BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019 - 2024

Barrow County Emergency Management Agency

Lux Mitigation and Planning Corp.

Barrow County, Georgia

Hazard Mitigation Plan Update

2019 – 2024

BARROW COUNTY

Prepared for the Barrow County Board of Commissioners

30 North Broad Street

Winder, Georgia 30680

770.307.3005

www.barrowga.org

Barrow County's
Hazard Mitigation Plan Update 2019

This document was funded in part by the Hazard Mitigation Planning Grant awarded to the Barrow County Emergency Management Agency by the Georgia Emergency Management Agency (GEMA) to fulfill the requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000). Barrow County's Hazard Mitigation Plan 2015 was updated by the Barrow County Hazard Mitigation Plan Update Committee and was prepared by Lux Mitigation and Planning Corp. For additional information, please contact Barrow County Emergency Management Agency.

Director Penny Clack
Barrow County Emergency Management Agency
222 Pleasant Hill Church Rd, NE
Winder, Georgia 30680
pclack@barrowga.org
770.307.2987, ext. 1842

Resolution – Barrow County

RESOLUTION – BARROW COUNTY, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

WHEREAS, Barrow County and its municipalities recognize that it is threatened by a number of different types of natural and man-made hazards that can result in loss of life, property loss, economic hardship and threats to public health and safety; and

WHEREAS, the Federal Emergency Management Agency (FEMA) has required that every county and municipality have a pre-disaster mitigation plan in place, and requires the adoption of such plans in order to receive funding from the Hazard Mitigation Grant Program; and

WHEREAS, a Hazard Mitigation Plan is a community's plan for evaluating hazards, identifying resources and capabilities, selecting appropriate actions, and developing and implementing the preferred mitigation actions to eliminate or reduce future damage in order to protect the health, safety and welfare of the residents in the community; and

WHEREAS, the Barrow County Hazard Mitigation Plan Update 2019 - 2024 has been prepared in accordance with FEMA requirements at 44 CFR 201.6; and

WHEREAS, the Plan will be updated every five years;

NOW, THEREFORE, BE IT *RESOLVED*, by the Board of Commissioners of Barrow County, Georgia, and the Mayors and Councils of the City of Auburn, City of Bethlehem, City of Statham, City of Winder, Town of Braselton, and Town of Carl, each meeting in respective session, that:

1) Barrow County, Georgia; City of Auburn, City of Bethlehem, City of Statham, City of Winder, Town of Braselton, and Town of Carl have adopted the Barrow County Hazard Mitigation Plan Update 2019 - 2024; and

2) It is intended that the Plan be a working document and is the first of many steps toward improving rational, long-range mitigation planning and budgeting for Barrow County and its municipalities.

PASSED, APPROVED AND ADOPTED by the Barrow County Board of Commissioners in regular session this _____ day of _____, 2019.

_____ _____

Chairperson County Clerk

Resolution – Barrow County Municipalities

Requirement §201.6(c)(5)

RESOLUTION – TOWN OF CARL, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

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PASSED, APPROVED AND ADOPTED by the Mayor and Council of the Town of Carl, Georgia, in regular session this _____ day of _____, 2019.

_____ _____

Mayor Town Clerk

RESOLUTION – TOWN OF BRASELTON, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

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PASSED, APPROVED AND ADOPTED by the Mayor and Council of the Town of Braselton, Georgia, in regular session this _____ day of _____, 2019.

_____ _____

Mayor Town Clerk

RESOLUTION – CITY OF WINDER, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

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PASSED, APPROVED AND ADOPTED by the Mayor and Council of the City of Winder, Georgia, in regular session this _____ day of _____, 2019.

_____ _____

Mayor City Clerk

RESOLUTION – CITY OF STATHAM, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

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PASSED, APPROVED AND ADOPTED by the Mayor and Council of the City of Statham, Georgia, in regular session this _____ day of _____, 2019.

_____ _____

Mayor City Clerk

RESOLUTION – CITY OF BETHLEHEM, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

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PASSED, APPROVED AND ADOPTED by the Mayor and Council of the City of Bethlehem, Georgia, in regular session this _____ day of _____, 2019.

_____ _____

Mayor City Clerk

RESOLUTION – CITY OF AUBURN, GEORGIA

BARROW COUNTY HAZARD MITIGATION PLAN UPDATE 2019-2024

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PASSED, APPROVED AND ADOPTED by the Mayor and Council of the City of Auburn, Georgia, in regular session this _____ day of _____, 2019.

_____ _____

Mayor City Clerk

Preface

Mitigation Vision for the Future

Emergency Managers succeed or fail based on how well they follow the following fundamental principles of emergency management, mitigation, preparedness, response and recovery. Purposefully, our emergency management forefathers put the word mitigation first as a "means" to prevent or minimize the effects of disasters.

Mitigation is commonly defined as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Hazard mitigation focuses attention and resources on community policies and actions that will produce successive benefits over time. A mitigation plan states the aspirations and specific courses of action that a community intends to follow to reduce vulnerability and exposure to future hazard events. These plans are formulated through a systematic process centered on the participation of citizens, businesses, public officials, and other community stakeholders.

Mitigation forms, or should form, the very foundation of every emergency management agency. To reduce, minimize, or eliminate hazards in their communities, emergency management agencies adopt and implement mitigation practices. The Federal DMA 2000 sets the benchmark and outlines the criteria for communities with the vision to implement hazard mitigation practices in their communities.

Barrow County and its municipalities realize the benefits achieved by the development and implementation of mitigation plans and strategies in their community. Barrow County's elected officials, public safety organizations, planners, and many others have proven that by working together towards the development and implementation of this plan, they can reduce the loss of life and property in their communities.

The jurisdictions covered by this plan include the following:

Barrow County
City of Auburn
City of Bethlehem
City of Statham
City of Winder
Town of Braselton
Town of Carl

Table of Contents

CHAPTER THREE – HAZARD PROFILES (CONTINUED)

APPENDICIES

CHAPTER ONE
–
INTRODUCTION

Summary of Updates for Chapter One

The following table provides a description of each section of this chapter and a summary of the changes that have been made to the Barrow County Hazard Mitigation Plan 2015.

