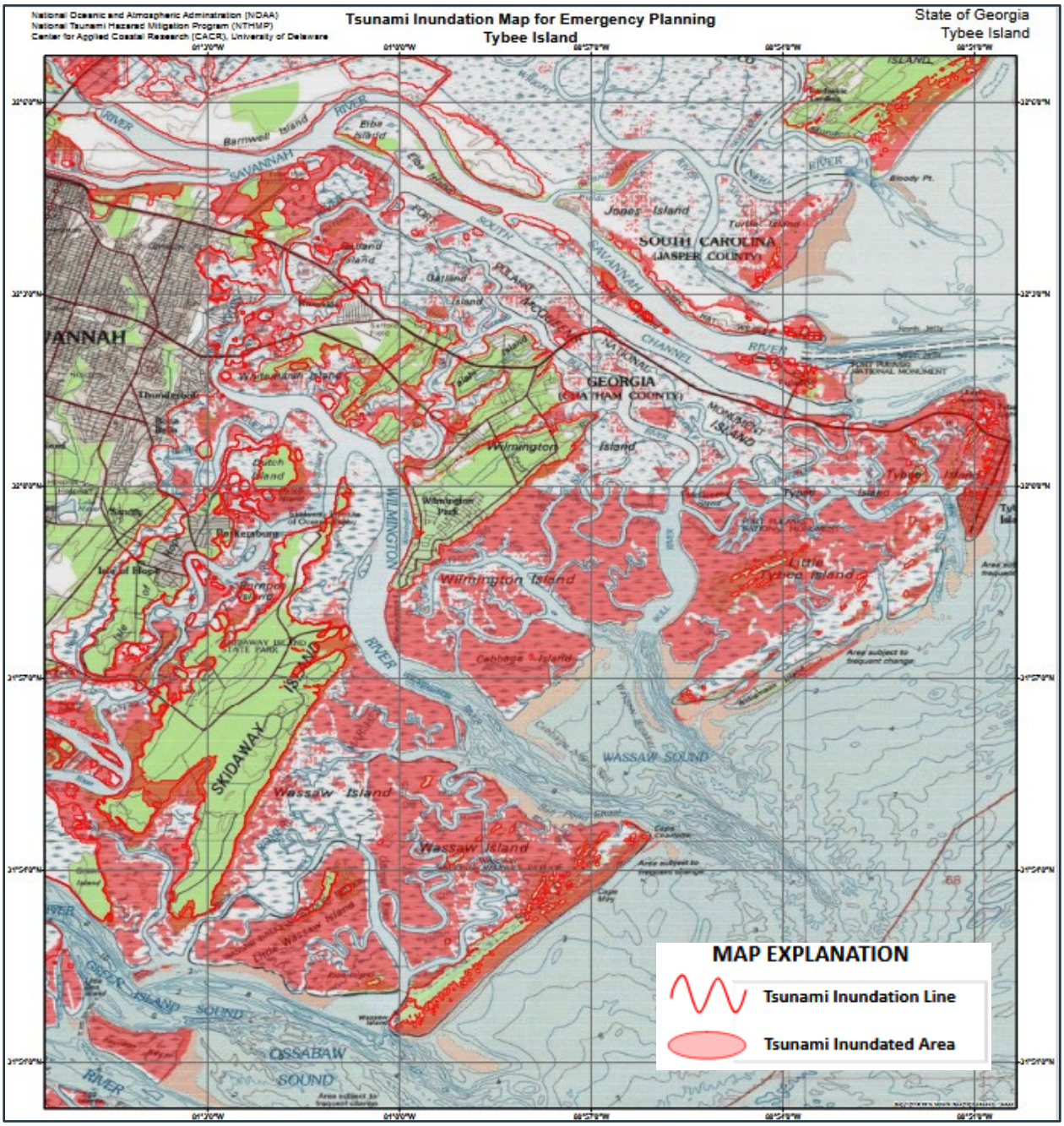
Location

The entire Georgia coastal zone including Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden Counties is exposed to tsunami hazard. Specific areas of concern include:

- Barrier islands such as Tybee, St. Simons, Jekyll, and Cumberland, where development and tourism are concentrated.
- Low-lying critical infrastructure such as the Port of Savannah, Port of Brunswick, bridges and causeways, and energy or water facilities located near tidal estuaries.
- Dense visitor-serving areas where evacuation is constrained by limited roadway access.

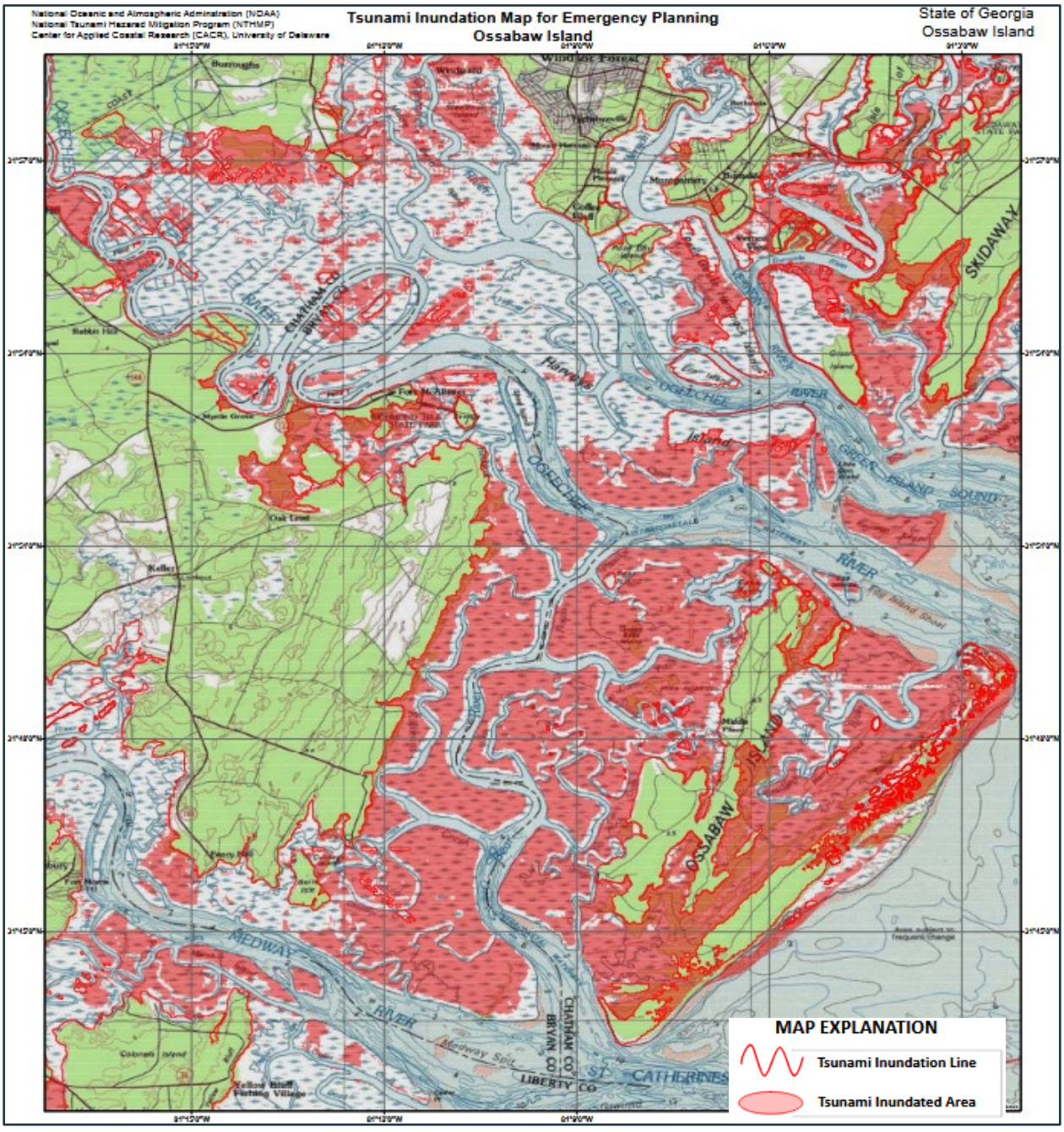
Based on modeling by NOAA and USGS, arrival times from credible Caribbean sources are estimated at 4–5.5 hours, with some far-field sources (e.g., Azores–Gibraltar) producing lead times of 20 hours or more. Figure 2-44 through Figure 2-46 provide tsunami inundation models for planning purposes in Chatham County.

Figure 2-44 – Tsunami Inundation for Tybee Island, 2015



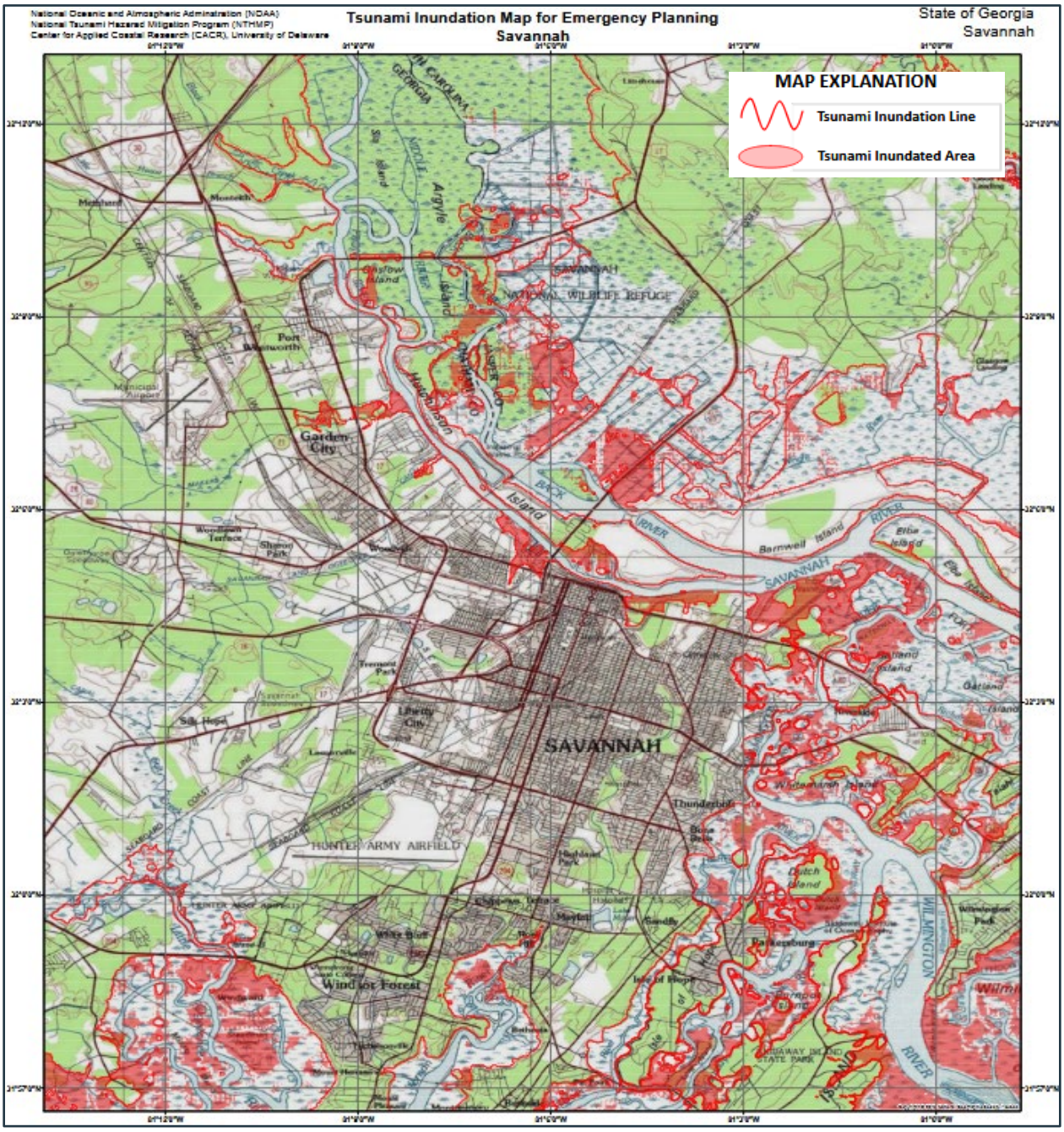
Source: NOAA/NWS Tsunami Evacuation and Inundation Maps; https://www.weather.gov/nthmp/tsunamimaps

Figure 2-45 – Tsunami Inundation for Ossabaw Island, 2015



Source: NOAA/NWS Tsunami Evacuation and Inundation Maps; https://www.weather.gov/nthmp/tsunamimaps

Figure 2-46 – Tsunami Inundation for Savannah, 2015



Source: NOAA/NWS Tsunami Evacuation and Inundation Maps; https://www.weather.gov/nthmp/tsunamimaps

Extent

While the Modified Mercalli Intensity Scale (MMI) is commonly used in the U.S. to describe the shaking intensity of earthquakes based on observed effects and damage, it's not specifically a tsunami scale. Instead, the U.S. focuses on a comprehensive warning system to communicate the potential impacts of a tsunami, enabling coastal communities to take appropriate action based on the level of threat. NOAA's tsunami forecasting system utilizes DART sensors (Deep-ocean Assessment and Reporting of Tsunamis)

and the MOST model (Method of Splitting Tsunamis) to predict tsunami characteristics and guide warning levels.

The United States uses a system of tsunami messages issued by the National Weather Service (NWS) and the Pacific Tsunami Warning Center (PTWC), with the aim of ensuring timely and effective public response. This system employs four alert levels:

- **Tsunami Warning:** This indicates a serious threat with dangerous coastal flooding and powerful currents expected or occurring, requiring immediate action, including evacuation to higher ground.
- **Tsunami Advisory:** This signifies the potential for strong currents and waves dangerous to those near or in the water, requiring staying out of the water and away from beaches and waterways.
- **Tsunami Watch:** A Watch means a distant earthquake has occurred that could generate a tsunami, and the public should stay tuned for updates and be prepared to take action.
- **Tsunami Information Statement:** This indicates a situation where no tsunami threat is expected, or the threat level has not yet been determined.

Figure 2-44 through Figure 2-46 depict potential inundation areas in the coastal and tidal river areas of the county, including unincorporated Chatham County, Tybee Island, Garden City, Savannah, and areas around Thunderbolt, and Vernonburg.

Impact: 3 – Limited

Spatial Extent: 2 – Small

Historical Occurrences

There are no confirmed records of damaging tsunamis in Georgia's history. The 1755 Lisbon earthquake generated a trans-Atlantic tsunami, but no verified inundation was recorded along Georgia's coast. The 1886 Charleston earthquake produced widespread regional shaking, though no tsunami impacts in Georgia were documented.

Probability of Future Occurrence

While historical evidence suggests very low probability, national modeling studies indicate that even modest events could disrupt port operations, damage vessels, and inundate low-lying barrier islands.

Probability: 1 – Unlikely

Climate Change

While climate change doesn't directly cause tsunamis, it can exacerbate the conditions that make them more likely or more destructive. Rising sea levels from climate change can increase the inundation area and depth of tsunamis, making them more impactful on coastal communities.

Vulnerability Assessment

People

People and populations along the coast and in low-lying tidal areas are most vulnerable to tsunami. For those who are unable to evacuate for medical reasons, there should be provision to take care of special-needs patients and those in hospitals and nursing homes. Many of these patients are either oxygen-dependent, insulin-dependent, or in need of intensive medical care. There is a need to provide ongoing treatment for these vulnerable citizens, either on the coast or by air evacuation to upland hospitals. The

stress from disasters such as a hurricane can result in immediate and long-term physical and emotional health problems among victims.

Tsunami evacuees may need short-term shelter support. Based on the model inundation mapping, the entire Tybee Island community, portions of the county islands, and small parts of east Savannah would require evacuation planning and support.

Property

Tsunamis can cause catastrophic damage to coastlines and several miles inland. Tsunamis can produce large waves and tidal surges with significant velocity to damage or destroy structures in the tsunami inundation zones. Additionally, debris caused by a tsunami can impound streams and rivers, causing additional flooding to structures in the nearby area. Port facilities in Savannah that are vulnerable to strong tsunami currents and vessel movement may also be impacted.

Aside from an overall increase in exposure due to development throughout the planning area, there have been no significant changes in development in the planning area that would affect vulnerability to tsunami in Chatham County.

Environment

Tsunamis cause acute and rapid erosion of beaches, dunes, and other natural protective barriers. They uproot trees and other vegetation, can swamp habitats for animals, and cause salt-water intrusion into freshwater areas.

Consequence Analysis

Table 2-81 summarizes the potential negative consequences of tsunami.

Table 2-81 – Consequence Analysis - Tsunami

Category	Consequences
Public	Injuries; fatalities
Responders	Injuries; fatalities; potential impacts to response capabilities due to tsunami impacts
Continuity of Operations (including Continued Delivery of Services)	Potential impacts to continuity of operations due to tsunami impacts; delays in providing services
Property, Facilities and Infrastructure	Structural damage to buildings may occur; loss of glass windows and doors by water pressure and debris; partial wall collapses, and other damages requiring significant repairs are possible in a significant tsunami. Flooding from tsunami may also negatively impact facilities and infrastructure.
Environment	Debris impoundments, saltwater intrusion, and uprooting of vegetation can have long-term impacts on the environment.
Economic Condition of the Jurisdiction	Tsunamis can severely impact/destroy critical infrastructure and other economic drivers.
Public Confidence in the Jurisdiction's Governance	Public confidence in the jurisdiction's governance may be influenced by tsunami events if response and recovery are not timely and effective.

Hazard Summary by Jurisdiction

Table 2-82 summarizes tsunami hazard risk by jurisdiction. Coastal and tidal river jurisdictions are at a higher risk of tsunami impacts.

Table 2-82 –Tsunami Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	2	2	4	1	1.8	L
Bloomingdale	1	1	1	4	1	1.3	L
Garden City	1	1	2	4	1	1.5	L
Pooler	1	1	1	4	1	1.3	L
Port Wentworth	1	1	2	4	1	1.5	L
Savannah	1	1	2	4	1	1.5	L
Thunderbolt	1	1	2	4	1	1.5	L
Tybee Island	1	4	4	4	1	2.8	H
Vernonburg	1	1	2	4	1	1.5	L

2.5.13 Wildfire

Hazard Background

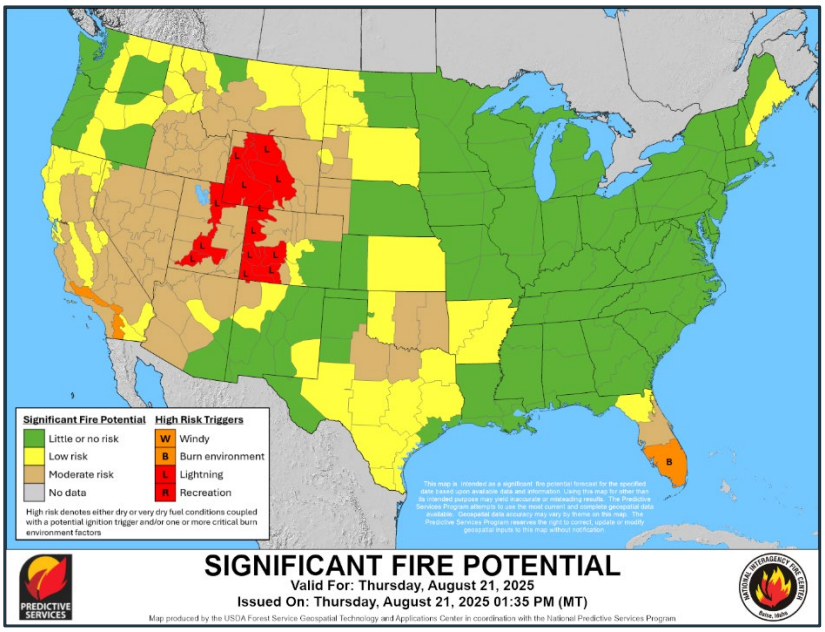
A wildfire is an uncontained fire that spreads through the environment. Wildfires have the ability to consume large areas, including infrastructure, property, and resources. When massive fires develop near populated areas, evacuations possibly ensue. Not only do the flames impact the environment, but the massive volumes of smoke spread by certain atmospheric conditions also impact the health of downwind populations. There are three general types of fire spread that are recognized.

- **Ground fires** – burn organic matter in the soil beneath surface litter and are sustained by glowing combustion.
- **Surface fires** – spread with a flaming front and burn leaf litter, fallen branches and other fuels located at ground level.
- **Crown fires** – burn through the top layer of foliage on a tree, known as the canopy or crown fires. Crown fires, the most intense type of fire and often the most difficult to contain, need strong winds, steep slopes and a heavy fuel load to continue burning.

Generally, wildfires are started by humans, either through arson or carelessness, or by lightning strikes. Fire intensity is controlled by both short-term weather conditions and longer-term vegetation conditions. During intense fires, understory vegetation, such as leaves, small branches, and other organic materials that accumulate on the ground, can become additional fuel for the fire. The most explosive conditions occur when dry, gusty winds blow across dry vegetation.

Weather plays a major role in the birth, growth and death of a wildfire. The National Weather Service Fire Weather Program emerged in response to a need for weather support for large and dangerous wildfires. This service is provided to federal and state land management agencies for the prevention, suppression, and management of forest and rangeland fires. As shown in Figure 2-47, the National Weather Service provides year-round fire weather forecasts for the region at www.weather.gov/fire.

Figure 2-47 – Fire Weather Forecast, Chatham County



Source: National Weather Service

Weather conditions favorable to wildfire include drought, which increases flammability of surface fuels, and winds, which aid a wildfire's progress. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Rapid response can contain wildfires and limit their threat to property.

Chatham County experiences a variety of wildfire conditions found in the Keetch-Byram Drought Index (KBDI), which is described in Table 2-83. Information available during the risk assessment showed that Chatham County is not in a drought and approximately 10% of the State of Georgia is abnormally dry, but no areas in the state are under drought conditions. For this period, the KDBI is low at 199.

Table 2-83 – Keetch-Byram Drought Index Fire Danger Rating System

KBDI	Description
0-200	Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in sports and patches.
200-400	Fires more readily burn and will carry across an area with no gaps. Heavier fuels will still not readily ignite and burn. Also, expect smoldering and the resulting smoke to carry into and possibly through the night.
400-600	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days, creating possible smoke and control problems.
600-800	Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

Location

The location of wildfire risk can be defined by the acreage of Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels and thus demarcates the spatial extent of wildfire risk. The WUI is essentially all the land in the county that is not heavily urbanized. The Southern Wildfire Risk Assessment (SWRA) Version 5.0 further defines a Functional WUI a s a classification of land near buildings greater than 430 square feet into zones that describe the wildfire risk mitigation activities appropriate for each zone. Those classifications are:

- Direct Exposure - The Direct Exposure zone is burnable land cover within 75 m of a structure. Reducing fire intensity and ember production in this zone would reduce the exposure of nearby buildings to heat and embers. Buildings in this zone also require hardening of the structure to resist ignition.
- Indirect Exposure - The Indirect Exposure zone is nonburnable land cover within 1500 m of burnable land cover that is within 75 m of a structure, meaning that embers and home-to-home spread could reach within this zone. Indirectly exposed structures would benefit from the hardening of the structure to resist ignition from embers and nearby structures, but defensible space is usually not required due to the heavily developed nature of the zone.
- Critical Fireshed - The Critical Fireshed is the unpopulated land within about 2.4 km of a group of structures. Fires that originate within or spread to the Critical Fireshed have an immediate threat of reaching the nearby structures; fuel treatments that slow fire spread in this zone can reduce risk to these structures.

- Sources of Ember Load to Buildings - These are areas of burnable land cover that produces embers capable of reaching nearby buildings. Ember production is a function of fire type and intensity, and ember travel is a function of wind speed and direction. Fuel treatment in this zone is a priority for reducing ember load to the nearby buildings.
- Little-to-No Exposure - The Little-to-No Exposure zone is nonburnable land that is within 75 m of a structure but greater than 1500 m from a large (500 ha) contiguous block of burnable land cover. Flames—even from home-to-home spread—and embers are unlikely to reach the Little-to-No-Exposure zone, but smoke and evacuations could still impact this area.

Table 2-84 provides the acreage of land in each classification. Figure 2-48 shows the locations of the Functional WUI areas in the county.

Table 2-84 – Functional WUI Acres in Chatham County

	Functional Wildland Urban Interface (WUI) Category	Acres	Percent
	Direct Exposure	32,367	9 %
	Indirect Exposure	45,801	13 %
	Critical Fireshed	97,327	27 %
	Sources of Ember Load to Buildings	47,070	13 %
	Little to No Exposure	1,729	0 %
	Water	139,863	38 %
	Total	**364,156**	**100 %**

Source: Southern Wildfire Risk Assessment Report, Version 5

Figure 2-48 – Functional WUI Interface, Chatham County

Source: Southern Wildfire Risk Assessment Report, Version 5

Population growth within the WUI substantially increases the risk of wildfire. The expansion of residential development from urban centers into rural landscapes increases the potential for wildland fire threat to public safety and the potential for damage to forest resources and dependent industries.

Extent

Wildfire extent can be defined by the fire's intensity and measured by the Characteristic Fire Intensity Scale, which identifies areas where significant fuel hazards could produce dangerous fires. Fire Intensity ratings identify where significant fuel hazards and dangerous fire behavior potential exist based on fuels, topography, and a weighted average of four percentile weather categories. The Fire Intensity Scale, shown in Table 2-85, consists of five classes, as defined by Southern Wildfire Risk Assessment. Figure 2-49 shows the potential fire intensity within the WUI across Chatham County.

Table 2-85 – Fire Intensity Scale

Class	Description
1, Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
2, Low	Small flames, usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.

Class	Description
3, Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
4, High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
5, Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Source: Southern Wildfire Risk Assessment

Figure 2-49 – Characteristic Fire Intensity, Chatham County

Source: Southern Wildfire Risk Assessment

A significant portion, approximately 21.9 percent, of Chatham County may experience up to a Class 4 or greater Fire Intensity, which poses significant risk to life and property. However, the areas with greatest potential fire intensity are largely outside the WUI along the coastal and marsh areas, which are generally less populated. Approximately 5.3 percent of the county may experience Class 3 Fire Intensity, which has potential for harm to life and property but is easier to control with fire breaks. The remainder of the region is either non-burnable (50.6%) or would face a Class 1 or Class 2 Fire Intensity.

Impact: 2 – Limited

Spatial Extent: 3 – Moderate

Historical Occurrences

The Georgia Forestry Commission maintains monthly records of acreage burned and number of fires burned that are accessible to the public under the Georgia Open Records Law. The Commission also created a Community Wildfire Protection Plan for Chatham County in September 2014, which was updated in 2020. The purpose of this plan is to assess wildfire risks in the county and plan to mitigate such risks as funding becomes available.

According to the 2020 Community Wildfire Protection Plan, over the prior 56 years, the County averaged 73 reported wildland fires per year, burning 475 acres on average per year. Over the previous ten year, the county averaged 18 fires per year burning 175 acres annually. Table 2-86 summarizes past occurrences of wildfire in Chatham County since 1999 as provided by the Georgia Forestry Commission in August 2019. More recent data was not available during the plan update process. The data is from GFC records only and may not include data on fires burned within jurisdictional limits that did not require GFC assistance to suppress. Actual number of fires and acreage burned may be higher than what is reported here.

Table 2-86 – Records for Wildfire in Chatham County, 1999-2018

Year	Number of Fires	Acreage Burned
1999	77	311.86
2000	49	281.28
2001	52	203.93
2002	40	273.86
2003	5	2.63
2004	38	123.22
2005	32	35.97
2006	39	77.43
2007	51	1,517.68
2008	27	96.79
2009	17	54.10
2010	36	135.06
2011	35	142.46
2012	26	113.30
2013	6	13.30
2014	6	31.24
2015	5	31.01
2016	8	17.89
2017	8	23.58
2018	7	45.70
Total	**564**	**3,532.29**

Source: Georgia Forestry Commission

The region experienced prolonged periods of severe drought in 2002 and 2002, as well as moderate drought in 2007. These periods of drought may explain some of the annual variation in fires and acreage burned.

On average using the best available data, Chatham County experiences 28.2 fires and 176.6 acres burned annually from fires reported by the Georgia Forestry Commission. Actual number of fires and acreage burned is likely higher because smaller fires within jurisdictional boundaries are managed by local fire departments.

Probability of Future Occurrence

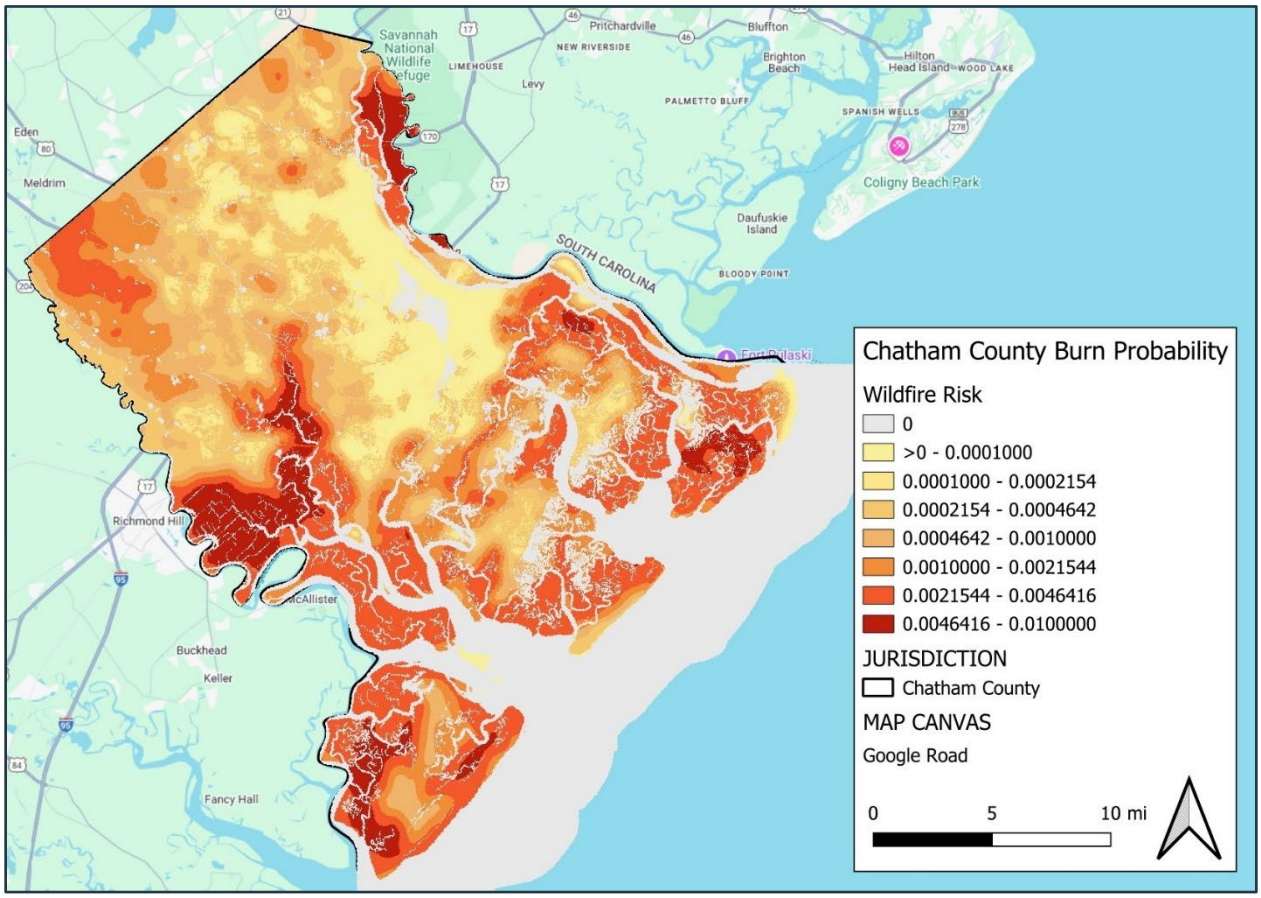
Burn probability is the likelihood of wildfire burning a specific location within a set time frame - commonly represented as the chance of burning during one calendar year or wildfire season. Burn Probability can be expressed as a fraction (ex. 0.005) or odds (1-in-200) and is based on fire behavior modeling across thousands of simulations of possible fire seasons. Burn probability for Chatham County received a ranking matrix of 1-12, with 1 being the lowest probability and 12 being the highest. In each simulation, factors contributing to the probability of a fire occurring, including weather and ignition likelihood are varied based on patterns derived from observations in recent decades. Burn probability is not predictive and does not reflect any forecast weather or fire danger conditions. It also does not calculate fire intensity. The Burn Probability for Chatham County is presented in Table 2-87 and illustrated in Figure 2-50.

Table 2-87 – Burn Probability, Chatham County

	Burn Probability Category	Probability Ranking	Acres	Percent
	0	1	142,134	35 %
	>0 - 0.0001000	2	25,514	6 %
	0.0001000 - 0.0002154	3	17,572	4 %
	0.0002154 - 0.0004642	4	46,080	11 %
	0.0004642 - 0.0010000	5	43,915	11 %
	0.0010000 - 0.0021544	6	43,577	11 %
	0.0021544 - 0.0046416	7	62,816	16 %
	0.0046416 - 0.0100000	8	19,522	5 %
	0.0100000 - 0.0215443	9	0	0 %
	0.0215443 - 0.0464159	10	0	0 %
	0.0464159 - 0.1000000	11	0	0 %
	>0.10000000	12	0	0 %
	Total		**401,130**	**100 %**

Source: Southern Wildfire Risk Assessment

Figure 2-50 – Burn Probability, Chatham County



Source: Southern Wildfire Risk Assessment

Just over 30 percent of Chatham County has a burn probability ranking between 6 and 8. The areas of higher burn probability are located on the coast and on the southwestern border of the county. The north and northwestern portions of the county have a burn probability of 1 to 5. The probability of wildfire across the county is considered likely, defined as between a 10% and 100% annual chance of occurrence. The communities containing a higher burn probability, as noted, have a comparatively higher probability of occurrence.

Probability: 3 – Likely

Climate Change

Chatham County's probability of wildfire impacts is expected to rise under climate change because of hotter conditions, periodic drying episodes, a longer season of fire-favorable weather, and a likely increase in lightning and human ignitions. Even if massive, landscape-scale conflagrations remain less common than in western U.S. forests, the frequency of hazardous fire windows, localized destructive fires, and smoke events that harm public health and infrastructure is very likely to increase.

Vulnerability Assessment

The Southern Wildfire Risk Assessment Report, Version 5 provides additional details on wildfire risk in Chatham County. It is available in Appendix F of this plan.

People

Wildfire can cause fatalities and human health hazards. Ensuring procedures are in place for rapid warning and evacuation are essential to reducing vulnerability.

Property

Wildfire can cause direct property losses, including damage to buildings, vehicles, landscaped areas, agricultural lands, and livestock. Construction practices and building codes can increase fire resistance and fire safety of structures. Techniques for reducing vulnerability to wildfire include using street design to ensure accessibility to fire trucks, incorporating fire resistant materials in building construction, and using landscaping practices to reduce flammability and the ability for fire to spread.