Chapter 1 Section	Updates
Introduction	• Content Revised
Authority	• Content Revised
Funding	• New Section – Not in 2015 Plan
Scope	• Content Revised
Purpose	• Content Revised
Consistency with Federal Guidelines	• Content Revised
Plan Review	• Content Revised
Hazard Mitigation Plan Update Committee	• Updated committee list to match the 2019 planning participants
Public Participation	• Content Revised
Multi-Jurisdictional Considerations	• New Section – Not in 2015 Plan as a Stand-Alone Section
Incorporation of Existing Plans, Studies, and Resources	• Updated with new plan, study, and resource incorporations

Introduction

The Barrow County Hazard Mitigation Plan Update is the first phase of a multi-hazard mitigation strategy for the entire community. This Plan encourages cooperation among various organizations and crosses political sub-divisions. As written, this Plan fulfills the requirements of the Federal DMA 2000. DMA 2000 provides federal assistance to state and local emergency management agencies and other disaster response organizations to reduce damage from disasters. The Act is administered by GEMA and FEMA.

It is important that state and local government, public-private partnerships, and community citizens can see the results of these mitigation efforts; therefore, the goals and strategies need to be achievable. Barrow County's Hazard Mitigation Plan Update Committee adopted the following goals during plan development:

GOAL 1 Protect the public health and safety

GOAL 2 Reduce and eliminate (to the extent possible) community exposure to natural and technological hazard events

GOAL 3 Reduce loss and damage to private property and public infrastructure resulting from natural or technological hazards

GOAL 4 Maintain continuity of public and private sector operations during and after hazard events

GOAL 5 Respond promptly, appropriately, and efficiently in the event of natural or technological hazards

This plan complies with all requirements and scope of work as described in Barrow County's Hazard Mitigation Grant application.

Authority

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

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

Developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans, Barrow County's Updated Hazard Mitigation Plan will be brought forth to each participating jurisdiction in Barrow County to be formally adopted. The Plan shall be routinely monitored and revised to maintain compliance with the following provisions, rules, and legislation:

Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390); and

FEMA's Interim Final Rule published in the Federal Register on February 26, 2002, at 44 CFR Part 201.

Funding

Barrow County was awarded a $32,000 Hazard Mitigation Planning Grant by FEMA through GEMA for the update of Barrow County's 2015 Hazard Mitigation Plan. FEMA contributed 75% and GEMA contributed 10 of the total cost of the Plan Update. The Hazard Mitigation Planning Grant required a 15% match by Barrow County. This match was fulfilled entirely (100%) by In-Kind contributions – time spent by county and municipal employees, local stakeholders, representatives from organizations, and citizen volunteers updating the Plan was provided instead of cash from the County's budget.

Scope

The scope of the Barrow County Hazard Mitigation Plan Update encompasses all areas of Barrow County, including municipalities. The Plan identifies all natural and technological hazards that could threaten life and property in Barrow County. The scope of this Plan includes both short and long-term mitigation strategies with implementation and possible sources of project funding.

The Hazard Mitigation Plan Update is organized to incorporate the requirements of Interim Final Rule 44 CFR 201.4.

Chapter One includes an overview of the Hazard Mitigation Plan Update, the overall goals of the plan, and details of the planning process as required by Interim Final Rule 44 CFR 201.4(c)(1).

Chapter Two of the Plan details the Barrow County profile, including the demographics, municipalities, and history of the county.

Chapter Three identifies the risk assessment process, past natural hazard events with associated losses, and current natural hazard risks. Potential losses are also analyzed as required by Interim Final Rule 44 CFFR 201.4(c)(2). Additionally, Chapter Three identifies and analyzes potential technological hazards faced by Barrow County.

Chapter Four identifies Barrow County's hazard mitigation goals and objectives, mitigation strategies and actions, and sources of potential funding for mitigation projects as required by Interim Final Rule 44 CFR 201.4(c)(3).

Chapter Five identifies the maintenance and implementation strategies for the Plan. The process for evaluation of the Hazard Mitigation Plan implementation progress is also detailed as required by Interim Final Rule 44 CFR 201.4(c)(4) and (5).

Purpose

The purpose of the Barrow County Hazard Mitigation Plan Update is to:

- Protect life, promote safety and preserve property by reducing the potential for future damages and economic losses that result from natural and technological hazards;
- Make communities in Barrow County safer places to live, work, and play;
- Qualify for grant funding in both the pre-disaster and post-disaster environments;
- Speed the recovery and redevelopment process following future disaster events;
- Demonstrate a firm local commitment to hazard mitigation principles; and
- Comply with state and federal legislative requirements for local multi-jurisdictional hazard mitigation plans.

Consistency with Federal and State Mitigation Policies

The Plan is intended to enhance and complement state and federal recommendations for the mitigation of natural and technological hazards in the following ways:

- Substantially reduce the risk of life, injuries and hardship from the destruction of natural and technological disasters on an ongoing basis;
- Create greater public awareness about the need for individual preparedness and about the need to build safer, more disaster resistant communities;
- Develop strategies for long-term community sustainability during community disasters; and,
- Develop governmental and business continuity plans that will continue essential private sector and governmental activities during disasters.

FEMA publishes several guidance documents for local governments on mitigating natural disasters. The updated Barrow County Hazard Mitigation Plan recognizes, adopts, incorporates, and endorses the following principles:

- Develop a strategic mitigation plan for Barrow County;
- Enforce current building codes;
- Develop incentives to promote mitigation;
- Incorporate mitigation of natural hazards into land use plans;
- Promote awareness of mitigation opportunities and programs throughout our community on a continual basis; and,
- Identify potential funding sources for mitigation projects.

The private sector is often an overlooked segment of the community during disasters. It is vital that this sector of a community is included in mitigation efforts that are consistent with state and federal recommendations, such as the following:

- Develop mitigation incentives with insurance agencies and lending institutions;

- Encourage the creation of a business continuity plan for the continuance of commerce during and following a disaster; and,

- Partner with local businesses to educate customers about potential hazards in the community and possible mitigation ideas.