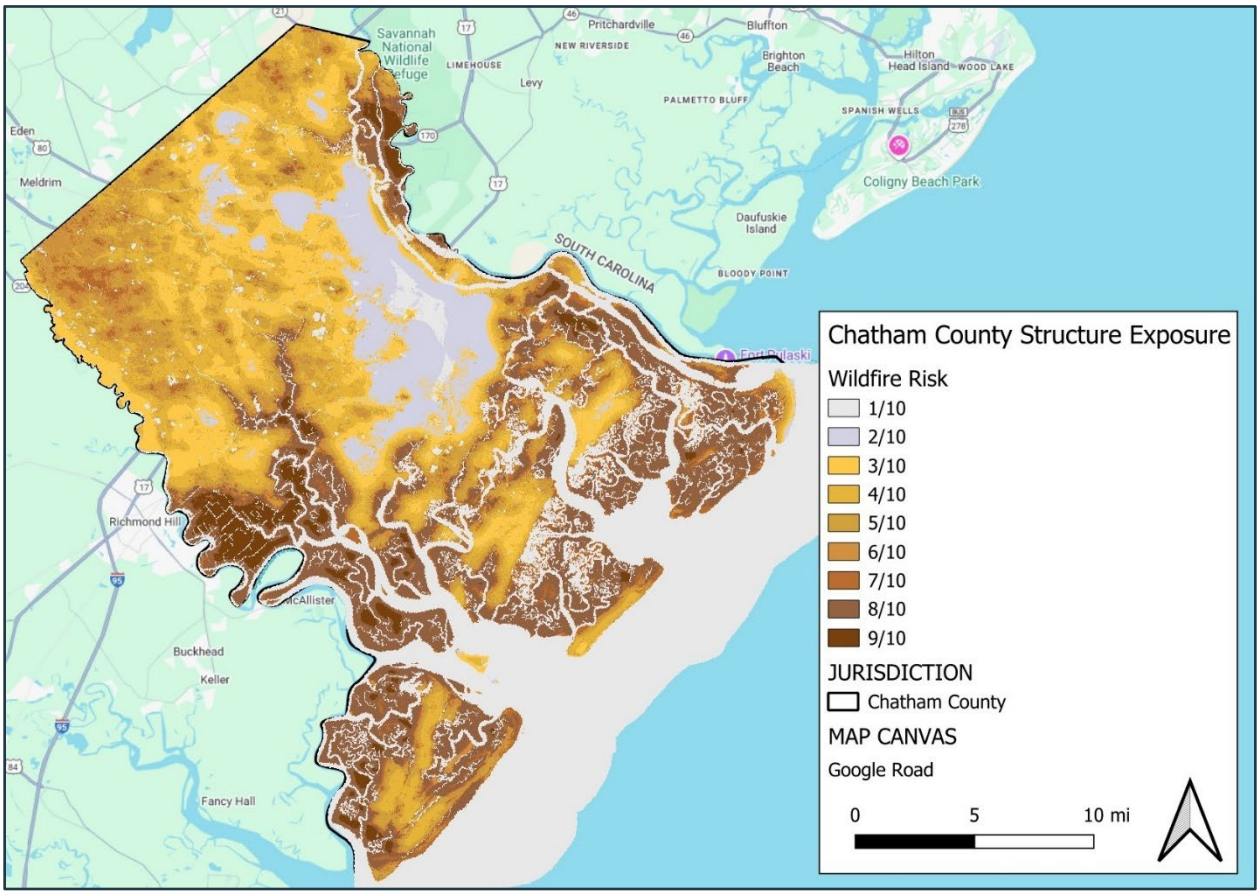
The SWRA provides a wildfire exposure risk score by acreage. The data shows a rating of the potential impact of wildfire on homes, people, and property. This index ranges from 1 to 10, where lower values are least exposed. Table 2-88 summarizes the number of acres in each score category and the percentage of the county. This table represents potential risks in the event of a wildfire may differ. Figure 2-51 shows the areas of structure exposure. The greatest risk is along the coast and in the southeastern portion of the county. The least risk is depicted in the northern part of Savannah and west through Garden City.

Aside from an overall increase in exposure due to development throughout the planning area, there have been no significant changes in development in the planning area that would affect vulnerability to tornado in Chatham County.

Table 2-88 – Chatham County Wildfire Exposure

	Wildfire Exposure Score Category	Acres	Percent
	1/10	142,134	35 %
	2/10	26,600	7 %
	3/10	41,000	10 %
	4/10	49,466	12 %
	5/10	29,933	7 %
	6/10	21,655	5 %
	7/10	19,248	5 %
	8/10	61,117	15 %
	9/10	9,976	2 %
	10/10	0	0 %
	Total	**401,129**	**100 %**

Figure 2-51 – Wildfire Risk, Chatham County



Environment

Wildfires have the potential to destroy forest and forage resources and damage natural habitats. Wildfire can also damage agricultural crops on private land. Wildfire is part of a natural process, however, and the environment will return to its original state in time.

Consequence Analysis

Table 2-89 summarizes the potential detrimental consequences of wildfire.

Table 2-89 – Consequence Analysis - Wildfire

Category	Consequences
Public	In addition to the potential for fatalities, wildfire and the resulting diminished air quality pose health risks. Exposure to wildfire smoke can cause serious health problems within a community, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Vulnerable populations include children, the elderly, people with respiratory problems or with heart disease. Even healthy citizens may experience minor symptoms, such as sore throats and itchy eyes.
Responders	Public and firefighter safety is the first priority in all wildland fire management activities. Wildfires are a real threat to the health and safety of the emergency services. Most fire-fighters in rural areas are 'retained'. This means that they are part-time and can be called away from their normal work to attend to fires.

Category	Consequences
Continuity of Operations (including Continued Delivery of Services)	Wildfire events can result in a loss of power which may impact operations. Downed trees, power lines and damaged road conditions may prevent access to critical facilities and/or emergency equipment.
Property, Facilities and Infrastructure	Wildfires frequently damage community infrastructure, including roadways, communication networks and facilities, power lines, and water distribution systems. Restoring basic services is critical and a top priority. Efforts to restore roadways include the costs of maintenance and damage assessment teams, field data collection, and replacement or repair costs. Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground distribution lines, and soil erosion or debris deposits into waterways after the fire. Utilities and communications repairs are also necessary for equipment damaged by a fire. This includes power lines, transformers, cell phone towers, and phone lines.
Environment	Wildfires cause damage to the natural environment, killing vegetation and animals. The risk of floods and debris flows increases after wildfires due to the exposure of bare ground and the loss of vegetation. In addition, the secondary effects of wildfires, including erosion, landslides, introduction of invasive species, and changes in water quality, are often more disastrous than the fire itself.
Economic Condition of the Jurisdiction	Wildfires can have significant short-term and long-term effects on the local economy. Wildfires, and extreme fire danger, may reduce recreation and tourism in and near the fires. If aesthetics are impaired, local property values can decline. Extensive fire damage to trees can significantly alter the timber supply, both through a short-term surplus from timber salvage and a longer-term decline while the trees regrow. Water supplies can be degraded by post-fire erosion and stream sedimentation.
Public Confidence in the Jurisdiction's Governance	Wildfire events may cause issues with public confidence because they have very visible impacts on the community. Public confidence in the jurisdiction's governance may be influenced by actions taken pre-disaster to mitigate and prepare for impacts, including the amount of public education provided; efforts to provide warning to residents; response actions; and speed and effectiveness of recovery.

Hazard Summary by Jurisdiction

The following table summarizes wildfire hazard risk by jurisdiction. Wildfire warning time and duration do not vary by jurisdiction. Spatial extent ratings were estimated based on the proportion of area within the WUI; all jurisdictions have at least 50% of their area in the WUI and were assigned a rating of 3. Impact ratings were based on fire intensity data from SWRA. Jurisdictions with significant clusters of moderate to high fire intensity were assigned a rating of 3; all other jurisdictions were assigned a rating of 2. Probability ratings were determined based on burn probability data from SWRA. Jurisdictions with clusters of moderate burn probability were assigned a rating of 3; all other jurisdictions were assigned a probability of 2.

Table 2-90 –Wildfire Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	3	3	4	3	3.1	H
Bloomingdale	2	3	3	4	3	2.8	H
Garden City	2	3	3	4	3	2.8	H
Pooler	2	2	3	4	3	2.5	H
Port Wentworth	2	2	3	4	3	2.5	H
Savannah	3	3	3	4	3	3.1	H
Thunderbolt	3	3	3	4	3	3.1	H
Tybee Island	3	3	3	4	3	3.1	H
Vernonburg	3	3	3	4	3	3.1	H

2.5.14 Conflagration

Hazard Background

A conflagration is a large, rapidly spreading fire in the built environment, particularly densely developed and/or populated areas. In conflagrations, fires spread uncontrollably from structure to structure. These fires are especially dangerous because of the danger to human life presented by large, fast-moving fires in areas with the limited egress endemic to developed areas. For hazard mitigation purposes, major urban fires involving large buildings and/or multiple properties are of primary concern. The effects of a major urban fire include minor to significant property damage, loss of life, and residential or business displacement. In Chatham County, industrial/warehouse fires are of the most significant concern, along with the possibility that such events could spread to dense residential areas.

The 1991 Tunnel Fire in the Oakland Hills ushered in the return of built environment conflagrations in the USA. Wildfire, which had been viewed as a wildland and rural community problem, now was a catalyst for conflagration due to the encroachment of development into the wildland-urban interface. Over the next three decades, the most catastrophic wildfires were often those where fire burned communities in the Wildland-Urban Interface (WUI) and spread into suburban neighborhoods, creating a conflagration.

Most recently, the Lahaina Fire on the island of Maui, Hawaii and the Marshall Fire in Colorado demonstrated the devastating impact of a conflagration in the built environment. Both fires spread from arid grasslands into a community and in both cases over 1,000 structures were lost in just twelve hours, as well as the significant loss of nearly 100 human lives in Lahaina.

The five factors that have always accompanied urban and suburban conflagrations are:

- Drought
- Wind
- Ignition mechanism, often human-based
- Dense construction using materials with little to no resistance to the hazard
- Dense combustible elements surrounding and between structures

Warning Time: 4 – Less than 6 hours

Duration: 2 – Less than 24 hours

Location:

A conflagration can consume enormous swaths of a community in a manner that is not predictable. The boundaries of the wildland-urban interface in the county are discussed in the “Wildfire” section which may provide some guidance as to higher risk areas and areas in which a conflagration may start. Conflagration risk in Chatham County has not been studied but densely developed areas in or near the Wildland-Urban Interface may be at increased risk.

Conflagration involving warehouse facilities and/or industrial areas are also a concern in Chatham County. They pose significant risks, with the National Fire Protection Association (NFPA) reporting an average of 1,508 warehouse fires annually between 2018 and 2022. These fires are associated with higher property losses. Electrical issues, operating equipment, and arson are leading contributors to these fires, causing injuries and substantial damage.

All areas of Chatham County are exposed to structure fire hazards; however, certain communities and land uses present elevated conflagration risk:

- City of Savannah Historic District: Concentration of 19th-century wood-frame and mixed-construction buildings with limited separation.
- Port of Savannah and industrial corridors: Warehouses, petrochemical storage, and intermodal facilities.
- Suburban multifamily housing: Apartment complexes, townhomes, and high-density developments with shared walls.
- Tourist areas and commercial corridors: High-occupancy structures, hotels, and entertainment venues.
- Islands and barrier communities (Tybee, Wilmington, Skidaway): Limited access/egress and reliance on volunteer or smaller fire companies.

Extent

Localized fires are common and generally contained by local fire services within minutes to hours. Conflagration potential exists in areas with high-density wood construction (Savannah historic core, older neighborhoods), critical infrastructure clusters (Port facilities, chemical storage, utilities), and large industrial or institutional facilities (hospitals, universities, plants).

Severity ranges from localized damage to countywide cascading impacts if a major fire disrupts port operations, industrial facilities, or transportation corridors.

Wind and drought conditions can amplify spread and intensity. Section 2.5.13 provides a discussion of extent in terms of wildfire risk in Chatham County. Conflagration risk and extent have not been studied in the planning area.

Impact: 3 – Critical

Spatial Extent: 3 – Moderate

Historical Occurrences

Historical accounts of major fires in Chatham County date back to Savannah's Great Fire of 1820, which destroyed over 450 buildings and the Savannah Fire of 1889, which burned 150 buildings and displaced thousands. In recent history, Savannah and Chatham County have experienced multiple large industrial and commercial structure fires, including:

- Port-area warehouse fires involving hazardous materials (chemical and petrochemical).
- Multifamily housing fires in Savannah neighborhoods causing mass displacement.
- Historic structure losses in the downtown district due to electrical faults and aging infrastructure.

January 11, 1820 – The Great Fire of 1820 was one of the most devastating events in Savannah's history, breaking out on January 11, 1820, during a period of severe economic hardship following the War of 1812 and a yellow fever epidemic. Fanned by high winds, the blaze quickly spread through the city's wooden buildings, destroying more than 450 structures, including homes, businesses, warehouses, and churches, and leaving hundreds of residents homeless. While remarkably only two lives were reported lost, the fire caused extensive property damage and reshaped the city's development. Recovery efforts included widespread rebuilding, stricter fire ordinances, and greater emphasis on using brick construction, which permanently altered the architectural character of Savannah.

April 6, 1889 – Fire struck on April 6, when flames ignited near West Broad and Indian Streets and were rapidly spread by strong winds through tightly built wooden neighborhoods. In just a few hours, the fire consumed over 150 buildings, including homes, businesses, churches, and warehouses, leaving thousands of residents displaced and causing millions of dollars in damage. Despite the scale of destruction, only a handful of lives were lost, thanks in part to the efforts of firefighters and community volunteers. The

disaster highlighted the vulnerability of Savannah's densely packed wooden structures and led to stronger fire codes, expanded water supply and hydrant systems, and a greater push toward brick construction and improved firefighting capacity, shaping the city's built environment into the early 20th century.

April 10, 1995 – The Powell Duffryn fire of 1995 was one of Savannah's most serious modern industrial disasters. On April 10, a massive blaze broke out at the Powell Duffryn Terminals chemical storage facility along the Savannah River, where large quantities of petroleum products, solvents, and hazardous chemicals were stored. The fire produced towering flames and thick black smoke visible for miles, forcing the evacuation of thousands of nearby residents and businesses due to concerns over toxic fumes and potential explosions. Firefighters battled the fire for hours under dangerous conditions, using large volumes of foam and water to contain the blaze. While no fatalities occurred, several responders suffered injuries, and the incident raised major concerns about hazardous material storage, environmental contamination of the river and marshes, and the risks posed to surrounding communities by Savannah's industrial and port facilities. The event prompted stronger fire safety measures, emergency response planning, and regulatory oversight of chemical storage operations in the region.

February 7, 2008 – The Imperial Sugar refinery fire and explosion in Port Wentworth, Georgia, occurred on February 7, 2008, and was one of the nation's deadliest industrial accidents in recent decades. A massive dust explosion, fueled by accumulations of combustible sugar dust inside the refinery, ripped through the facility, causing a chain reaction of secondary blasts and fires. The disaster killed 14 workers and injured dozens more, many with severe burns, while devastating large portions of the plant and halting operations for months. Emergency responders from across Chatham County and the region fought the blaze and conducted rescues under extreme conditions. The tragedy drew national attention to the dangers of combustible dust in industrial settings and led to significant reforms in workplace safety practices, stronger OSHA emphasis on dust hazard standards, and long-term improvements in fire protection and emergency response planning for Savannah-area industrial facilities.

Nationally, conflagrations are not common but have occurred with increased frequency in recent decades. Notable conflagrations in recent history in the USA include:

October 20, 1991 – The Oakland Hills Tunnel Fire, also known as the 1991 Oakland Firestorm, erupted in the Berkeley and Oakland Hills of California. Sparked from a rekindled grassfire and fanned by hot, dry winds, the blaze exploded into a firestorm that swept through densely built hillside neighborhoods. In just two days, it destroyed more than 3,000 homes and apartments, burned about 1,520 acres, killed 25 people, and injured over 150 others. Flames advanced so quickly that many residents had little or no warning to evacuate, and the fire's intensity overwhelmed firefighting resources.

December 30, 2021 – The Marshall Fire erupted in Boulder County, Colorado, during an extreme wind event with gusts over 100 mph following a prolonged drought. The fast-moving grassfire ignited in dry open space near Superior and Louisville and quickly spread into residential subdivisions, fueled by high winds and suburban development patterns at the wildland–urban interface. In less than 24 hours, the fire destroyed over 1,000 homes and businesses, damaged hundreds more, forced the evacuation of more than 35,000 residents, and caused two confirmed deaths with one person missing. Losses exceeded $2 billion, making it the most destructive wildfire in Colorado's history by structures lost.

August 8, 2023 – The 2023 Lahaina Fire on Maui, Hawaii, erupted on August 8, 2023, during a period of extreme drought and was intensified by powerful winds from nearby Hurricane Dora. The wildfire swept through the historic town of Lahaina, overwhelming firefighting resources and leaving residents with little time to escape. The blaze killed at least 100 people, making it the deadliest U.S. wildfire in more than a century, and destroyed or damaged over 2,000 structures.

Probability of Future Occurrences.

Any densely developed area in contact with the wildland-urban interface and the threat of wildland fire can be a candidate for a conflagration under the right conditions. A conflagration is always a possibility in such areas. More study is needed to accurately quantify all of the factors that need to be weighed in order to develop a probability model.

Additionally, areas of high-density populations with large warehousing, large, balloon construction structures, and older commercial properties with party walls are vulnerable to conflagrations. Many areas of Chatham County have these structural features in their jurisdictions.

While fire prevention, suppression, and modern codes have reduced frequency of large conflagrations, dense development patterns and critical industries continue to pose risk.

Probability: 1 – Unlikely

Vulnerability Assessment

People

Of most significant concern in conflagrations is the devastating impact on human life such a fire can have. Many residents can become trapped in a conflagration with no egress due to the fast-moving nature of such a disaster as well as the sheer number of other people trying to escape the flames. Fleeing residents can be overrun by fire while in their vehicles, on foot, or trying to shelter in their homes. Extensive loss of human life is one of the hallmarks of conflagration.

Property

Conflagrations are by definition widespread and commonly devour all of the built environment that lies in their path. Property damage by conflagration usually comes in the form of total devastation, total loss.

Environment

Conflagration has environmental implications that go beyond those of a typical wildfire; given the vast destruction caused by a conflagration, additional hazardous materials and pollutive agents are much more likely. Pollution of water sources caused by extensive runoff of debris and chemicals and air pollution from smoke and soot are some of the potential environmental effects experienced during wildfire events that are likely to be exacerbated in a conflagration event.

Consequence Analysis

Table 2-91 summarizes the potential detrimental consequences of conflagration.

Table 2-91 – Consequence Analysis - Conflagration

Category	Consequences
Public	In addition to the potential for fatalities, diminished downwind air quality poses health risks. Exposure to smoke can cause serious health problems within a community, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Weather conditions can alter the risk as high winds can carry smoke and toxic vapors for miles. Rain can also cause particulate matter in smoke to adhere to raindrops and fall onto people and property. Vulnerable populations include those who are in the immediate vicinity of the fire and those downwind.

Category	Consequences
Responders	Public and firefighter safety is the first priority in all fire management activities. Conflagrations threaten the health and safety of the emergency services personnel, especially those who are not properly trained and/or have the proper personal protective equipment.
Continuity of Operations (including Continued Delivery of Services)	Conflagration can result in a loss of utility services, which may impact operations.
Property, Facilities and Infrastructure	Conflagrations can damage community infrastructure, including roadways, communication networks and facilities, power lines, and water distribution systems. Restoring basic services is critical and a top priority. Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground distribution lines, and soil erosion or debris deposits into waterways after the fire. Utilities and communications repairs are also necessary for equipment damaged by a fire.
Environment	Conflagrations can cause damage to the natural environment, killing vegetation and animals. Toxic water runoff from firefighting operations can enter storm drains, natural waterways, marshes, and nearby soil.
Economic Condition of the Jurisdiction	Conflagration can have significant short-term and long-term effects on the local economy. Entire neighborhoods and business districts can be destroyed, and local property values can decline.
Public Confidence in the Jurisdiction's Governance	Conflagration events may cause issues with public confidence because they have very visible impacts on the community. Public confidence in the jurisdiction's governance may be influenced by actions taken to provide warning to residents; response actions; and speed and effectiveness of recovery.