Individual citizens must be made aware of the hazards they may encounter. Additionally, they must be educated on how to protect themselves from the hazards they face. They must be shown that mitigation is an important part of reducing loss of life and property in their community. Their support is critical to the success of any mitigation effort. The updated Barrow County Hazard Mitigation Plan supports the following FEMA recommendations regarding individual citizens:

- Become educated on the hazards that may impact your community;

- Become part of the process by supporting and encouraging mitigation programs that reduce vulnerability to disasters; and,

- An individual's responsibility is to safeguard his/her family, as well as themselves, prior to a disaster event.

Plan Review

Requirement §201.6(c)(1)

The contractor, Lux Mitigation and Planning, had the primary responsibility for collecting updated information and presenting pertinent data to the Plan Update Committee. An online, Dropbox folder was created for Barrow County's Plan Update. The approved 2015 Hazard Mitigation Plan was uploaded to the Dropbox folder, and the link to the folder was emailed to all members of the Hazard Mitigation Plan Update Committee. Each chapter of the 2015 Plan was reviewed. Hazard vulnerability and risk assessment data was updated, as was critical infrastructure information.

Special attention and consideration were given to the review and edit of mitigation strategies listed in the 2015 Plan. The Plan Update Committee examined each strategy and determined whether the strategy had been completed, needed to be modified, was in progress, or no longer applied. The Committee was highly encouraged to create new mitigation strategies to meet the current needs of the county and municipalities. Mitigation strategies from other Georgia counties were reviewed to help with the creation of new strategies. When the Committee agreed a new mitigation action would be beneficial, it was tailored to Barrow County's needs and was included in the 2019 Plan. The contractor sent the Committee, including sporadically attending participants, regular emails which contained a Dropbox link to the most updated version of the Plan and encouraged the Committee to thoroughly critique each version.

Barrow County's Hazard Mitigation Plan Update Meeting Dates:

Thursday, January 24, 2019	Kick-Off Meeting (Public Meeting #1)
Thursday, February 28, 2019	Hazard Identification and Prioritization; Update Critical Facilities Information
Thursday, March 28, 2019	Analysis of Hazard Profile Research; Review and Edit 2015 Hazard Mitigation Strategies
Thursday, April 25, 2019	Continue to Review and Edit 2015 Hazard Mitigation Strategies; Identify New Hazard Mitigation Strategies
Thursday, May 16, 2019	Risk Assessment Analysis; Presentation of 2019 Hazard Mitigation Plan - Rough Draft

Thursday, June 27, 2019	Review and Edit 2019 Hazard Mitigation Plan - Final Draft; Update Plan Distribution List; Discuss Available Hazard Mitigation Grants (Public Meeting #2)

Each section of Barrow County's 2015 Hazard Mitigation Plan has been revised in some manner. Therefore, a summary of those changes will be listed in the first section of each chapter. Significant additions/modifications to this Plan include the following:

- Addition of Technological Hazards Section
- Addition of Transportation Incidents to Technological Hazards
- Addition of Terrorism to Technological Hazards
- Addition of Utility Failure to Technological Hazards
- Addition of Emergent Infectious Diseases to Technological Hazards
- Incorporation of data from the 2019 Barrow County HAZUS Report

Hazard Mitigation Plan Update Participants

Requirement §201.6(b)(2)

The following 51 participants contributed to the update of Barrow County's 2015 Hazard Mitigation Plan: *(in alphabetical order)*

Iris E. Akridge
Director
City of Auburn Public Works

Ken Austin
Winder Healthcare

Julia Autry
Park Manager
Georgia Department of Natural Resources – Fort Yargo State Park

Nicholas Bilir
Sergeant
City of Winder Police Department

Scott Bratcher
Barrow County Roads & Bridges

Kathy Bridges
Town Clerk
Town of Bethlehem

Dave Brock
Mayor
Town of Carl

Paul Brown
Disaster Program Specialist
American Red Cross

Tammy S. Brown
Probate Judge
Barrow County Probate Court

Bryan Bullock
Deputy Director
Jackson County Emergency Management Agency

Beth Burgess
Director
Athens-Clarke County Emergency Management Agency

Tracey Byrd
Clerk
Barrow County Magistrate Court

Glen A. Cain
Assistant – Barrow County Emergency Management Agency
Fire Marshal and Captain - Barrow County Emergency Services

Richard Carignan
Captain
Barrow County Emergency Services

Allison Choudhury
Firefighter; Emergency Medical Technician
Barrow County Emergency Services

Penny Clack
Director
Barrow County Emergency Management Agency

Chris Cooper
Captain
City of Winder Police Department

Scott Dakin
Deputy Director
Barrow County Emergency Management Agency

Mallory Danner
Paramedic; Emergency Preparedness Coordinator
Northeast Georgia Medical Center - Barrow

Todd Dewberry
PSM Coordinator
Harrison Poultry

Caroline Evans
Chief Magistrate Judge
Barrow County Magistrate Court

Jim Fullington
Chief
City of Winder Police Department

Mark Gieszler
Maintenance Manager
Northeast Georgia Medical Center – Barrow

Autron Hayes
Director
Barrow County Public Works

Karen Hayes
Accounts Payable Specialist
Barrow County Finance Department

Kevin Hill
Emergency Management Specialist
Gwinnett County Office of Emergency Management

Chris Hodge
Chief
City of Auburn Police Department

Tyrees P. Jones
Fire Inspector
Barrow County Emergency Services

Denise Lark
Regional Resource Coordinator, Region 5
Georgia Department of Family and Children Services

Michael Mackendree
Firefighter
Barrow County Emergency Services

Alex Mitchem
City Administrator
City of Auburn

Mike Nations
HESS Manager
Harrison Poultry

Chris Owens
Owner
Chick-fil-A

Sam Powell
Director
City of Statham Public Works

Cindy Price
Office Manager
Barrow County Health Department

Michael Renshaw
County Manager
Barrow County Administration

Giles Roberts
Emergency Management Specialist
Gwinnett County Office of Emergency Management