Hazard Summary by Jurisdiction

The following table summarizes conflagration hazard risk by jurisdiction. Warning time and duration do not vary by jurisdiction. Spatial extent ratings were estimated based on the proportion of area with higher housing density and greater industrial development. Impact ratings were based on population density and wildfire risk. Probability ratings were determined based on available data on conflagration and large fire history across the county.

Table 2-92 –Conflagration Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	3	3	4	2	2.4	M
Bloomingdale	1	2	3	4	2	2.1	M
Garden City	1	3	3	4	2	2.4	M
Pooler	1	2	2	4	2	1.9	L
Port Wentworth	1	2	2	4	2	1.9	L
Savannah	1	3	3	4	2	2.4	M
Thunderbolt	1	2	2	4	2	1.9	L
Tybee Island	1	3	3	4	2	2.4	M
Vernonburg	1	2	2	4	2	1.9	L

2.5.15 Hazardous Materials Incident

Hazard Background

A hazardous substance is any substance that may cause harm to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in increasing types and quantities. Each year over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals". Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area.

Fixed Hazardous Materials Incident

A fixed hazardous materials incident is the release of chemical substances or mixtures during production or handling at a fixed facility. Hazardous materials releases can be accidental or intentional, as with a terror attack, addressed in Section 2.5.16.

Fixed facilities with hazardous materials can include industrial, commercial, and federal facilities. The Emergency Planning and Community Right-to-Know Act (EPCRA) created several methods for tracking facilities with hazardous materials. Section 313 of the EPCRA created the Toxics Release Inventory (TRI). The TRI tracks toxic chemical releases and pollution prevention activities reported by industrial and federal facilities. TRI data is made publicly available by the U.S. Environmental Protection Agency (EPA). Section 312 of the EPCRA mandated additional reporting of hazard materials by businesses and organizations with quantities of hazardous materials over a certain threshold. Tier II reports must be submitted annually, and help local fire departments, Local Emergency Planning Committees (LEPC) and State Emergency Response Commissions (SERCs) plan for and respond to chemical emergencies. Tier II facility reports are identified and mapped as part of the County's Emergency Operations Plans. Figure 2-52 provides the locations of Tier II facilities in Chatham County. These facilities can be viewed in greater detail at the following link:

https://cccdn.blob.core.windows.net/cdn/Files/CEMA/Plans/APP10-1%20TAB%20C%20TIER%20II%20FACILITY%20MAPS.pdf

Transportation Hazardous Materials Incident

A transportation hazardous materials incident is the accidental release of chemical substances or mixtures during transport. Transportation Hazardous Materials Incidents in Chatham County can occur during railroad, highway, pipeline, or air transport. Railroad and highway accidents involving hazardous materials pose a great potential for public exposures. Both nearby populations and motorists can be impacted and become exposed by accidents and releases. Trains carry larger quantities and mixed quantities of hazardous materials, which can have a greater impact on populations and the environment. Trucks carry hazardous materials on busy streets and highways, often in close proximity to residences and essential facilities. Pipelines run through western Chatham County and can pose a risk if structural failure occurs. If airplanes carrying hazardous cargo crash, or otherwise leak contaminated cargo, populations and the environment in the impacted area can become exposed. Figure 2-53 shows the location of railroads and major roadways that transport hazardous materials in Chatham County.

Pipeline Incident

A pipeline transportation incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small, slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure

can lessen the risk to those near the pipelines. The U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) maintains an inventory of the location of all gas transmission and hazardous liquid pipelines as well as liquid natural gas plants and hazardous liquid breakout tanks. The location of gas transmission pipelines in Chatham County are shown in Figure 2-54 as reported in the public viewer of the National Pipeline Mapping System.

Warning Time: 4 – Less than six hours

Duration: 2 – Less than 24 hours

Location

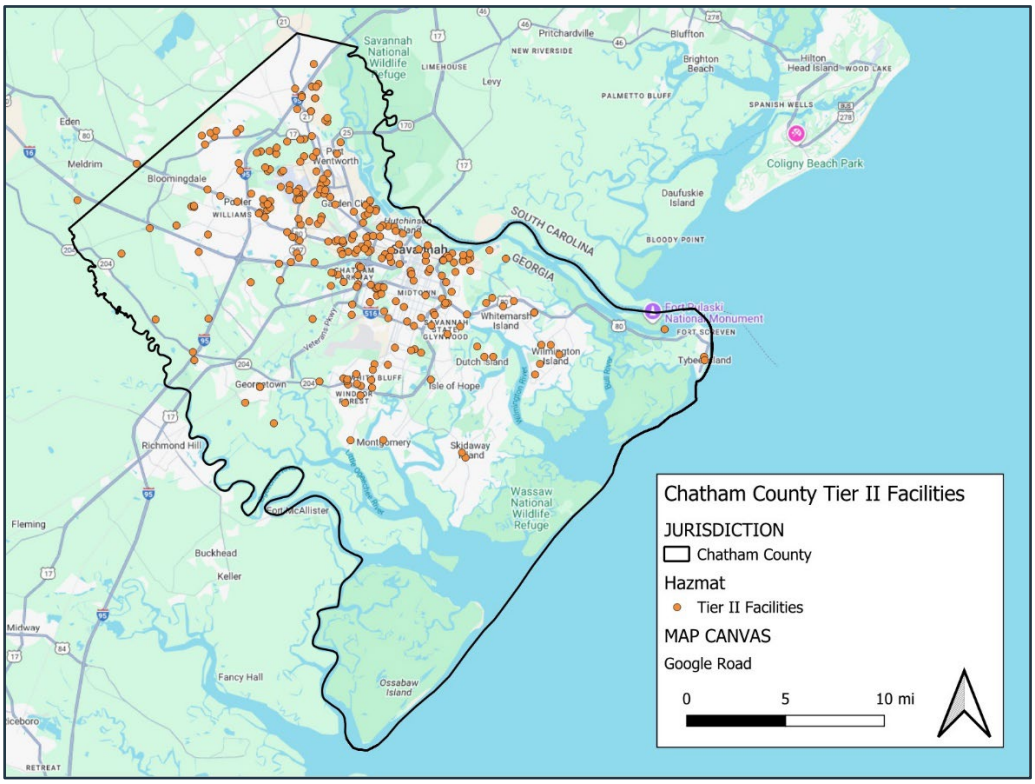
Tier II facility operators are required to submit annual reports detailing hazardous chemical storage to the State Emergency Response Commission (SERC), the Local Emergency Planning Committee (LEPC) and the local fire department. The number of 2024 reporting facilities are shown in Figure 2-52 and by location in Table 2-93.

Table 2-93 – Number of Tier II Facilities by Jurisdiction

Location	Tier II Facilities
Bloomingdale	6
Garden City	31
Pooler	22
Port Wentworth	10
Savannah	135
Thunderbolt	3
Tybee Island	2
Unincorporated Chatham County	67
Vernonburg	0
Total	**278**

Source: Chatham County Tier II Facilities Report

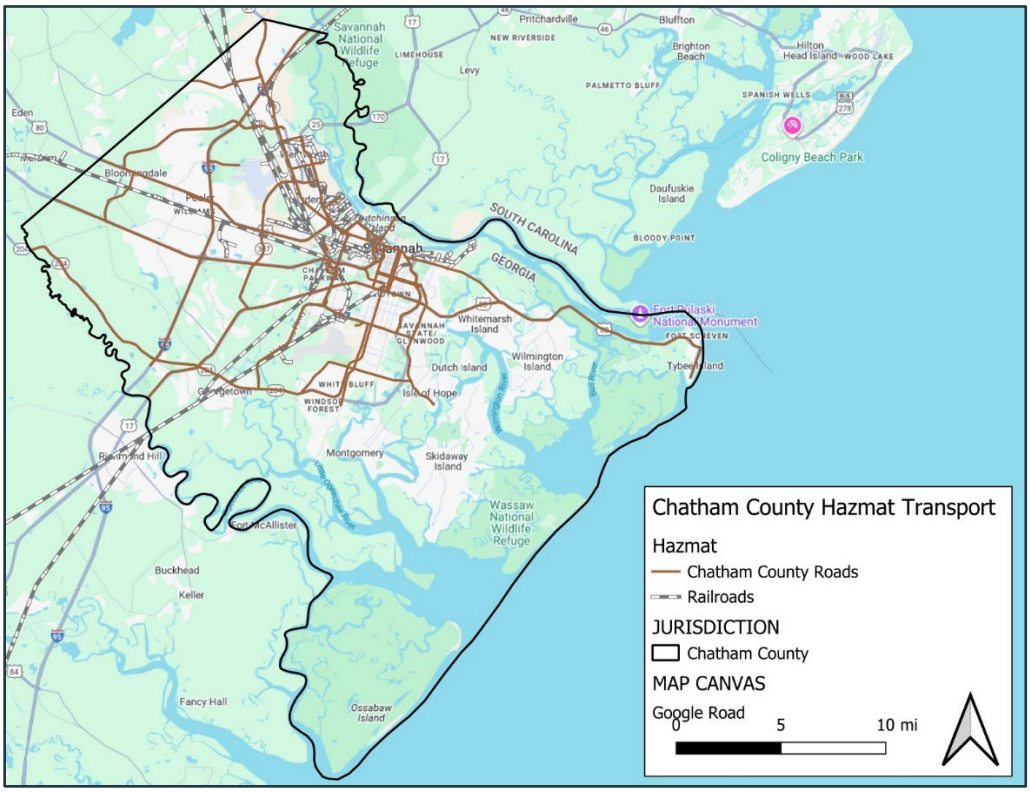
Figure 2-52 – Tier II Facilities, Chatham County



Source: Chatham County Emergency Management

Railroads do not report hazmat cargo documents to a central government agency in advance of a shipment. Instead, they must maintain electronic and physical documentation and provide it to the appropriate parties including their own crews and emergency responders before and during transport. The Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Railroad Administration (FRA) oversee and enforce these requirements. Road and railroad locations in Chatham County are depicted in Figure 2-53.

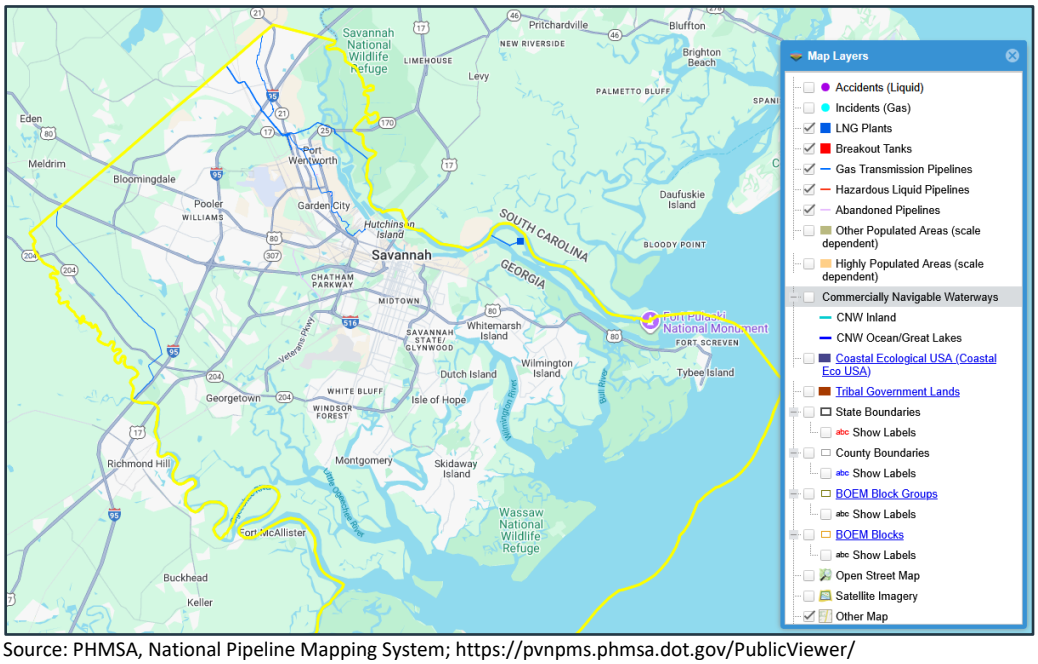
Figure 2-53 – Railroads, Chatham County



Source: Open Street Map

The U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) maintains an inventory of the location of all gas transmission and hazardous liquid pipelines as well as liquid natural gas plants and hazardous liquid breakout tanks. The location of gas transmission pipelines in Chatham County are shown in Figure 2-54, as reported in the public viewer of the National Pipeline Mapping System.

Figure 2-54 – Pipelines, Chatham County



Source: PHMSA, National Pipeline Mapping System; https://pvnpms.phmsa.dot.gov/PublicViewer/

Extent

The magnitude of a hazardous materials incident can be defined by the material type, the amount released, and the location of the release. The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), which records hazardous material incidents across the country, defines a "serious incident" as a hazardous materials incident that involves:

- a fatality or major injury caused by the release of a hazardous material,
- the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire,
- a release or exposure to fire which results in the closure of a major transportation artery,
- the alteration of an aircraft flight plan or operation,
- the release of radioactive materials from Type B packaging,
- the release of over 11.9 galls or 88.2 pounds of a severe marine pollutant, or
- the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material.

Prior to 2002, however, a hazardous materials "serious incident" was defined as follows:

- a fatality or major injury due to a hazardous material
- closure of a major transportation artery or facility or evacuation of six or more persons due to the presence of hazardous material, or
- a vehicle accident or derailment resulting in the release of a hazardous material.

Impact: 3 – Critical

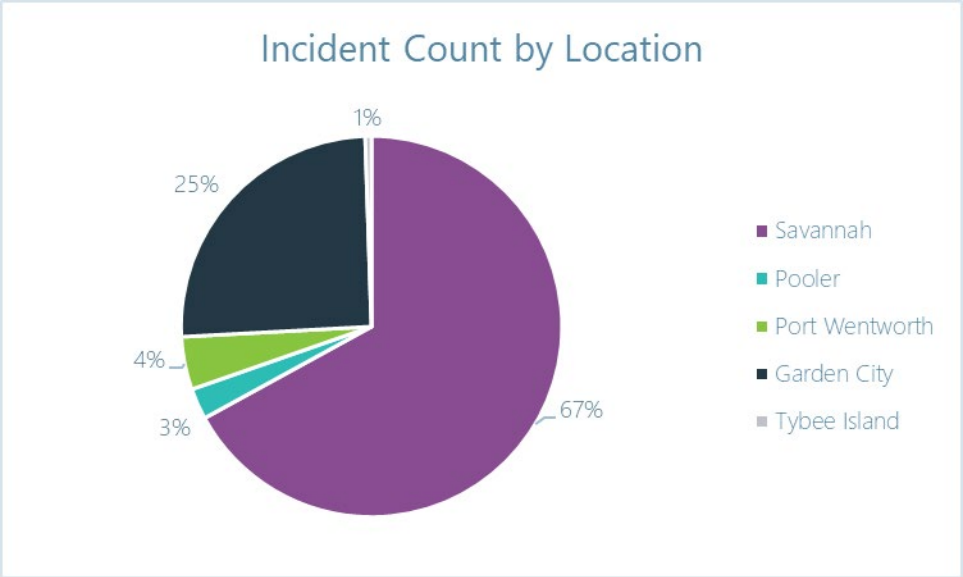
Spatial Extent: 3 – Moderate

Historical Occurrences

The USDOT's PHMSA has historically maintained a database of reported hazardous materials incidents, but new data was not available during this plan update. Data utilized in the 2020 plan update is summarized in Figure 2-55 and Figure 2-56 by location and hazardous material class. According to PHMSA

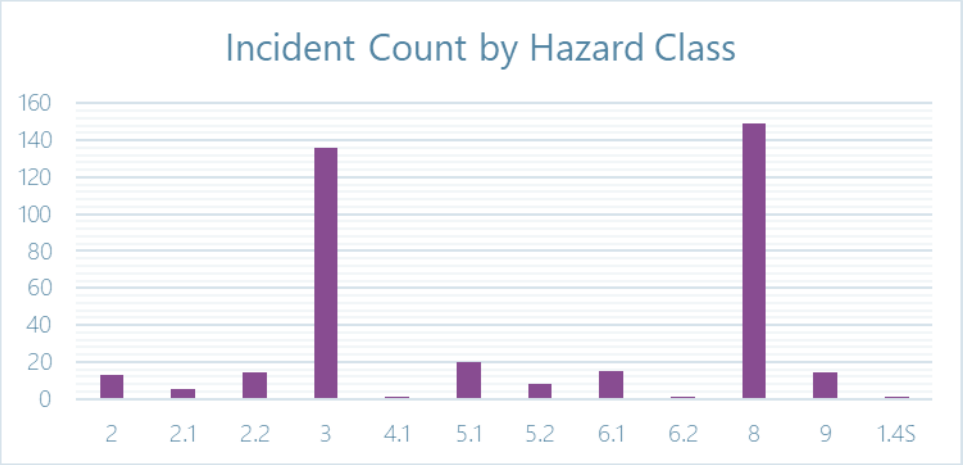
records, there were 379 recorded releases in Chatham County from 1999 through 2018. Nineteen events were considered serious incidents, of which 15 were serious bulk releases; 6 events were flagged for serious evacuation, 2 caused minor injuries, and 5 resulted in the closure of major transportation arteries.

Figure 2-55 – Count of Hazardous Materials Release Incidents by Location, 1999-2018



Source: PHMSA Incident Reports, Office of Hazardous Materials Safety, Incident Reports Database Search, data as of Sept 4, 2019.

Figure 2-56 – Count of Hazardous Materials Release Incidents by Hazard Class, 1999-2018



Source: PHMSA Incident Reports, Office of Hazardous Materials Safety, Incident Reports Database Search, data as of Sept 4, 2019.

The most common materials spilled in the planning area are Class 3 (Flammable and Combustible Liquids) and Class 8 (Corrosives). Figure 2-57 describes all nine hazard classes.

Figure 2-57 – Hazardous Materials Classes

Source: U.S. Department of Transportation

Probability of Future Occurrence

Based on historical occurrences recorded by PHMSA, there were 19 serious incidents of hazardous materials releases in the 20-year period from 1999 through 2018. Using historical occurrences as an indication of future probability, there is a 95 percent annual probability of a serious incident occurring.

Probability: 3 – Likely

Vulnerability Assessment

People

Hazardous materials incidents can cause injuries, hospitalizations, and even fatalities to people nearby. People living near hazardous facilities and along transportation routes may be at a higher risk of exposure, particularly those living or working downstream and downwind from such facilities. For example, a toxic spill or a release of an airborne chemical near a populated area can lead to significant evacuations and have a high potential for loss of life. Individuals working with or transporting hazardous materials are also at heightened risk.

In addition to the immediate health impacts of releases, a handful of studies have found long term health impacts such as increased incidence of certain cancers and birth defects among people living near certain chemical facilities. However, there has not been sufficient research done on the subject to allow detailed analysis.

The primary economic impact of hazardous material incidents results from lost business, delayed deliveries, property damage, and potential contamination. Large and publicized hazardous material-related events can deter tourists and could potentially discourage residents and businesses. Economic effects from major transportation corridor closures can be significant.

42.5% of property parcels in Chatham County are within or overlap a 5-mile buffer zone of a Tier II hazardous materials facility. 25.2% of parcels are within or overlap a 5-mile railroad buffer zone. Buildings and occupants on these parcels are considered most vulnerable to hazardous materials release incidents.

Property

The impact of a fixed hazardous facility, such as a chemical processing facility is typically localized to the property where the incident occurs. The impact of a small spill (i.e. liquid spill) may also be limited to the extent of the spill and remediated if needed. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to property.

Impacts of hazardous material incidents on critical facilities are most often limited to the area or facility where they occurred, such as at a transit station, airport, fire station, hospital, or railroad. However, they can cause long-term traffic delays and road closures resulting in major delays in the movement of goods and services. These impacts can spread beyond the planning area to affect neighboring counties, or vice versa. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to critical facilities, but there is a chance they may be impacted.

42.5% of property parcels in Chatham County are within or overlap a 5-mile buffer zone of a Tier II hazardous materials facility. 25.2% of parcels are within or overlap a 5-mile railroad buffer zone. Buildings and occupants on these parcels are considered most vulnerable to hazardous materials release incidents.

55% (235) essential facilities are within the 5-mile Tier II buffer zone and 34.6% (148) are within the 5-mile railroad buffer.

Environment

Hazardous material incidents may affect a small area at a regulated facility or cover a large area outside such a facility. Widespread effects occur when hazards contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer. Impacts on wildlife and natural resources can also be significant. Airborne hazardous materials can be carried by the wind for 5 miles or more, creating a risk of contamination of the environment and health risks to animals.

Consequence Analysis

Table 2-94 summarizes the potential detrimental consequences of hazardous materials incident.

Table 2-94 – Consequence Analysis – Hazardous Materials Incident

Category	Consequences
Public	Contact with hazardous materials could cause serious illness or death. Those living and working closest to hazardous materials sites face the greatest risk of exposure. Exposure may also occur through contamination of food or water supplies.
Responders	Responders face similar risks as the general public but a heightened potential for exposure to hazardous materials.
Continuity of Operations (including Continued Delivery of Services)	A hazardous materials incident may cause temporary road closures or other localized impacts but is unlikely to affect continuity of operations.
Property, Facilities and Infrastructure	Some hazardous materials are flammable, explosive, and/or corrosive, which could result in structural damages to property. Impacts would be highly localized.
Environment	Consequences depend on the type of material released. Possible ecological impacts include loss of wildlife, loss of habitat, and degradation of air and/or water quality.
Economic Condition of the Jurisdiction	Clean up, remediation, and/or litigation costs may apply. Long-term economic damage is unlikely.

Category	Consequences
Public Confidence in the Jurisdiction's Governance	A hazardous materials incident may affect public confidence if the environmental or health impacts are enduring.

Hazard Summary by Jurisdiction

The following table summarizes hazardous materials risk by jurisdiction. Warning time and duration do not vary by jurisdiction. Spatial extent and impact ratings were estimated based on the number of Tier II facilities, railroads, and/or pipelines in the jurisdiction. Probability ratings were determined based on available data on hazardous materials incidents with significant impacts in each jurisdiction.

Table 2-95 –Hazardous Materials Incident Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	3	3	3	4	2	3.0	H
Bloomingdale	2	2	2	4	2	2.2	M
Garden City	3	3	3	4	2	3.0	H
Pooler	2	2	2	4	2	2.2	M
Port Wentworth	3	32	32	4	2	3.0	H
Savannah	3	3	3	4	2	3.0	H
Thunderbolt	3	3	2	4	2	2.8	H
Tybee Island	2	3	2	4	2	2.5	M
Vernonburg	2	2	2	4	2	2.2	M

2.5.16 Communicable Disease

Hazard Background

A disease is a pathological condition of a part, organ, or system of a living organism resulting from various causes, such as infection or exposure to toxins, and characterized by an identifiable group of signs or symptoms. The major concern is an epidemic or pandemic, when a prevalent disease affects a disproportionally large number of individuals in a population, community, or region, country or world at the same time.

Of great concern are infectious diseases caused by the entry and growth of microorganisms in humans. Infectious diseases are diseases caused by a pathogen that enters the body, triggering development of an infection. Such pathogens may include bacteria, viruses, fungi, prions, or protozoans. Infectious diseases can have a range of causes and are often contagious or communicable, meaning they can be passed from person to person. They can be transmitted through numerous modes, including direct contact (person-to-person, animal-to-person, or mother-to-unborn child), insect bites, food and water contamination, or inhalation. Many infectious diseases can make the body vulnerable to secondary infections, which are caused by other organisms taking advantage of an already weakened immune system.

According to the Global Health Council, over 9.5 million people die each year from infectious diseases. Although progress has been made to control or eradicate many infectious diseases, humans remain vulnerable to many new emerging organisms, such as the Coronavirus Disease 2019 (COVID-19), a novel coronavirus discovered in 2019. In addition, previously recognized pathogens can evolve to become resistant to available antibiotics and other treatments. For example, malaria, tuberculosis, and bacterial pneumonias are appearing in new forms that are resistant to drug treatments. The spread of infectious diseases also increases with population growth and the ease of travel.

Warning Time: 1 – More than 24 hours

Duration: 4 – More than 1 week

Location

All of Chatham County is susceptible to infectious diseases. Segments of the population at highest risk for contracting an illness from a pathogen are the very young, the elderly, or individuals who currently experience respiratory or immune deficiencies. These segments of the population are present throughout the region. In addition, because of the communicable nature of these diseases, tourism centers or areas of high population density are considered more at risk. As a result, the population in and around tourist destinations may have an increased potential for exposure and spread of infectious diseases.

Impact: 3 – Critical

Spatial Extent: 4 – Large

Historical Occurrence

- 1873: The Cholera Epidemic of 1873 in the United States
- 1918-1919: The Flu Pandemic of 1918
- 1948: The nation experienced its largest epidemic of poliomyelitis.
- 2019: COVID-19, caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)

Probability of Future Occurrence

The probability and magnitude of an infectious disease occurrence is difficult to evaluate due to the wide variation in disease characteristics, such as rate of spread, morbidity and mortality, detection and

response time, and the availability of vaccines and other forms of prevention. A review of the historical record indicates that disease-related disasters do occur in humans with some regularity and varying degrees of severity; however, there is growing concern about emerging infectious diseases. Infectious diseases pose a significant risk to Chatham County; however, the probability of a major infectious disease outbreak with the potential of reaching the scale of an epidemic is not nearly as common. Based on recent history, an infectious disease outbreak occurs in any given part of the United States about every 5 to 10 years, while a pandemic occurs every 50 to 100 years.

Probability: 1 – Unlikely

Vulnerability Assessment

People

Populations are vulnerable to communicable diseases due to factors such as high-density living environments (e.g., nursing homes, correctional facilities, shelters), workplace proximity, and frequent public interaction. Vulnerable groups include the elderly, children, individuals with chronic conditions, immunocompromised populations, healthcare workers, and those with limited access to healthcare. Families experiencing job loss or medical bills from disease impacts may face housing insecurity, foreclosures, or evictions, increasing community vulnerability.

Property

Healthcare facilities, emergency shelters, and congregate housing face increased strain, requiring rapid adaptation (e.g., isolation spaces, infection control upgrades).

Environment

Increased demand on sanitation systems (medical waste, household waste from quarantined households) can strain local environmental services. Inadequate disposal could lead to secondary public health hazards. Some communicable diseases involve zoonotic transmission (from animals to humans). Outbreaks may require wildlife management, animal culling, or stricter agricultural and food safety controls, impacting local ecosystems and agriculture.

Consequence Analysis

Table 2-96 summarizes the potential detrimental consequences of infectious disease.

Table 2-96 – Consequence Analysis – Communicable Disease

Category	Consequences
Public	Widespread disease can result in increased illness, hospitalization, and mortality. Psychological stress and disruptions to education, childcare, and social support systems compound impacts. Vulnerable populations with language, cultural, or economic barriers may struggle to access timely information or medical resources.
Responders	Emergency responders and healthcare workers are at an increased risk of exposure to communicable disease.
Continuity of Operations (including Continued Delivery of Services)	Workforce absenteeism during outbreaks can hinder continuity of essential services, including healthcare, emergency response, education, utilities, and critical supply chains.
Property, Facilities and Infrastructure	Hospitals, clinics, and long-term care centers may face overwhelming demand, leading to capacity shortages, equipment strain, and the need for rapid facility adaptation. Supply chains for medical equipment, pharmaceuticals, and protective gear can be disrupted, delaying response capacity. Airports, ports, and public transit

Category	Consequences
	may experience decreased usage due to restrictions or fear of transmission, while freight systems may see bottlenecks if workforce capacity is reduced.
Environment	Communicable diseases may reduce safe access to shared community spaces such as parks, schools, and recreational facilities, limiting social cohesion and economic activity.
Economic Condition of the Jurisdiction	Prolonged outbreaks disrupt business operations, supply chains, and retail environments. Commercial properties may experience closures or reduced capacity due to workforce shortages or public health restrictions.
Public Confidence in the Jurisdiction's Governance	A communicable disease outbreak may affect public confidence if the environmental or health impacts are enduring, or if people are forced to act in ways that oppose their belief systems, ability to move freely, or feel inconvenienced.

Hazard Summary by Jurisdiction

The following table summarizes communicable disease risk by jurisdiction. Given the nature of communicable disease and the general interconnectivity of people across Chatham County, risk and vulnerability are considered equal for all jurisdictions.

Table 2-97 –Communicable Disease Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	3	4	1	4	2.5	H
Bloomingdale	1	3	4	1	4	2.5	H
Garden City	1	3	4	1	4	2.5	H
Pooler	1	3	4	1	4	2.5	H
Port Wentworth	1	3	4	1	4	2.5	H
Savannah	1	3	4	1	4	2.5	H
Thunderbolt	1	3	4	1	4	2.5	H
Tybee Island	1	3	4	1	4	2.5	H
Vernonburg	1	3	4	1	4	2.5	H

2.5.17 Hostile Events

Hazard Background

There is no universal globally agreed-upon definition of hostile events. In a broad sense, they use violence and threats to intimidate or coerce, especially against civilians, in the pursuit of political aims. Terrorism. As part of the broader hostile event category, is defined in the United States by the Code of Federal Regulations as "the unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof, in furtherance of political or social objectives."

For this analysis, this hazard encompasses the following sub-hazards: enemy attack, biological terrorism, chemical terrorism, conventional terrorism, radiological terrorism, and public disorder (cyberattack is addressed separately in Section 2.5.18). These hazards can occur anywhere and demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties. The threat of hostile events, both international and domestic, is ever present, and an attack can occur when least expected.

Enemy attack is an incident that could cause massive destruction and extensive casualties throughout the world. Some areas could experience direct weapons' effects: blast and heat; others could experience indirect weapons' effect. International political and military activities of other nations are closely monitored by the federal government, and the State of Georgia would be notified of any escalating military threats.

The use of biological agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers. Biological agents vary in the amount of time they pose a threat. They can be a threat from hours to years depending upon the agent and the conditions in which it exists.

Chemical terrorism involves the use or threat of chemical agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Effects of chemical contaminants are similar to biological agents.

Use of conventional weapons and explosives against persons or property in violation of the criminal laws of the United States for purposes of intimidations, coercion, or ransom is conventional terrorism. Hazard effects are instantaneous; additional secondary devices may be used, lengthening the time duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally static other than cascading consequences and incremental structural failures. Conventional terrorism can also include tactical assault or sniping from remote locations.

Radiological terrorism is the use of radiological materials against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers or by the detonation of a nuclear device underground, at the surface, in the air or at high altitude.

Mass demonstrations, or direct conflict by large groups of citizens, such as in riots and non-peaceful strikes, are examples of public disorder. These are assembling of people together in a manner to substantially interfere with public peace to constitute a threat, and with use of unlawful force or violence against another person, or causing property damage or attempting to interfere with, disrupting, or

destroying the government, political subdivision, or group of people. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target or institution. Most events are within the capacity of local law enforcement.

The Southern Poverty Law Center (SPLC) reports 41 active hate groups in Georgia, shown in Table 2-98. The SPLC defines a hate group as any group with "beliefs or practices that attack or malign an entire class of people – particularly when the characteristics being maligned are immutable." It is important to note that inclusion on the SPLC list is not meant to imply that a group advocates or engages in violence or other criminal activity.

Table 2-98 – Hate Groups Active in Georgia

Group	Type	Location
The United Nuwaubians Worldwide/All Eyes on Egipt	Black Nationalist	Athens
Great Millstone	Black Nationalist	Atlanta
House of Israel	Black Nationalist	Atlanta
Israel United in Christ	Black Nationalist	Atlanta
Israelite School of Universal Practical Knowledge	Black Nationalist	Atlanta
Luxor Couture	Black Nationalist	Atlanta
Nation of Islam	Black Nationalist	Atlanta
New Black Panther Party	Black Nationalist	Atlanta
New Black Panther Party for Self Defense	Black Nationalist	Atlanta
Sicarii 1715	Black Nationalist	Atlanta
Proud Boys	General Hate	Atlanta
Affirmative Right	White Nationalist	Atlanta
Identity Evropa	White Nationalist	Atlanta
Occidental Quarterly/Charles Martel Society	White Nationalist	Atlanta
Nation of Islam	Black Nationalist	Augusta
Nationalist Liberty Union	General Hate	Augusta
Covenant People's Ministry	Christian Identity	Brooks
Nation of Islam	Black Nationalist	Brunswick
League of the South	Neo-Confederate	Cartersville
International Keystone Knights of the Ku Klux Klan	Ku Klux Klan	Cedartown
United Northern and Southern Knights of the Ku Klux Klan	Ku Klux Klan	Ellijay
Proud Boys	General Hate	Gainesville
Wildman's Civil War Surplus and Herb Shop	Neo-Confederate	Kennesaw
The United Nuwaubians Worldwide/All Eyes on Egipt	Black Nationalist	Lithonia
All Eyes on Egypt Bookstore	Black Nationalist	Macon
Dustin Inman Society, The	Anti-Immigrant	Marietta
Sunshine on Government (SONG) Alliance	Anti-Muslim	Newton
American Vision	Anti-LGBT	Powder Springs
League of the South	Neo-Confederate	Powder Springs
Israel United in Christ	Black Nationalist	Savannah
Israelites Saints of Christ	Black Nationalist	Savannah
Identity Evropa	White Nationalist	Savannah
Asatru Folk Assembly	General Hate	Statewide
American White Knights of the Ku Klux Klan	Ku Klux Klan	Statewide
Identity Dixie	Neo-Confederate	Statewide
Atomwaffen Division	Neo-Nazi	Statewide
Traditionalist Worker Party	Neo-Nazi	Statewide

Group	Type	Location
Blood and Honour Social Club	Racist Skinhead	Statewide
Confederate Hammerskins	Racist Skinhead	Statewide
Crew 38	Racist Skinhead	Statewide
Patriot Front	White Nationalist	Statewide

Source: Southern Poverty Law Center, https://www.splcenter.org/hate-map

Three hate groups identified by the SPLC have a footprint in Chatham County – Israel United in Christ, Israelites Saints of Christ, and Identity Evropa, all in Savannah.

Warning Time: 4 – Less than six hours

Duration: 4 – More than one week

Generally, no warning is given for specific acts of terrorism. Duration is dependent on the mission, magnitude, time and need to control, and criminal investigation time of a hostile event. This score takes into account a prolonged scenario with continuous impacts.

Location

A hostile event could occur at any location in the County, but are more likely to target highly populated areas, critical infrastructure, or symbolic locations. Any of the critical facilities identified by the HMPC could be targeted; During previous planning efforts, the HMPC identified the following facilities with potentially elevated risk of terror threat. This list remains consistent:

- St. Joseph's Hospital
- Memorial Hospital, Savannah
- Federal Courthouse
- Chatham County Courthouse
- World Trade Center Savannah
- Georgia Port Authority
- Natural Gas Pressure Center
- County Emergency Operations Center
- Fort Pulaski National Monument
- County and Municipal Police/Sheriff's Offices
- Grayson Stadium
- Savannah/Hilton Head International Airport
- Savannah Civic Center
- Enmarket Arena

Extent

The extent of a hostile event is tied to many factors, including the attack vector, location, time of day, and other circumstances; for this reason, it is difficult to put assess a single definition or conclusion of the extent of "terrorism." As a general rule, terrorism incidents are targeted to where they can do the most damage and have the maximum impact possible, though this impact is tempered by the weapon used in the attack itself.

Impact: 4 – Catastrophic

Spatial Extent: 1 – Negligible

Historical Occurrences

As noted in the previous Chatham County Hazard Mitigation Plan, there have been no major terror events in the County. There is still, however, some possibility that one could occur in the future given the incidents that have occurred in the United States in the past and the facilities and locations in the county that could be potential targets.

June 2004 – Protests against the G8 Summit in Sea Island, Georgia, included demonstrations in Savannah and Brunswick. Law enforcement, including National Guard troops, actively prevented potential violence through heavy security presence. No terrorist action occurred, but tensions were notably high.

January 2020 – Following the tragic disappearance of Quinton Simon, persistent and emotionally charged protests—some involving YouTubers—occurred outside his family's home in Chatham County. In response to escalating disruptions, the Chatham County Police enforced local ordinances limiting parades/public assemblies and restrictive loitering measures in the neighborhood.

May 29-June 7, 2020 – During George Floyd-related protests in 2020, Savannah saw "violent protests and riots" leading to arrest of more than 15 individuals for disorderly conduct or violating city curfew. A curfew was in effect that night, though major physical damage was not reported.