Dan Schultz
Director
Barrow County Planning and Community Development

Jennifer Scott
Manager
Town of Braselton

Lauren Shirley
Firefighter; Advanced Emergency Medical Technician
Barrow County Emergency Services

Alan Shuman
Chief
Barrow County Emergency Services

John Skinner
Chief Safety and Security Officer
Barrow County School System

Jud Smith
Sheriff
Barrow County Sheriff's Office

Luis Suarez
Supervisor
Barrow County Building and Grounds

Matt Treeter
Manager
Barrow County Stormwater Department

Sandy Weinel
Capital Projects Coordinator
Town of Braselton

John Westbury
Assistant Administrator
Winder Healthcare

Mark Whiddon
Utilities Manager
Barrow County Wastewater Department

Matt Whiting
Chief
City of Winder Fire Department

Roger Wilhelm
Utilities Director
City of Winder Gas and Water Departments

Heath Williams
Deputy Chief
Barrow County Emergency Services

The Plan Update Committee relied on their consultant to guide them through the update process. During meetings, the participants had productive discussions, expanded their professional networks, asked thoughtful questions, made important decisions, and provided critical input during key stages in the update process. Efforts were made to involve all county and municipal departments, as well as community organizations and local businesses, which may have a role in the implementation of mitigation actions and/or policies. These efforts included sending invitations via email to attend the Kick-off Meeting, sending reminder emails before each upcoming meeting, emailing pertinent information throughout the process, and requesting the review and critique of each chapter in the updated Plan.

All neighboring jurisdictions were invited to participate in the Barrow County Hazard Mitigation Plan Update process. The Emergency Management Agency for each surrounding jurisdiction – Athens-Clarke, Gwinnett, Hall, Jackson, Oconee, and Walton Counties – were including on all invitation emails sent to the Barrow County Hazard Mitigation Plan Update Committee. Beth Burgess, the EMA Director for Athens-Clarke County, Bryan Bullock, EMA Deputy Director for Jackson County, and Kevin Hill, Emergency Management Specialist for Gwinnett County, all attended meetings of the Barrow County Hazard Mitigation Plan Update and participated in the plan update process.

All neighboring counties – Clarke, Gwinnett, Hall, Jackson, Oconee and Walton - were asked to peer review the 2019 Mitigation Plan draft. The Plan was sent to each County EMA office. For the next Plan Update, it was decided that the EMA Directors from surrounding counties should be asked to attend the Plan Update Committee meetings, in hopes they will share mitigation ideas from their own counties.

Public Participation

Requirement §201.6(b)(1)
State Requirement Element F2

Public awareness is a key component of any community's overall mitigation strategy. As citizens become more involved in decisions that affect their safety, they may develop a greater respect for the natural hazards present in their community, and thus, may take the steps necessary to reduce potential impacts of those hazards.

The following local organizations and businesses participated in the update of Barrow County's 2015 Mitigation Plan: American Red Cross, Chick-fil-A, Harrison Poultry, Northeast Georgia Medical Center – Barrow, and Winder Healthcare

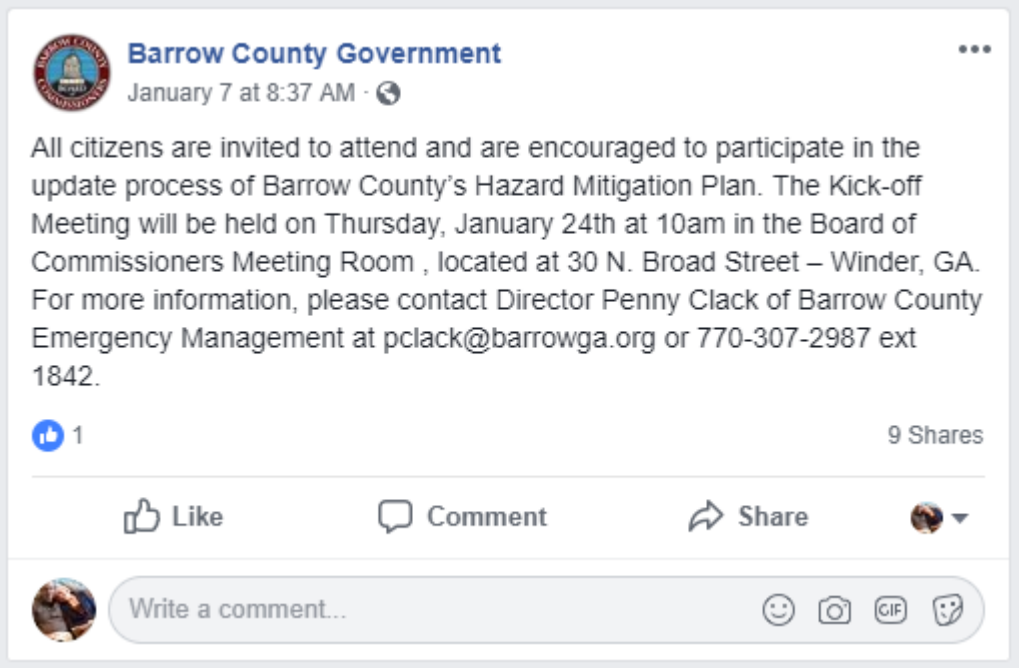
The Plan Update Committee took it upon themselves to ensure the processes undertaken for the development, implementation, and maintenance of the 2019 Hazard Mitigation Plan adequately considered public needs and viewpoints.