March 2022 – An ex-Port of Savannah worker, Elliott Sherman pleaded guilty to phoning in a bomb threat targeting a Port of Savannah facility on the anniversary of September 11. The threat was determined to be a hoax.

November 2023 – A Chatham County man was indicted for making bomb hoaxes targeting a Savannah mosque (Islamic Center of Savannah) and an office park on Chatham Parkway near the federal courthouse.

Probability of Future Occurrence

While difficult to estimate when a deliberate act like terrorism may occur, it can be inferred that the probability of a terrorist attack in any one area in the County is very low at any given time. When identified, credible threats may increase the probability of an incident; these threats are generally tracked by law enforcement.

Probability: 1 – Unlikely

Vulnerability Assessment

Methodologies and Assumptions

Vulnerability to hostile events was assessed through hypothetical scenarios. These scenarios were modeled using the Electronic Mass Casualty Assessment and Planning Scenarios (EMCAPS) tool developed by the Johns Hopkins Office of Critical Event Preparedness and Response, Johns Hopkins Applied Physics Laboratory, the U.S. Department of Homeland Security, and the National Center for the Study of Preparedness and Catastrophic Event Response.

People

People can suffer death or illness as a result of a terrorist attack. Symptoms of illness from a biological or chemical attack may go undetected for days or even weeks. Local healthcare workers may observe a pattern of unusual illness or early warning monitoring systems may detect airborne pathogens. People will face increased risk if a biological or chemical agent is released indoors, as this may result in exposure to a higher concentration of pathogens, whereas agents that are released outdoors would disperse in the direction of the wind. Physical harm from a weapons attack or explosive device is not dependent on location, but risk is greater in areas where higher numbers of people may gather. People could also be

affected by an attack on food and water supply. In addition to impacts on physical health, any terrorist attack could cause significant stress and anxiety.

The following hypothetical scenarios illustrate the potential impacts of a chlorine gas release and an improvised explosive device (IED) attack on a location in the City of Savannah, chosen due to its relatively high population density as well as the presence of multiple government buildings, culturally significant sites, and critical facilities and infrastructure. These scenarios were modeled using the Electronic Mass Casualty Assessment and Planning Scenarios (EMCAPS) tool developed by the Johns Hopkins Office of Critical Event Preparedness and Response, Johns Hopkins Applied Physics Laboratory, the U.S. Department of Homeland Security, and the National Center for the Study of Preparedness and Catastrophic Event Response.

Scenario #1 – Chemical Attack: Toxic Gas – Chlorine Release

Scenario Overview: A bomb is attached to a tractor trailer tanker carrying compressed chlorine. The entire contents of the tank escape to the atmosphere and the plume spreads to the surrounding area. The plume spreading and the effect on the population are calculated according to the following input variables: outdoor temperature is 85°F, wind speed is 9 mph, the setting is urban, and the population density is 1,300 persons per square mile. The following assumptions apply:

- 4,850-gallon tank, all contents released through 3-ft hole
- Partly cloudy, no precipitation
- 50% of people in plume area are indoors
- Effects of chlorine on population determined through evaluation of chlorine gas concentration zones, which were determined using ALOHA plume modeling software
- First effects on humans at concentration = 10 ppm
- Minimum lethal dose = 430 ppm for 30 min
- Median lethal dose (short-term exposure) = 1,000 ppm

Table 2-99 outlines the expected losses based on the above parameters.

Table 2-99 – Estimated Casualties from Chlorine Attack

Injury Description	Population affected
Fatality	28 persons
Eye pain & swelling, headache, restricted airflow – difficulty breathing, coughing, chest pain, lung inflammation and edema, bloody sputum, vomiting, skin irritation, possible chemical burns	43 persons
Eye pain & swelling, headache, throat irritation, rapid breathing, coughing, chest pain, lung inflammation and edema, bloody sputum, vomiting, skin irritation	96 persons
Eye pain & swelling, headache, throat irritation, rapid breathing, coughing, chest pain, skin irritation	194 persons
Eye irritation, headache, throat irritation, coughing, skin irritation	238 persons
Eye irritation, headache, coughing, skin irritation	226 persons
Total impacted population	825 persons
"Worried Well" Cases (assumed to be 9x affected population)	7,425 persons
Cost of Decontamination @ $12/person (assumes all persons with skin injuries will require decontamination and approximately 1/10 of the worried well will demand to be decontaminated). Total persons treated = 1,568	$18,816

Source: EMCAPS tool

Scenario #2 – IED: Truck Bomb

Scenario Overview: An Improvised Explosive Device (IED) utilizing an ammonium nitrate/fuel oil (ANFO) mixture is carried in a cargo truck to a populated area and detonated. The bomb size is assumed to be 1000 lbs ANFO and the population density is 1 person per 50 square feet, equivalent to a moderately crowded pedestrian area as might be found in an average large city or outside a stadium. It is assumed that the explosion will take place in a relatively open area (e.g. stadium parking lot, park, etc.). The following assumptions apply:

- ANFO - TNT equivalence = 0.82
- Blast pressure damage impact taken from National Fire Protection Association (NFPA) 921 Guide for Fire and Explosion Investigations - 2001 Edition, Table 18.13.3.1[b]
- Buildings and other physical structures are not considered in these calculations

Table 2-100 outlines the expected losses based on the above parameters.

Table 2-100 – Estimated Casualties from IED Attack

Injury Description	Population affected
Total Dead	173 persons
Total Traumatic Injuries	303 persons
Total Urgent Care Injuries	1,491 persons
Injuries not Requiring Hospitalization	558 persons

Source: EMCAPS tool

Expected symptoms and injuries would include impact injuries (pulmonary blast), pulmonary contusion, barotrauma, fractures (internal, compound, spinal), smoke inhalation, GI blast injury (edema, hemorrhage, rupture), auditory blast injury (partial or total loss of hearing), lacerations, shrapnel, debris penetrations (glass, metal, etc.) and burns. Transportation would be limited or inaccessible near the blast, and services and utilities could be unavailable.

Property

The potential for damage to property is highly dependent on the type of attack. Buildings and infrastructure may be damaged by an explosive device or by contamination from a biological or chemical attack. Impacts are generally highly localized to the target of the attack.

To put the above scenarios into perspective, the HMPC identified several locations and events that could be targeted by similar attacks. The HMPC noted that the Port of Savannah, which is a major economic hub, and the annual St. Patrick's Day celebration in Savannah, which draws approximately 500,000 tourists to the area, could be targeted. During the planning process for the previous plan updates, the HMPC also identified the following critical facilities as having elevated risk to terror threat:

- St. Joseph's Hospital
- Memorial Hospital, Savannah
- Federal Courthouse
- Chatham County Courthouse
- World Trade Center Savannah
- Georgia Port Authority
- Natural Gas Pressure Center
- County Emergency Operations Center
- Fort Pulaski National Monument
- County and Municipal Police/Sheriff's Offices

- Grayson Stadium
- Savannah/Hilton Head International Airport
- Savannah Civic Center
- Enmarket Arena

Environment

Environmental impacts are also dependent on the type of attack. Impacts could be negligible or could require major clean-up and remediation.

Consequence Analysis

Table 2-101 summarizes the potential detrimental consequences of a hostile event.

Table 2-101 – Consequence Analysis – Hostile Event

Category	Consequences
Public	Illness, injury, or fatality are possible; these impacts would be highly localized to the attack. Widespread stress and psychological suffering may occur.
Responders	Responders face increased risks during an effort to stop an attack or rescue others while an attack is underway.
Continuity of Operations (including Continued Delivery of Services)	Critical infrastructure may be targeted by an attack; therefore, continuity of operations may be affected. Long-term issues may arise if transportation or utility infrastructure is severely damaged.
Property, Facilities and Infrastructure	Impacts depend on the type of attack. Buildings and infrastructure could be unaffected or completely destroyed.
Environment	Water and food supply could be contaminated by a biological or chemical attack. Remediation could be required.
Economic Condition of the Jurisdiction	The local economy could be disrupted, depending on the location and scale of an attack.
Public Confidence in the Jurisdiction's Governance	Loss of public confidence likely should an attack be carried out; additional loss of confidence and trust may result if response and recovery are not swift and effective

Hazard Summary by Jurisdiction

The following table summarizes hostile events risk by jurisdiction. Given the nature of hostile events and the understanding that they can occur anytime and anywhere, risk and vulnerability are considered equal for all jurisdictions.

Table 2-102 –Hostile Event Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	4	1	4	4	2.5	H
Bloomingdale	1	4	1	4	4	2.5	H
Garden City	1	4	1	4	4	2.5	H
Pooler	1	4	1	4	4	2.5	H
Port Wentworth	1	4	1	4	4	2.5	H
Savannah	1	4	1	4	4	2.5	H
Thunderbolt	1	4	1	4	4	2.5	H
Tybee Island	1	4	1	4	4	2.5	H
Vernonburg	1	4	1	4	4	2.5	H

2.5.18 Cyberattack

Hazard Background

Electronic attack using one computer system against another in order to intimidate people or disrupt other systems is a cyber-attack. Cyberattacks include ransomware, malware, phishing, data breaches, and intrusions targeting information technology (IT) and operational technology (OT) systems. Impacts range from data loss and service disruption to safety risks where OT is involved (e.g., water, energy, transportation). Federal partners (CISA, FBI, EPA, NSA) warn that critical-infrastructure sectors especially water/wastewater, healthcare, transportation, education, and local government face persistent threats that can degrade essential services.

All governments, businesses and citizens that conduct business utilizing computers face these threats. Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today. The Georgia Cyber Crime Center (G3C) was created through a cooperative effort by the Office of the Governor, the Georgia Bureau of Investigation, the Georgia Technology Authority, and Augusta University to provide specialized investigative assistance on cyber-related crime. G3C helps local and state law enforcement agencies across Georgia solve sophisticated crimes involving cyber-related criminal activity, including computer and network intrusion.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

Generally, no warning is given for cyberattack. Duration is dependent on the type and complexity of attack, the target, the consequences and the time to safely restore services. This score takes into account a prolonged scenario with continuous or cascading impacts.

Location

Cyber risk is countywide because it follows networks and supply chains rather than physical boundaries. Key local exposure points include:

- Urban government & services in Savannah (administrative IT, public safety CAD/RMS, finance, permitting).
- Healthcare systems serving the region (SJ/C, clinics), where downtime directly affects patient care.
- Education systems (Savannah-Chatham County Public School System), with large user populations, legacy systems, and peak-season targeting.
- Water and wastewater utilities whose OT systems (SCADA/PLC) can be targeted; compromise can affect water quality/pressure and wastewater operations.
- Transportation, logistics, and the Port of Savannah/Georgia Ports Authority (GPA)—mission-critical to local jobs and national supply chains; maritime facilities operate under federal security rules and coordinate with DHS/CISA.
- Private sector (small/midsize businesses, tourism/hospitality, manufacturers) are reliant on e-commerce and cloud services.

Since our society is highly networked and interconnected, an attack could be launched from anywhere on earth and could range in impacts from small and localized to a far-reaching global scale. Depending on the attack vector and parameters, a cyber-attack could impact all of Chatham County and its associated municipal jurisdictions.

Extent

Severity is best described by service downtime, data loss, and extent of OT disruption:

- IT-only incidents (e.g., ransomware on office networks) can halt revenue, billing, permitting, and records for days to weeks; recovery costs can be in the millions.
- OT-adjacent or OT incidents can force shutdowns of fuel, water, or transport systems—creating cascading supply effects.
- Healthcare incidents can delay care and trigger HIPAA breaches, legal exposure, and diversion of patients.
- K-12 incidents frequently result in multi-day school disruptions and large-scale data exposure, with nationally rising frequency and downtime.

Impact: 4 – Critical

Spatial Extent: 4 – Large

Historical Occurrences

Cyberattacks can happen anywhere at any time. In Chatham County, there have been at least four attacks in the past 10 year. Additional events may exist in nonpublic reports.

City of Savannah malware incident (Feb. 2018): City reported a malware/phishing event; precautionary containment actions; no city data compromised per local reporting.

St. Joseph's/Candler ransomware (June 17, 2021): Forced manual processes and later breach notifications affecting ~1.4M individuals; litigation followed.

Regional fuel disruption from Colonial Pipeline ransomware (May 2021): Multi-state emergency declarations and notable fuel impacts across the Southeast, including Georgia.

Savannah-Chatham County Public School System (Jan. 2025): Third-party vendor (PowerSchool) cybersecurity incident reported with local impact notifications.

Ongoing critical-infrastructure alerts: CISA advisories highlight continuing threats to water/wastewater systems that are relevant to all U.S. utilities, including those in Chatham County.

Probability of Future Occurrence

Based on available data and recorded events over a 10-year period, Chatham County jurisdictional entities and businesses could expect a cyberattack every 2.5 years; this consideration should be used for annualized probability only.

Probability: 1 – Unlikely

Vulnerability Assessment

Methodologies and Assumptions

Any entity dependent on IT/OT—local government, first responders, utilities, port/logistics, healthcare, K-12 and higher education, and SMEs in tourism/manufacturing. Vulnerability is elevated where (1) legacy/unsupported systems are present, (2) multi-factor authentication (MFA) is absent, (3) staffing and training are limited, and (4) incident response/backups are immature.

People

People are vulnerable to cyberattacks through the loss of personal information, exposure to fraud, and disruption of essential services such as healthcare, education, and utilities. These incidents can cause

financial hardship, delays in critical care, and learning or work interruptions, with impacts falling hardest on those with limited digital literacy, economic resources, or access to recovery support.

Property

Property is vulnerable when business operations, financial systems, and facility management technologies are disrupted. Attacks can force closures, damage records, and compromise building systems such as security, utilities, or point-of-sale networks, leading to revenue loss and costly recovery. Prolonged downtime or data loss may also reduce property values, increase vacancies, and create long-term economic instability for owners and tenants.

Environment

The environment is vulnerable when critical infrastructure systems that manage water, wastewater, energy, or industrial processes are targeted. A successful attack could disrupt treatment operations, release pollutants, or cause hazardous materials incidents, leading to contamination of air, soil, or waterways. Such impacts not only threaten ecosystems but also create long-term public health and safety risks.

Consequence Analysis

Table 2-103 summarizes the potential detrimental consequences of cyberattack.

Table 2-103 – Consequence Analysis – Cyberattack

Category	Consequences
Public	Medically fragile residents relying on hospital/clinic services (care delays). Households dependent on uninterrupted water/wastewater and fuel distribution (public health, economic activity). Students/families during school outages (learning loss, childcare disruption). Small businesses and logistics operators dependent on continuous port/trucking systems (cash-flow shocks).
Responders	Responder operations may be impacted by failures in operating systems such as radios, internet services, medical tracking/reporting systems, and SCADA systems.
Continuity of Operations (including Continued Delivery of Services)	Payroll, finance, tax/revenue, 911/CAD interfaces, records, courts, records access, diagnostics, and scheduling services may be delayed or inaccessible.
Property, Facilities and Infrastructure	Gate systems, building access systems, terminal operations, trucking appointment systems, train scheduling systems, and airport operating systems could be impacted.
Environment	Environmental consequences could arise from failures to control hazardous materials, radiological materials, biologicals, sewer systems and other elements that can become environmental threats if not properly managed and controlled.
Economic Condition of the Jurisdiction	Cyberattacks can impact government, business, and personal financial security. If daily operations are interrupted, the economy will be impacted.
Public Confidence in the Jurisdiction's Governance	Loss of public confidence is likely is an attack impacts personal data, finances, or ability to do business; additional loss of confidence and trust may result if response and recovery are not swift and effective

Hazard Summary by Jurisdiction

The following table summarizes cyberattack risk by jurisdiction. Given the nature of cyberattack and the widespread impacts, risk and vulnerability are considered equal for all jurisdictions.

Table 2-104 – Cyberattack Risk Ranking Summary

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Chatham County	1	4	4	4	3	2.7	H
Bloomingdale	1	4	4	4	3	2.7	H
Garden City	1	4	4	4	3	2.7	H
Pooler	1	4	4	4	3	2.7	H
Port Wentworth	1	4	4	4	3	2.7	H
Savannah	1	4	4	4	3	2.7	H
Thunderbolt	1	4	4	4	3	2.7	H
Tybee Island	1	4	4	4	3	2.7	H
Vernonburg	1	4	4	4	3	2.7	H

2.6 CONCLUSIONS ON HAZARD RISK

Priority Risk Index

As discussed in Section 2.3 Risk Assessment Methodology and Assumptions, the Priority Risk Index was used to rate each hazard on a set of risk criteria and determine an overall standardized score for each hazard. The conclusions drawn from this process are summarized below.

Table 2-105 summarizes the degree of risk assigned to each identified hazard using the PRI method.

Table 2-105 – Summary of PRI Results

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Dam Failure	Unlikely	Limited	Negligible	Less than 6 hrs	Less than 1 week	1.8
Drought	Likely	Limiteed	Large	More than 24 hrs	More than 1 week	2.8
Earthquake	Unlikely	Minor	Large	Less than 6 hrs	Less than 6 hrs	1.9
Erosion	Likely	Limited	Small	More than 24 hrs	Less than 1 week	2.5
Extreme Heat	Highly Likely	Critical	Large	More than 24 hrs	Less than 1 week	3.3
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 1 week	3.3
Tropical Cyclone (Hurricane & Tropical Storm)	Likely	Catastrophic	Large	More than 24 hrs	Less than 1 week	3.3
Sea Level Rise	Likely	Critical	Moderate	More than 24 hrs	More than 1 week	2.9
Severe Weather (Hail)[1]	Highly Likely	Limited	Small	Less than 6 hrs	Less than 6 hrs	2.4
Severe Weather (Lightning)[1]	Highly Likely	Limited	Negligible	Less than 6 hrs	Less than 6 hrs	2.2
Severe Weather (Winds)[1]	Highly Likely	Critical	Large	Less than 6 hrs	Less than 6 hrs	3.1
Severe Winter Weather	Likely	Limited	Large	More than 24 hrs	Less than 1 week	2.7
Tornado	Likely	Critical	Small	Less than 6 hrs	Less than 6 hrs	2.7
Tsunami	Unlikely	Limited	Small	Less than 6 hrs	Less than 6 hrs	1.8
Wildfire	Likely	Critical	Moderate	Less than 6 hrs	Less than 1 week	3.1
Conflagration	Unlikely	Critical	Moderate	Less than 6 hrs	Less than 24 hrs	2.4
Hazardous Materials	Likely	Critical	Moderate	Less than 6 hrs	Less than 24 hrs	3.0
Communicable Disease	Unlikely	Critical	Large	More than 24 hrs	More than 1 week	2.5
Hostile Event	Unlikely	Catastrophic	Negligible	Less than 6 hrs	More than 1 week	2.5
Cyberattack	Unlikely	Catastrophic	Large	Less than 6 hrs	Less than 1 week	2.7

[1]Note: Severe Weather hazards average to a score of 2.6 and are therefore considered together as a high-risk hazard.

The results from the PRI have been classified into three categories based on the assigned risk value which are summarized in Table 2-106:

- **High Risk** – Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread.
- **Moderate Risk** – Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **Low Risk** – Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal. This is not a priority hazard.

Table 2-106 – Summary of Hazard Risk Classification

Risk Ranking	Hazard
High Risk (> 2.4)	Drought Erosion Extreme Heat Flood Tropical Cyclone (Hurricane & Tropical Storm) Sea Level Rise Severe Weather (Thunderstorm Wind, Lightning, Hail) Severe Winter Weather Tornado Wildfire Communicable Disease Cyberattack Hazardous Materials Incident Hostile Event
Moderate Risk (2.0 - 2.4)	Conflagration
Low Risk (< 2.0)	Dam Failure Earthquake Tsunami

3 Mitigation Strategy

Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the Chatham County Hazard Mitigation Plan. It describes how the County met Step 6: Set Goals, Step 7: Review Possible Activities, and Step 8: Draft an Action Plan from the 10-step planning process. This section contains the following subsections:

- 3.1 Goals and Objectives
- 3.2 Identification and Analysis of Mitigation Activities
- 3.3 Mitigation Action Plans

Table 3-1 – Section 3 Summary of Updates

2020 Plan Section Number	2025 Plan Section and Description of Changes
Section 3 – Mitigation Strategy	**Section 3 – Mitigation Strategy**
3.1 Goals and Objectives – This section was updated to reflect the discussion of the plan goals and the development of objectives.	3.1 Goals and Objectives – This section was updated to reflect the discussion and revision of the plan goals and objectives. The HMPC decided to separate 2020 Goal 1 into two goals to better prioritize protection of residents (Goal 1) and the built environment (Goal 2).
3.2 Identification and Analysis of Mitigation Activities – This section was simplified to summarize the mitigation categories considered by the HMPC. A full detailed review of mitigation alternatives is provided in Appendix C. A description of the prioritization criteria used to prioritize mitigation actions was added to this section.	3.2 Identification and Analysis of Mitigation Activities – This section was reviewed and maintains a summation of the mitigation categories considered and action prioritization criteria utilized by the HMPC. A full detailed review of mitigation alternatives is provided in Appendix C.
3.3 Mitigation Action Plans – This section presents the updated Mitigation Action Plans for each jurisdiction.	3.3 Mitigation Action Plans – This section presents the updated Countywide Mitigation Action Plans. Specific actions for each jurisdiction are provided in the jurisdictional annexes (Annex A-H).

3.1 GOALS AND OBJECTIVES

Requirement §201.6(c)(3)(i): [The mitigation strategy section shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Section 2 documents the hazards and associated risks that threaten Chatham County, including the vulnerability of structures, infrastructure, and critical facilities. Based on this understanding of risks, the HMPC must identify mitigation actions to reduce exposure, vulnerability, and overall risk. The intent of goal setting is to guide the review of possible mitigation actions. This Plan needs to make sure that recommended actions are consistent with what is appropriate for the County. Mitigation goals should reflect community priorities and should be consistent with other plans in the County.

- **Goals** are general guidelines that explain what is to be achieved. They are usually broad-based, long-term policy type statements that represent global visions. Goals help define the benefits that the plan is trying to achieve.
- **Objectives** are short term aims which, when combined, form a strategy or course of action to meet a goal. Objectives provide more specific criteria for achieving goals.

3.1.1 Goal Setting

At the second planning meeting, held on March 26, 2025, the HMPC reviewed and discussed the goals from the 2020 Plan. One key consideration in evaluating these goals was to ensure that the goals of the Hazard Mitigation Plan align with other community planning efforts such as comprehensive and land use plans. These documents are important guides for future growth within the community.

Minor changes were proposed to the previous goals in effort to clarify their wording and intent. The updates were validated by the committee. The HMPC then reviewed, discussed, and revised the objectives to further guide the creation of mitigation actions. The 2025 goals and objectives approved by the HMPC are presented below.

3.1.2 Resulting Goals and Objectives

Goal 1: Protect residents and visitors of Chatham County from hazard impacts.

Objective 1.1: Reduce life safety risks by providing evacuation services, emergency shelter, and protective measures during dangerous and after hazard incidents as appropriate.

Objective 1.2: Provide alert and warning messaging through a variety of communication formats.

Objective 1.3: Protect lives inside public buildings through appropriate structural mitigation measures, building closures, or building evacuations as appropriate for the hazard.

Goal 2: Protect public structures, infrastructure, and resources from hazard impacts.

Objective 2.1: Retrofit or otherwise protect critical facilities and infrastructure.

Objective 2.2: Regulate development in known hazard areas.

Objective 2.3: Protect natural and beneficial floodplain functions and key natural resources.

Goal 3: Improve education and outreach efforts regarding potential impacts from hazards as well as specific mitigation measures that can be undertaken.

Objective 3.1: Encourage personal responsibility for hazard mitigation and preparedness.

Objective 3.2: Expand outreach methods to reach more audiences, including non-English language content, materials, and communications.

Goal 4: Improve capabilities and coordination to plan and implement hazard mitigation projects, programs and activities.

Objective 4.1: Promote resiliency and address the impacts of climate change on natural hazards.

Objective 4.2: Use GIS and other technologies to improve capabilities.

Objective 4.3: Identify new mitigation measures, technologies and practices.

Goal 5: Improve data collection, dissemination, and redundancy use to reduce hazard impacts.

Objective 5.1: Increase redundancy of critical systems and services.

Objective 5.2: Encourage data and resource sharing across agencies and jurisdictions.

3.2 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIVITIES

Requirement §201.6(c)(3)(ii): [The mitigation strategy section shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

To identify and select mitigation projects, the HMPC targeted those hazards considered high and moderate priorities for the planning area, based on the analysis provided in Section 2 Hazard Identification & Risk Assessment. The following hazards were determined based on the Priority Risk Index scores to be high and moderate priority hazards:

- Communicable Disease
- Conflagration
- Dam Failure
- Drought
- Earthquake
- Erosion
- Extreme Heat
- Flood
- Hazardous Materials Incident
- Hostile Threat
- Sea Level Rise
- Severe Weather
- Severe Winter Weather
- Tornado
- Tropical Cyclone
- Tsunami
- Wildfire

The term "All" is utilized in the "Hazards Addressed" column of Table 3-2 below (and in Annexes A-H) where all of the above hazards apply to a specific mitigation action. Otherwise, specific hazards are listed in that column.

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC organized actions based on the following list of mitigation categories, which are utilized as part of the CRS planning process but are also applicable to multi-hazard mitigation.

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information and Outreach

More detail on the range of mitigation alternatives considered by the HMPC are provided in Appendix C.

The HMPC was also provided with the FEMA publication Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013) and geographically relevant examples of potential mitigation actions for each of the above categories. The HMPC was instructed to consider both future and existing buildings in evaluating possible mitigation actions. The HMPC also reviewed existing actions in the 2020 plan and considered which incomplete actions would be continued in this action plan.

3.2.1 Prioritization Process

In the process of identifying continuing and new mitigation actions, the HMPC was provided with a set of criteria to assist in deciding why one action might be more important, more effective, or more likely to be implemented than another. HMPC members were asked to rate each action with an approach modified from the FEMA STAPLEE criteria. The considerations for action prioritization were as follows:

- **Socially Acceptable:** Is the action acceptable to the community? Does it have a greater impact on a certain segment of the population? Are the benefits fair?
- **Technically Feasible:** Is the action technically feasibly? Is it a long-term solution to the problem? Does it capitalize on existing planning mechanisms for implementation?
- **Administrative Resources:** Are there adequate staffing, funding and other capabilities to implement the project? Is there adequate additional capability to ensure ongoing maintenance?
- **Politically Supported:** Will there be adequate political and public support for the project? Does the project have a local champion to support implementation?
- **Legally Allowable:** Does the community have the legal authority to implement the action?
- **Economically Sound:** Can the action be funded locally? Will the action need to be funded by an outside entity, and has that funding been secured? How much will the project cost? Can the benefits be quantified, and do they outweigh the costs?
- **Environmentally Sound:** Does the action comply with environmental regulations? Does the action meet the community's environmental goals? Does the action impact land, water, endangered species, or other natural assets?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority, as reflected in the prioritization criteria above. For each action, the HMPC considered the benefit-cost analysis in terms of:

- Ability of the action to address the problem
- Contribution of the action to save life or property
- Available technical and administrative resources for implementation
- Availability of funding and perceived cost-effectiveness

The consideration of these criteria helped to prioritize and refine mitigation actions but did not constitute a full benefit-cost analysis. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

The prioritization ranking, simplified as High, Moderate, or Low, for each mitigation action considered by the HMPC is provided in the Mitigation Action Plans below. These priority rankings are relative and assigned by each jurisdiction's representatives on the HMPC but can be generally defined as follows:

- **High**: Project can be implemented quickly and/or easily, provides the best return on investment, and/or addresses a high-priority hazard or significant vulnerability.
- **Moderate**: Project provides a good benefit-cost ration but requires some additional support to implement.

- **Low**: Project requires significant administrative or financial support to implement, is a long-range pursuit, has a low benefit-cost ratio, and/or does not address a high-priority hazard.

Changes in priorities are reflected in the priority rankings of the mitigation actions and in the actions that have been deleted from the mitigation plan (detailed in Section 1.3). Priorities for mitigation were impacted by findings in the updated risk assessment, changes in local capability, and changes in resources available for mitigation.

3.3 MITIGATION ACTION PLANS

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include an] action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Countywide mitigation actions are provided in Table 3-3 and are duplicated in the Chatham County Unincorporated Areas Annex (Annex A) for tracking and strategy management purposes. In this plan, "countywide" refers to the participating jurisdictions of:

- Unincorporated Chatham County
- City of Bloomingdale
- Garden City
- City of Pooler
- City of Port Wentworth
- City of Savannah
- Town of Thunderbolt
- City of Tybee Island
- Town of Vernonburg*

Mitigation action plans for each participating jurisdiction are provided in the Jurisdictional Annexes to the HMP. The plans are organized as follows:

- Annex A, Section A.6: Chatham County*
- Annex B, Section B.6: City of Bloomingdale
- Annex C, Section C.6: City of Garden City
- Annex D, Section D.6: City of Pooler
- Annex E, Section E.6: City of Port Wentworth
- Annex F, Section F.6: City of Savannah
- Annex G, Section G.6: Town of Thunderbolt
- Annex H, Section H.6: City of Tybee Island

*Note: Actions for Chatham County cover the unincorporated areas of the county as well as the Town of Vernonburg, which was also covered by Chatham County actions in the 2015 and 2020 plan.

Each countywide mitigation action recommended for implementation is listed in Table 3-3 along with detail on the hazards addressed, the goal and objective addressed, the priority rating, the lead agency responsible for implementation, potential funding sources for the action, a projected implementation timeline, and the 2025 status and comments on the status for actions that were carried forward from the 2020 plan. Potential funding sources are generally abbreviated in the mitigation action tables and are defined in Table 3-2 below:

Table 3-2 – Potential Mitigation Funding Sources

Name/Acronym	Description
CIP	Capital Improvement Projects
City Operating Budget	General income funds appropriated to specific departments and/or projects
DHS	Department of Homeland Security Grants
Federal Grants	Federal Grants other than DHS/FEMA
FMA	Flood Mitigation Assistance
General Funds	General income funds appropriated to specific departments and/or projects
HMGP	Hazard Mitigation Grant Program
Local Funds	General income funds appropriated to specific departments and/or projects
NGO Grants	Non-Governmental Organization Grants
PDM	Pre-Disaster Mitigation
SPLOST	Special Purpose Local Option Sales Tax
SRL	Severe Repetitive Loss
State Grants	State originated and/or administered grants

Table 3-3 – Countywide Mitigation Actions

Action #	Action Description	Hazard(s) Addressed	Goal & Objective Addressed	Priority	Lead Agency / Department	Potential Funding Source	Implementation Timeline	2025 Status	2025 Implementation Status Comments
Prevention									
P-1	Evaluate critical facilities, including cultural and historical facilities, for the installation and construction of safe rooms.	All	2.1	Low	Emergency Management	HMGP, PDM, Federal Grants	2025	Carry Forward	Revised. Project currently in progress. Working with GEMA and FEMA for evaluation and implementation.
P-2	Evaluate the conveyance system	Flooding, Tropical Cyclone, Severe Weather	2.1	High	Engineering/Public Works	HMGP, CIP, PDM	2027	Carry Forward	Revised
P-3	Flood Mitigation for flood prone areas	Flooding, Tropical Cyclone, Severe Weather, Dam Breaks	2.1, 2.2, 2.3	High	Engineering/Public Works	HMGP, CIP, PDM	2027	Carry Forward	Revised.
P-4	Install signage in tsunami risk areas and along tsunami evacuation routes	Tsunami, Flooding, Severe Weather	1.1, 1.2, 3.1, 3.2	High	Public Works	HMGP, PDM, CIP	2027	New	2025 addition.
P-5	Map and assess community vulnerability to tsunamis	Tsunami, Flooding, Severe Weather	1.1, 4.2	High	Engineering/Public Works	HMGP, PDM, CIP	2025-2027	New	2025 addition
P-6	Evaluation and Modeling of the drainage system	All	1.1, 4.2	High	Engineering/Public Works	HMGP, PDM, CIP	2025-2027	New	2025 addition
P-7	Purchase portable message boards for flood mitigation	Flood	1.1, 1.2, 3.2	High	Emergency Management	HMGP, CIP, PDM	2025-2026	New	2025 addition
P-8	Purchase a vacuum truck for stormwater removal and drainage	All	1.1, 2.1	Moderate	Engineering/Public Works	HMGP, CIP, PDM	2025-2028	New	2025 addition
P-9	Purchase portable stop signs for flood mitigation	Flood	1.1	Moderate	Facilities/ Resilience	HMGP, CIP, PDM	2026-2027	New	2025 addition
P-10	Purchase a camera truck for drain and/or sewer system inspections	All	1.1, 2.1	Moderate	Engineering/Public Works	HMGP, CIP, PDM	2026-2028	New	2025 addition
P-11	Implement alternative fire protection measures	Conflagration	1.1, 2.1	Moderate	Fire Department	HMGP, CIP, PDM	2026-2027	New	2025 addition
P-12	Strengthen policies and/or ordinances for Disaster Resilience	All	1.1, 1.3, 4.1	High	Facilities/Resilience	HMGP, PDM, Federal Grants, & NGO Grants	2025-2028	New	2025 addition
P-13	Acquire/deploy environment monitoring systems for all/various weather hazards.	All	1.1, 1.2, 3.2, 4.3, 5.2	Moderate	Emergency Management	Local Funding, HMGP, PDM	2026-2028	New	2025 addition
Property Protection									
PP-1	Replace windows (if needed) and install hurricane shutters on critical facilities	All	1.3, 2.1	Moderate	Facilities/ Emergency Management	PDM, HMGP, Federal Grants, Local Funds	2027-2028	Carry Forward	Funding limitations have prevented this action from being implemented.
Emergency Services									
ES-1	Purchase and install generator connections for critical facilities	All	2.1, 5.1	Low	Facilities	Local Funds; CIP	2025-2030	Carry Forward	Funding limitations have prevented this action from being completed.
ES-2	Portable generators for critical facilities	All	2.1, 5.1	High	Facilities	Local Funds; CIP	2026	Carry Forward	Funding limitations have prevented this action from being completed.
ES-3	Generators purchased and installed for all critical facilities.	All	2.1, 5.1	Moderate	Emergency Management	HMGP 5%	2028	Carry Forward	Funding limitations have prevented this action from being completed.
ES-4	Install solar panels	All	4.3, 5.1	Moderate	Facilities, Emergency Management, Resilience	PDM, HMGP, Federal, State, and NGO grants	2028-2032	Carry Forward	Revised
ES-5	Install battery backup to provide power during and after emergencies	All	4.3, 5.1	Moderate	Facilities, Emergency Management, Resilience	PDM, HMGP, Federal, State, and NGO grants	2028-2032	Carry Forward	Funding limitations have prevented this action from being implemented.
Public Education & Awareness									
PEA-1	Conduct public forums to provide mitigation information and all hazards preparedness information.	All	3.1, 3.2	Low	Emergency Management	Local Funds; HMGP 5%	2027	Carry Forward	Ongoing mitigation activities

4 Capability Assessment

This section discusses the capability of the Chatham County planning area to implement hazard mitigation activities. It consists of the following subsections:

4.1 Overview
4.2 Capability Assessment Findings
4.3 Conclusions on Local Capability

Table 4-1 – Section 4 Summary of Updates

2020 Plan Section Number	2025 Plan Section and Description of Changes
Section 4 – Capability Assessment	**Section 4 – Capability Assessment**
4.1 Overview – This section is a new section that was previously documented as a separate annex to the plan.	4.1 Overview – No changes were required to this section.
4.2 Capability Assessment Findings – This section includes minor revisions from the previous Capability Annex and was updated with new HMPC input.	4.2 Capability Assessment Findings – This section was updated to reflect 2025 capabilities and NFIP information. A new CRS table was incorporate to show the current class and percentage discount for each participating jurisdiction.
4.3 Conclusions on Local Capability – Scoring was removed to place emphasis on identifying gaps and areas for improvement across all jurisdictions.	4.3 Conclusions on Local Capability – This section was reviewed for updates. None were necessary.

4.1 OVERVIEW

The purpose of conducting a capability assessment is 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 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.

The capability assessment completed for the Chatham County planning area serves as a critical planning step toward developing an effective mitigation strategy. Coupled with the risk assessment, the capability assessment helps identify and target effective goals, objectives, and mitigation actions that are realistically achievable under given local conditions.

To facilitate the inventory and analysis of local government capabilities within the planning area, a detailed Local Capability Self-Assessment worksheet was distributed to members of the HMPC after the first planning committee meeting. The survey questionnaire requested information on a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the region's ability to implement hazard mitigation actions. Other indicators included information related to the region's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes, and existing education and outreach programs that can be used to promote mitigation. Communities were also asked to comment on the current political climate with respect to hazard mitigation, an important consideration for any local planning or decision-making process.

At a minimum, the survey results provide an extensive and consolidated inventory of existing local plans, ordinances, programs, and resources in place or under development. With this information, inferences can be made about the overall effect on hazard loss reduction in each community.