A list of public outreach initiatives can be found below:

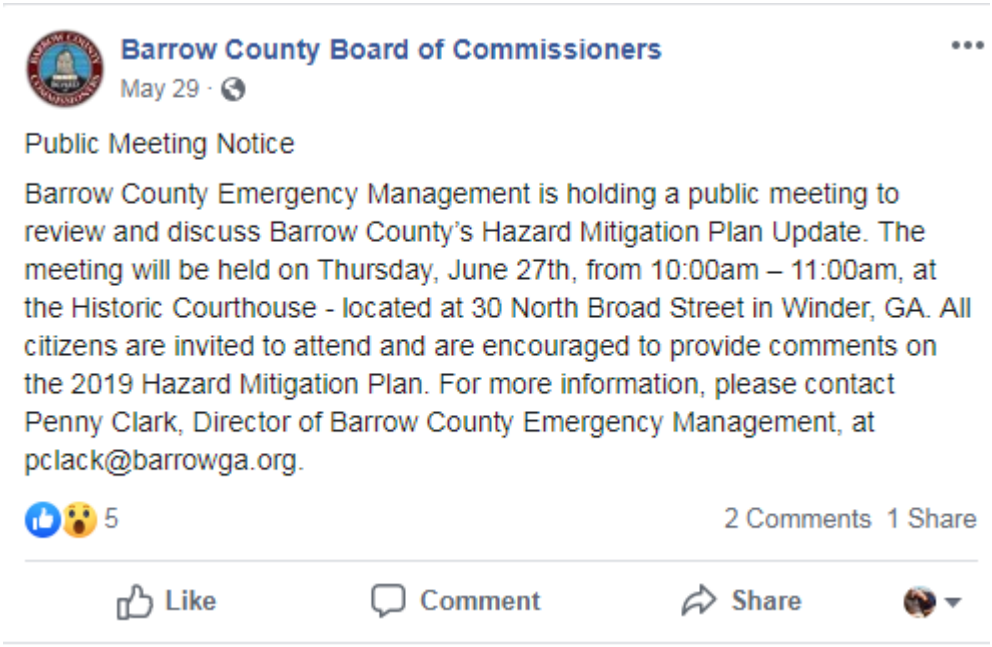
- Email reminders were sent to all Plan Update Committee members, as well as other stakeholders, prior to every meeting. Recipients were encouraged to share the meeting invitation with anyone they thought would be an asset to the Plan Update process or anyone who may want to learn more about what a Hazard Mitigation Plan is.
- The first public meeting was held on January 24, 2019. Notice of this meeting was posted to the Barrow County Government Facebook page on January 7, 2019. It was shared by multiple times – including by the FM 107.1 WJBB Radios and the Barrow County Emergency Services Facebook pages. This meeting was also posted to the events calendar on the front page of the Barrow County government website.
- The second public meeting was held on June 27, 2019. Notice of this meeting was posted to the Barrow County Government Facebook page and the Barrow County Emergency Services Facebook page on May 29, 2019. This meeting was also posted to the events calendar on the front page of the Barrow County government website.
- The Public was invited and encouraged to attend all six of the Barrow County Hazard Mitigation Plan Update Committee meetings. All six of the Committee meetings were advertised on the Barrow County government webpage events calendar. For documentation purposes, the kickoff meeting (January 24, 2019) and the sixth committee meeting (June 27, 2019) are the "official" public meetings for this planning process.

Documentation of Public Meeting Notice

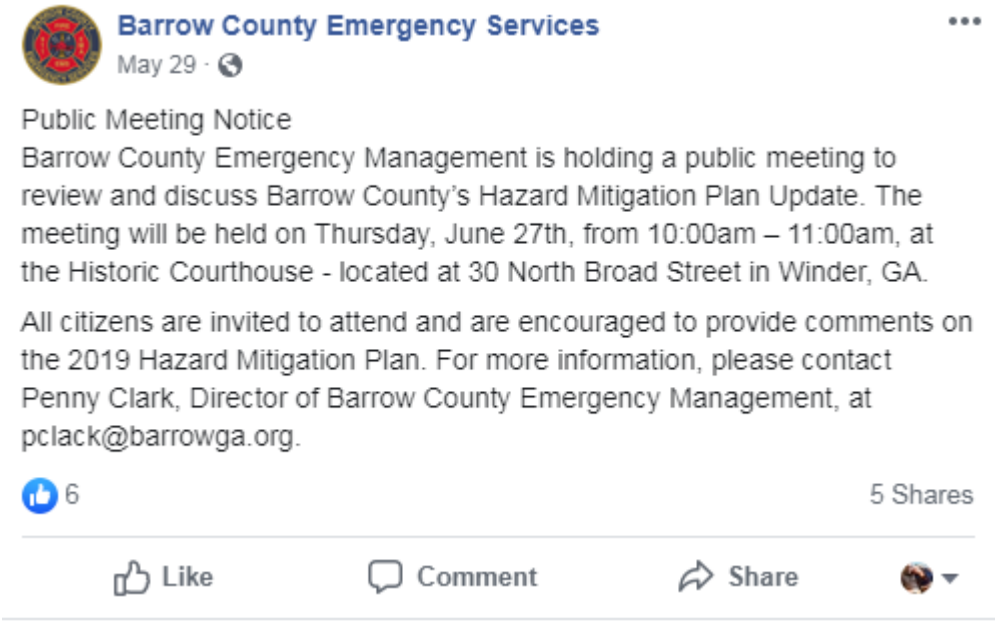
Public Meeting Notice on Barrow County Government Facebook page – Kickoff Meeting (posted January 7, 2019 for meeting on January 24, 2019)



Public Meeting Notice on Barrow County Government Facebook page – Hazard Mitigation Plan Update Meeting (posted May 29, 2019 for meeting on June 27,2019)



Public Meeting Notice on Barrow County Emergency Services Facebook page – Hazard Mitigation Plan Update Meeting (posted May 29, 2019 for meeting on June 27,2019)



Barrow County Emergency Services
May 29 ·

Public Meeting Notice
Barrow County Emergency Management is holding a public meeting to review and discuss Barrow County's Hazard Mitigation Plan Update. The meeting will be held on Thursday, June 27th, from 10:00am – 11:00am, at the Historic Courthouse - located at 30 North Broad Street in Winder, GA.

All citizens are invited to attend and are encouraged to provide comments on the 2019 Hazard Mitigation Plan. For more information, please contact Penny Clark, Director of Barrow County Emergency Management, at pclack@barrowga.org.