4.2 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this plan to provide insight into the relevant capacity of Chatham County and its incorporated municipalities to implement hazard mitigation activities. Information is based upon input provided by community representatives on the HMPC through a local capability self-assessment as well as research conducted by the planning consultant. Some jurisdiction representatives did not provide capability information for their communities; in these cases, information was based on research and on the 2020 Chatham County Pre-Disaster Multi-Jurisdictional Hazard Mitigation Plan.

4.2.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning. Regulatory capability also includes the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed, and structures are built, as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development for the Chatham County planning area, along with their potential effect on loss reduction. This information will help identify opportunities to address gaps, weaknesses, or conflicts with other initiatives and integrate the implementation of this plan with existing planning mechanisms where appropriate.

Table 4-2 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Chatham County planning area. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A plus sign (+) indicates that a jurisdiction is covered for that item under a county-implemented version. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Hazard Mitigation Plan.

Table 4-2 – Relevant Plans, Ordinances, and Programs

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Recovery Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Chatham County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	✓	✓	✓	✓		*	✓	✓	✓	✓	✓
City of Bloomingdale	✓	✓	✓	✓	✓	✓			+	✓	+	✓	✓		✓	✓	✓	✓	✓	✓	+	✓	✓	+	✓	✓
City of Garden City	✓	✓	✓	✓	✓	✓			✓	+	✓	✓	✓		✓	✓	✓	✓	✓	✓	+	✓	✓	+	✓	✓
City of Pooler	✓	✓		*	✓	+	+	+	✓	+	+	*	+			✓	✓	✓	✓	*	+	✓	+	+	✓	✓
City of Port Wentworth	✓	✓		✓	✓	✓			✓	✓	✓		*			✓	✓	✓	✓		+	✓	✓	+	✓	
City of Savannah	✓	✓	✓	✓	*	✓	+	*	✓	+	*	✓	✓	✓	✓	✓	✓	✓	✓	*	+	✓	✓	+	✓	✓
Town of Thunderbolt	✓	✓	✓	✓	✓	✓			+	✓	✓	✓				✓	✓	✓	✓		+	✓	✓	+	✓	✓
City of Tybee Island	✓	✓		✓	✓	+			+	✓	+			✓	✓	✓	✓	✓	✓	✓	+	✓	✓	+	✓	✓

Source: Data provided by HMPC

4.2.1.1 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management, as is shown in Figure 4-1. Mitigation is interconnected with all other phases and is an essential component of effective preparedness, response, and recovery. Opportunities to reduce potential losses through mitigation practices are most often implemented before a disaster event, such as through the elevation of flood-prone structures or by regular enforcement of policies that regulate development. However, mitigation opportunities can also be identified during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane. Furthermore, incorporating mitigation during the long-term recovery and redevelopment process following a disaster event is what enables a community to become more resilient.

Figure 4-1 – The Four Phases of Emergency Management

Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions.

Hazard Mitigation Plan

A hazard mitigation plan is a community's blueprint for how it intends to reduce the impact of natural, and in some cases human-caused, hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

All participating jurisdictions in this regional planning effort have previously been covered by the 2020 Chatham County Pre-Disaster Multi-Jurisdictional Hazard Mitigation Plan and are active participants in the 2025 plan.

Disaster Recovery Plan

A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster event. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event. Based on the 2025 capability findings and current HMPC input, all jurisdictions are participating in a countywide disaster recovery plan, which is being developed by the county.

Emergency Operations Plan

An emergency operations plan outlines the responsibilities of different departments and how resources will be deployed during and following an emergency or disaster. Current for 2025, all jurisdictions have an emergency operation plan or are covered under the County's plan.

Continuity of Operations Plan

A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event. Per the 2025 capability findings, all jurisdictions have a continuity of operations plan or are covered under the County's plan.

4.2.1.2 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they may not be designed as such.

Comprehensive/General Plan

A comprehensive land use plan, or general plan, establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically, a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions. All jurisdictions have a comprehensive or general plan.

Capital Improvements Plan

A Capital Improvements Plan (CIP) guides the scheduling of spending on public improvements. A CIP can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments. The majority of the participating jurisdictions have or are developing a CIP. However, for those without a CIP, this may be a gap to address in support of future mitigation efforts.

Historic Preservation Plan

A historic preservation plan is intended to preserve historic structures or districts within a community. An often-overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards, and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot easily be relocated out of harm's way. The County and a couple of cities have historic preservation plans. Other municipalities can benefit from developing their own plan to coordinate with the county to be part of theirs.

Zoning Ordinance

Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type

and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas. All jurisdictions have a zoning ordinance or are covered under the County's ordinance.

Subdivision Ordinance

A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development. Most of the jurisdictions have a subdivision ordinance.

Building Codes, Permitting, and Inspections

Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community. All of the jurisdictions have a building code or are covered under the County's ordinance.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program, developed by the Insurance Services Office, Inc. (ISO). The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The expectation is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses, and as a result should have lower insurance rates.

4.2.1.3 Floodplain Management

Flooding represents the greatest natural hazard facing the nation, yet the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program.

In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings be protected from damage by a 100-year flood event, and that new development in the floodplain does not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

Table 4-3 provides NFIP policy and claim information for each participating jurisdiction in the Chatham County planning area.

All jurisdictions in the region participate in the NFIP and will continue to comply with all required provisions of the program. Floodplain management is managed through zoning ordinances, building code restrictions, and the county building inspection program. The jurisdictions will coordinate with NCEM and

FEMA to develop maps and regulations related to Special Flood Hazard Areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property.

Table 4-3 – NFIP Policy and Claim Information

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Written Premium in Force	Closed Losses	Total Payments
Unincorporated Chatham County	08/01/80	08/16/18	13,575	$4,516,439,000	$11,508,722	1,025	$21,933,095
City of Bloomingdale	07/02/81	08/16/18	192	$54,549,000	$132,736	4	$818
City of Garden City	03/16/73	08/16/18	213	$72,434,000	$260,229	55	$2,049,543
City of Pooler	09/30/81	08/16/18	1,720	$522,986,000	$1,396,599	52	$672,476
City of Port Wentworth	03/16/73	08/16/18	153	$45,807,000	$176,538	19	$154,718
City of Savannah	05/21/71	08/16/18	5,663	$1,877,298,000	$4,075,894	470	$7,737,616
Town of Thunderbolt	07/02/87	08/16/18	266	$95,412,000	$298,617	28	$644,311
City of Tybee Island	01/14/72	08/16/18	1,986	$771,774,000	$2,748,377	520	$12,825,389
Town of Vernonburg	07/27/73	08/16/18	32	$10,052,000	$36,368	6	$695,024
TOTAL			**23,800**	**$7,966,751,100**	**$20,634,080**	**2,179**	**$46,712,990**

Source: FEMA FIMA NFIP Redacted Claims and NFIP Redacted Policies, accessed September 2025

Community Rating System

An additional indicator of floodplain management capability is active participation in the Community Rating System (CRS). The CRS is an incentive-based program that encourages communities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP. Each of the CRS mitigation activities is assigned a point value. As a community earns points and reaches identified thresholds, they can apply for an improved CRS class. Class ratings, which range from 10 to 1 and increase on 500-point increments, are tied to flood insurance premium reductions. Every class improvement earns an additional 5 percent discount for NFIP policyholders, with a starting discount of 5 percent for Class 9 communities and a maximum possible discount of 45 percent for Class 1 communities.

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it. Chatham County, Bloomingdale, Garden City, Pooler, Savannah, Thunderbolt, and Tybee Island participate in the CRS. Table 4-4 provides the CRS effective dates, class, and discount for each jurisdiction in the county.

Table 4-4 – CRS Eligible Communities

Jurisdiction	Original Effective Date	Current Effective Date	CRS Class	Percent Discount
Chatham County	10/01/1991	05/01/2015	5	25
City of Bloomingdale	05/01/2015	05/01/2016	8	10
City of Garden City	10/01/2013	05/01/2019	6	20
City of Pooler	10/01/1993	10/01/2015	6	20

Jurisdiction	Original Effective Date	Current Effective Date	CRS Class	Percent Discount
City of Port Wentworth	N/A	N/A	N/A	N/A
City of Savannah	10/01/1992	05/01/2016	5	25
Town of Thunderbolt	05/01/2015	05/01/2016	6	20
City of Tybee Island	10/01/1993	05/01/2015	5	25
Town of Vernonburg	N/A	N/A	N/A	N/A

Source: FEMA CRS Eligible Communities (April 1, 2025)

Floodplain Management Plan

A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts. Several jurisdictions have a floodplain management plan or are included under the County's plan.

Open Space Management Plan

An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state, and to expand or connect areas in the public domain such as parks, greenways, and other outdoor recreation areas. In many instances open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity. All the jurisdictions have an open space plan, are developing one, or are covered under the County's plan.

Stormwater Management Plan

A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding. All the jurisdictions have a stormwater management plan, are developing one, or are covered under the County's plan.

4.2.2 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using geographic information systems (GIS) to analyze and assess community hazard vulnerability. The Local Capability Self-Assessment was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 4-5 provides a summary of the Local Capability Self-Assessment results for the region regarding relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. An asterisk (*) indicates that the given capability is being developed for future implementation. A plus sign (+) indicates that a jurisdiction is covered for that capability under the county.

Table 4-5 – Relevant Staff/Personnel Resources

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Chatham County	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
City of Bloomingdale	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓
City of Garden City	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
City of Pooler	✓	✓	✓	✓	+	✓			✓	*	✓	*	+	✓
City of Port Wentworth	✓	✓		✓	✓	✓			✓	✓	✓	✓	✓	✓
City of Savannah	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Town of Thunderbolt	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
City of Tybee Island	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓	

Source: Local Capability Assessment Survey

4.2.3 Fiscal Capability

The ability of a local government to implement mitigation actions is often dependent on the amount of money available. This may take the form of outside grant funding awards or locally based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project such as the acquisition of flood-prone houses, which can require a substantial commitment from local, state, and federal funding sources.

Many participating jurisdictions have access to capital improvement programing, community development block grants, special purpose taxes, or fees. Additionally, general obligation, revenue, or special tax bonds may be available. Jurisdictions with limited fiscal capability should seek opportunities to hire grant writers or resource development staff, create local funding sources such as stormwater utility fees, or seek alternate funding sources.

4.2.4 Education and Outreach Capability

This type of local capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

All jurisdictions have ongoing public education or information programs. These could include but are not limited to responsible water use, fire safety, household preparedness, and environmental education. Additionally, some jurisdictions have school programs, StormReady certification, and local groups or non-profit organizations that focus on environmental protection or emergency preparedness.

4.2.5 Mitigation Capability

This type of local capability refers to ongoing property mitigation and efforts to acquire and implement mitigation projects with federal funding by the communities in this plan.

All participating jurisdictions apply for mitigation grant funding but only a few jurisdictions perform reconstruction projects, perform building elevations, or perform acquisitions.

4.2.6 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority, or it may conflict with or impede other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

Participating jurisdictions indicated that political leaders are willing to implement mitigation measures. However, fiscal limitations were noted as a limitation for garnering political support.

4.3 CONCLUSIONS ON LOCAL CAPABILITY

As previously discussed, one of the reasons for conducting a capability assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified. The participating jurisdictions used the capability assessment as part of the basis for the mitigation actions where each jurisdiction addresses their ability to expand on and improve their existing capabilities.

All of the jurisdictions are capable of implementing hazard mitigation efforts to varying degrees. Participating communities may refer to this assessment to identify gaps and opportunities for improvement in order to increase local capability to implement mitigation projects.

The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. During the process of identifying specific mitigation actions to pursue, the HMPC considered not only each jurisdiction's level of hazard risk, but also their existing capability to minimize or eliminate that risk.

5 Plan Implementation and Maintenance

This section outlines the process for adoption, implementation, monitoring, and maintenance of the plan. This section contains the following subsections:

- 5.1 Adoption
- 5.2 Implementation
- 5.3 Monitoring and Maintenance

Table 5-1 – Section 5 Summary of Updates

2020 Plan Section Number	2025 Plan Section and Description of Changes
Section 5 – Plan Implementation and Maintenance	**Section 5 – Plan Implementation and Maintenance**
5.1 Adoption – This section has been added to document adoption resolutions within the plan.	5.1 Adoption – This section has been updated with 2025 adoption resolutions as documentation of such within the plan.
5.2 Implementation – Revisions have been made but the original intent has been maintained.	5.2 Implementation – Only minor revisions were made to refine the implementation process and intent.
5.3 Monitoring and Maintenance – Revisions have been made but the original intent has been maintained.	5.3 Monitoring and Maintenance – Only minor revisions were made to refine the plan monitoring and maintenance process and intent.

5.1 ADOPTION

Requirement §201.6(c)(5): [The plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from all participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. Each participating jurisdiction will adopt the Hazard Mitigation Plan by ordinance or resolution. Copies of adopted ordinance or resolution are provided on the following pages along with a copy of the FEMA plan approval letter.

5.2 IMPLEMENTATION

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This section provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

Once adopted, the plan must be implemented to be effective. While this plan contains many worthwhile actions, each participating jurisdiction will need to decide which action(s) to undertake first. The priority

assigned to the actions in the planning process and funding availability will affect that decision. Low or no-cost actions are often the easiest way to demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the Hazard Mitigation Plan recommendations and their underlying principles into other plans and mechanisms, such as the jurisdictions' comprehensive plan, recovery plan, floodplain management plan, and/or historic preservation plan. The participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous planning efforts and recommends implementing actions, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the community. This effort is achieved through the routine actions of identifying and engaging champions, monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the costlier recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding becomes available, the County and participating jurisdictions will be positioned to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

The Georgia Emergency Management Act of 1981 authorizes local emergency management agencies such as CEMA to conduct emergency management activities for the County. CEMA was authorized to develop and implement a plan for mitigation actions by Local Government Resolution for Emergency Management executed by the Chatham County Commission and local municipalities on 25 April 2000.

Each jurisdiction participating in this plan (Chatham County, Bloomingdale, Garden City, Pooler, Port Wentworth, Savannah, Thunderbolt, Tybee Island, and Vernonburg) is responsible for plan implementation within their jurisdiction. Elected officials, officials appointed to head County, City, and Town departments, and community staff are charged with leading implementation of various activities in the plan. During the annual reviews as described later in this section, an assessment of progress on each of the goals and activities in the plan will be determined and noted. At that time, recommendations will be made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from the plan entirely and activities addressing problems unforeseen during plan development may be added.

Role of HMPC in Implementation, Monitoring and Maintenance

With adoption of this plan, each jurisdiction, in coordination with CEMA, will be responsible for the plan implementation and maintenance. As such, each jurisdiction agrees to continue its relationship with the HMPC and:

- Act as a forum for mitigation issues;
- Disseminate mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended revisions to the local governing body; and
- Inform and solicit input from the public.

The HMPC's primary duty moving forward is to see the plan successfully carried out and report to each local governing body, CEMA, GEMA, and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about mitigation, passing concerns on to appropriate entities, and posting relevant information on local websites (and others as appropriate).

5.3 MONITORING AND MAINTENANCE

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

Maintenance Schedule

CEMA is responsible for initiating plan reviews. In order to monitor progress and update the mitigation strategies identified in the action plan, the HMPC will revisit this plan annually and following a hazard event. CEMA will submit a five-year written update to GEMA and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be fully approved and adopted in 2025, the next plan update for Chatham County will occur in 2030.

Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or further annexation).

Updates to this plan will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

To best evaluate any changes in vulnerability as a result of plan implementation, CEMA will review this plan annually and reach out to the municipalities bi-annually to determine changes in their

implementation progress and results from implementation. CEMA will regularly review the status of implementation of action items in the plan. Monitoring activities will consist of:

- Soliciting and reviewing reports every other year from participating municipalities and the County regarding status of implementation of action items from the plan.
- Tracking progress of sources of improved or revised data for use in subsequent plan updates no less frequently than biennially.
- Preparing a report of the status of implementation of action items from the plan and the availability of improved or revised data.

At the jurisdictional level, a representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting on an annual basis to the jurisdictional lead on action status and providing input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities. If the action does not meet identified objectives, the jurisdictional lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and documenting any required modifications for the plan. An annual mitigation action status report should be prepared indicating if projects have been:

- Scoped and/or documented for FEMA or other grant applications;
- Submitted for FEMA or other funding programs;
- Approved or denied for FEMA or other funding;
- Documented for funding by other means (e.g. municipal capital improvement plans);
- Under construction or in-progress; or
- Completed, and if so, whether hazard conditions have occurred such that avoided losses can be documented.

Changes will be made to the plan during the update process to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as is appropriate and necessary, and as approved by local governing bodies. In keeping with the five-year update process, the HMPC or similar committee will convene public meetings to solicit public input on the plan and its routine maintenance, and the final product will be adopted by local governing bodies.

Maintenance Criteria

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan during annual reviews in preparation for the five-year update. More specifically, annual reviews will monitor changes to the following information:

- Community growth or change in the year.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.

- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of places of employment or schools and the number of days closed.
- Road or bridge closures due to the hazard and the length of time closed.
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Hazard Mitigation Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the goals, objectives, and recommendations of this plan into other plans and policies. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The 2025 plan was made available to county, municipal, and area planning organizations, including the Chatham County-Savannah Metropolitan Planning Commission (MPC) to serve as a foundation for planning and mitigation efforts. Most notably, the 2020 plan was reviewed and referenced during the development of the Chatham County-Savannah Comprehensive Plan 2040. This plan update will be presented to the agencies, writers, consultants and/or committees responsible for comprehensive and land use planning, capital improvements planning, emergency operations planning, and other related documents for their use in integrating this plan into future planning, preparedness, and mitigation efforts.

This plan update builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms such as comprehensive plans, floodplain management ordinances, emergency operations plans, and building codes and other ordinances. Those HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc., as appropriate. As described in Section 5.2 Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas;
- Attending other planning/program meetings;
- Participating in other planning processes; and
- Monitoring community budget meetings for other community program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community. Efforts should continuously be made to monitor the progress of mitigation actions implemented through other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this Hazard Mitigation Plan.

Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The annual review process provides an opportunity to solicit participation from new and existing stakeholders, publicize success stories from the plan implementation, and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through invitation to designated committee meetings, web postings, press releases to local media, and gathering of public comment, similar to the process used in the development of this plan.

When the HMPC reconvenes for the five-year update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the HMPC will be responsible for coordinating the activities necessary to involve the greater public, including disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public meetings will be held, and public comments will be solicited on the plan update draft.