6 5 Shares

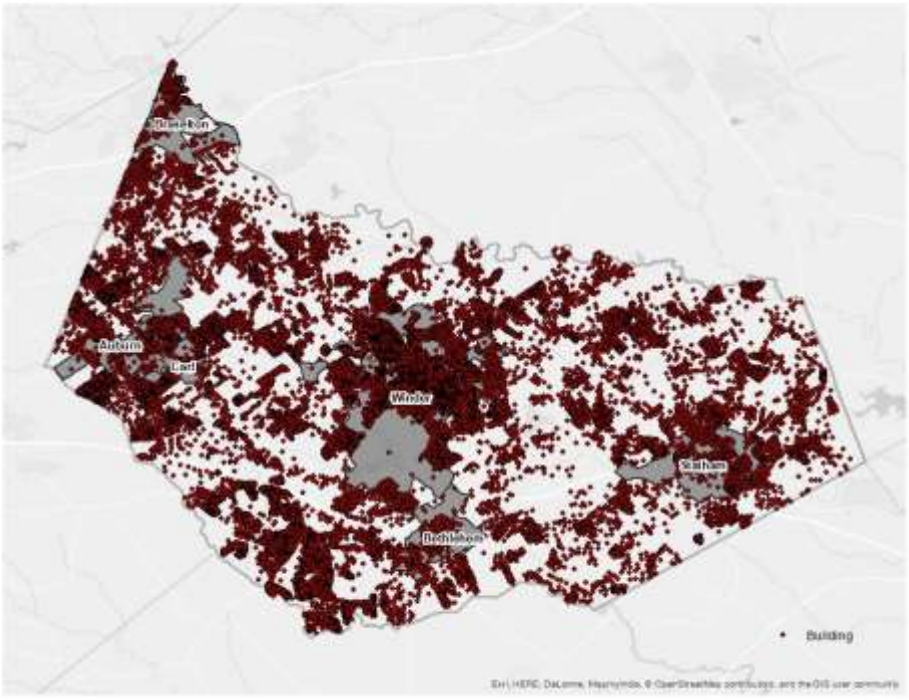
Like Comment Share

Multi-Jurisdictional Considerations

FEMA does not require cities and towns to adopt a local Hazard Mitigation Plan. However, the Federal DMA 2000 requires that all municipalities, wishing to be eligible to receive Hazard Mitigation Grants through FEMA, must adopt a local multi-hazard mitigation plan and must update that plan every five years. Barrow County's Hazard Mitigation Plan was most recently approved by FEMA in 2015. This FEMA-approved 2019 Hazard Mitigation Plan makes Barrow County, City of Auburn, City of Bethlehem, City of Statham, City of Winder, Town of Braselton, and Town of Carl eligible for FEMA's Hazard Mitigation Grant Program, Flood Assistance Mitigation Grants, and Pre-Disaster Mitigation Grants.

As set forth by Georgia House Bill 489, the Emergency Management Agency is the implementing agency for projects pertaining to hazard mitigation. Barrow County is dedicated to work in the best interests of the County, as well as, its municipalities. A few mitigation strategies in Barrow County's 2019 Mitigation Plan apply to a specific municipality. Unless noted otherwise, mitigation strategies apply equally to all jurisdictions. During the creation and update of this Plan, Barrow County Emergency Management Agency solicited and received participation from the following Barrow County municipalities: City of Auburn, City of Bethlehem, City of Statham, City of Winder, Town of Braselton, and Town of Carl.

Distribution of Buildings in Barrow County



Source: 2019 Barrow County HAZUS Report

Incorporation of Existing Plans, Studies, and Resources

Requirement §201.6(b)(3)

State Requirement Element F3

Existing Plans

2015 Barrow County Pre-Disaster Hazard Mitigation Plan
2019 State of Georgia Hazard Mitigation Plan
Barrow County Local Emergency Operations Plan
Georgia Forestry Commission's Barrow Co. Community Wildfire Protection Plan
Barrow County Joint Comprehensive Plan 2018 Update

Studies

2019 Hazard Risk Analyses (HAZUS Report)
2017 United States Department of Agriculture Ag Census
2010 United States Census
2009 Barrow County Flood Insurance Study
Radeloff, V. C., R. B. Hammer, S. I Stewart, J. S. Fried, S. S. Holcomb, and J. F. McKeefry. 2005. *The Wildland Urban Interface in the United States*. Ecological Applications 15:799-805.

Resources

2014 City of Boston Natural Hazard Mitigation Plan Update
2010 Camden County Joint Hazard Mitigation Plan Update
2010 Northern Virginia Hazard Mitigation Plan Update
National Climactic Data Center
National Weather Service
Barrow County Tax Assessor's Data
Barrow County Website
Georgia Mitigation Information System Database
Colorado State University (Hurricane mapping)
United States Geological Survey
FEMA Flood Insurance Rate Maps
National Flood Insurance Program
United States Coast Guard National Response Center Data
Georgia Department of Transportation
Georgia Safe Dams Program
Southern Group of State Foresters Wildfire Risk Assessment

Application of Existing Plans and Studies

Existing Planning Mechanism	Reviewed? Yes/No	Incorporation into 2019 Mitigation Plan
2015 Barrow County Hazard Mitigation Plan	Yes	Baseline for the 2019 Plan; updated mitigation strategies; updated hazards; updated Barrow County information
2014 State of Georgia Hazard Mitigation Plan	Yes	Hazard descriptions; potential hazards; mapping mechanisms; potential mitigation strategies that could be adopted on a local level
Barrow County Local Emergency Operations Plan (LEOP)	Yes	Identification of current resources; identification of current capabilities
Georgia Forestry's Barrow County Community Wildfire Protection Plan (CWPP)	Yes	Mitigation strategies for wildfire and drought; historical data
2017 USDA Agriculture Census	Yes	Agricultural data regarding potential losses for drought and wildfire
2010 United State Census	Yes	To update Barrow County's profile information
2009 Barrow County Flood Insurance Study	Yes	Identify potential flood prone areas; prioritization of flood-related mitigation strategies
Barrow County Comprehensive Plan 2018 Update	Yes	To identify future development trends; identify mitigation strategies to curb trends in a direction that considers the hazards of the area
Barrow County Flood Mitigation Assistance Plan	No	No such plan exists

CHAPTER TWO
–
BARROW COUNTY PROFILE

Summary of Updates for Chapter Two

The following table provides a description of each section of this chapter and a summary of the changes that have been made to the Barrow County Hazard Mitigation Plan 2015.

Chapter 2 Section	Updates
Past Hazards	• Information was updated for the last 50 years
History	• Content Revised
Past Events	• New Section – Not in 2015 Plan as a Stand-Alone Section
Demographics	• Content Revised
Economy	• Content Revised
Government	• New Section – Not in 2015 Plan
Municipalities	• New Section – Not in 2015 as a Stand-Alone Section
Transportation	• Content Revised
Climate	• New Section – Not in 2015 as a Stand-Alone Section
Utilities	• Content Revised
NFIP Compliance	• New Section – Not in 2015 as a Stand-Alone Section

Past Hazards

Barrow County, Georgia, has faced many natural hazards in its long history. Severe thunderstorms have been the most prevalent of these hazards. In the last 50 years, Barrow County has been subjected to 134 documented severe thunderstorm events. These events include torrential rainfall, hail, thunderstorm-force winds, and lightning.

Tornadoes, which can sometimes spawn from severe thunderstorms, have also occurred, although with much less frequency. In Barrow County, there have been 4 documented tornadoes in the last 50 years.

Because of heavy rainfall, either within Barrow County or upstream, flooding has also occurred. In the National Climactic Data Center (NCDC) databases of the National Weather Service, there is documentation of 11 flooding events for Barrow County.

Winter storms and heavy snowfall have affected Barrow County over the last 50 years. Because these natural events are barely an annual occurrence, the pre-planning and preparedness component of emergency management is not as robust as northern or western states that routinely see this type of weather. The NCDC recorded 34 winter storms or heavy snow events for Barrow County with five of those events occurring in the last five years.

Barrow County has been impacted by other less severe or less frequent hazards in the past. These hazards include, but are not limited to, the following: drought, excessive heat, tropical cyclones, earthquakes, and wildfires.

Barrow County has had ten Presidential Disaster Declarations (FEMA-declared major disasters) – two of which have occurred since the adoption of the 2015 Hazard Mitigation Plan.

History

The area that today is Barrow County was settled prior to the start of the 19th century. An Indian trail that ran through the county attracted settlers. To protect the settlers from the Cherokee and Creek Indians, the state built a frontier fort during 1792 called Fort Yargo, now a state park. Winder, the county seat, was known as Jug Tavern during this time.

Barrow County was the scene of one of the few Union defeats during Sherman's Atlanta Campaign known as Stoneman's Raid.

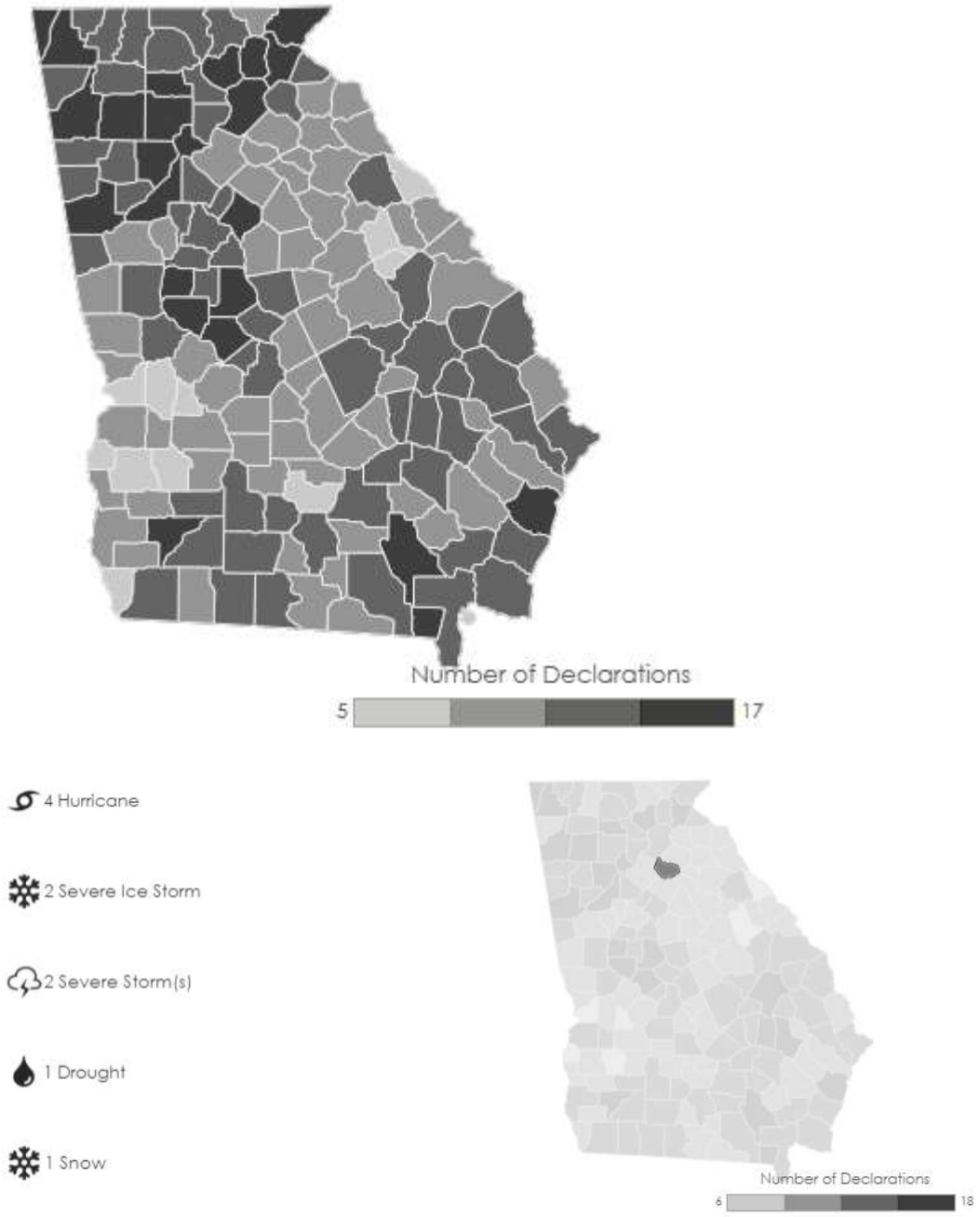
During the 1880s, rail was expanded, and Barrow County played host to two railroads - the Seaboard Air Line and the Gainesville and Midland. One of the railroad builders for the Seaboard Air Line Railroad was John H. Winder of North Carolina. Jug Tavern's name was changed to Winder by the Georgia General Assembly on Dec. 20, 1893 to honor the railroad builder.

Barrow County was created from portions of Gwinnett, Jackson, and Walton counties when Georgia voters approved a constitutional amendment on November 3, 1914 making Barrow County the 149th Georgia county out of 159. Barrow County was named after David Crenshaw Barrow, Jr. a University of Georgia mathematics and engineering professor who was later Chancellor serving in that position from 1906 to 1925. Barrow died on January 11, 1929 in Athens and is buried in Oconee Hill Cemetery in Athens.

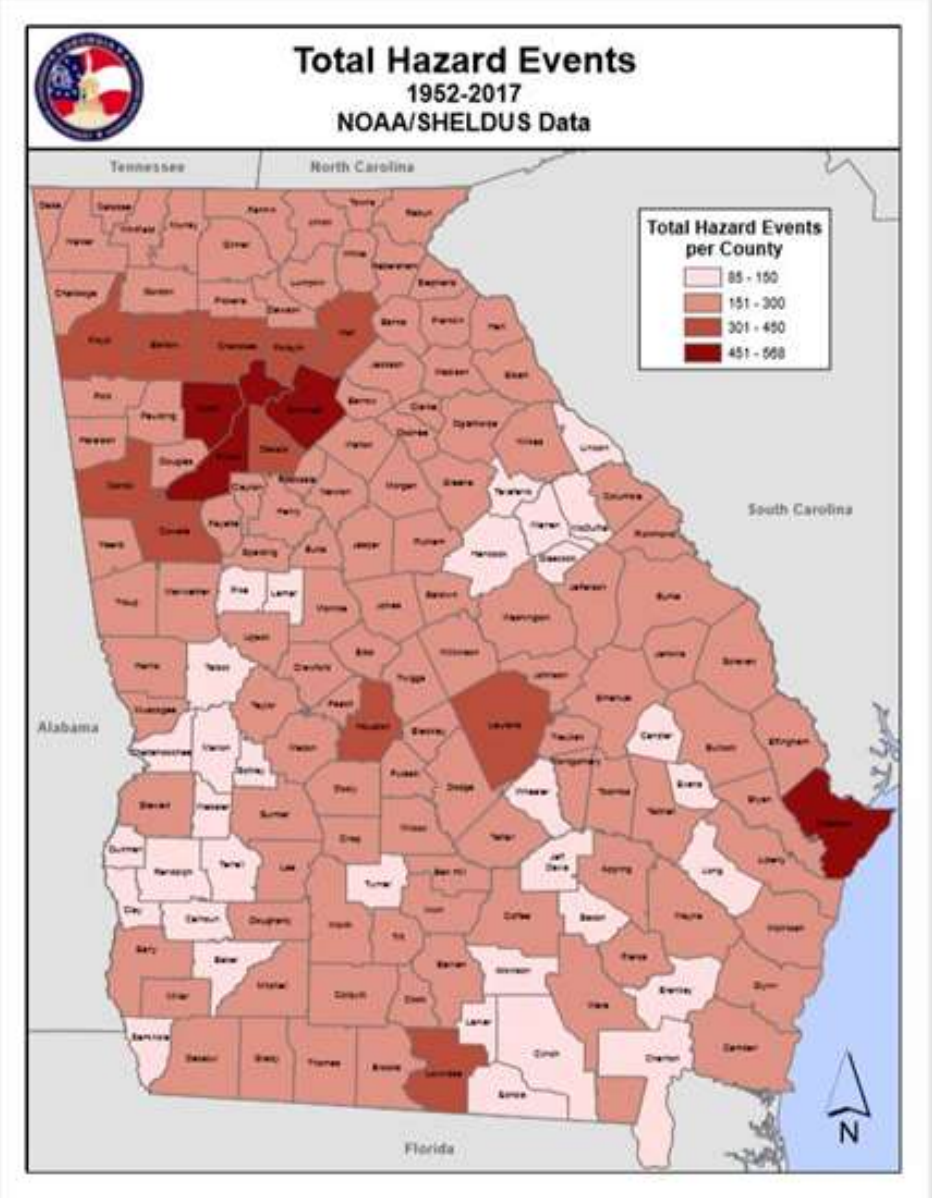
Notable Past Events

- **2017, Hurricane Irma (Federal Declaration)**
- 2017, Tornado (EF0)
- **2015, Severe Winter Storm (Federal Declaration)**
- **2014, Severe Winter Storm (Federal Declaration)**
- 2005, Tornado (F0)
- **2000, Ice Storm (Federal Declaration)**
- **1998, Severe Storms/Flooding (Federal Declaration)**
- **1995, Hurricane Opal (Federal Declaration)**
- **1993, Snowstorm (Federal Declaration)**
- 1984, Tornado (F1)
- **1977, Drought (Federal Declaration)**
- 1974, Tornado (F1)

Federal Disaster Declarations



Source: Federal Emergency Management Agency (FEMA)



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Demographics

Barrow County

	2000 Census	2010 Census	2017 Census Estimates
Population	46,144	63, 367	75,099
White	84.8%	78.8%	79.8%
African American	9.7%	11.4%	11.2%
Hispanic/Latino	3.2%	8.7%	10.0%
Asian	2.2%	3.4%	3.6%
American Indian	0.3%	0.3%	0.3%
Two or More Races	1.4%	2.3%	2.5%
Median Age	32.5	33.6	35.1
Median Household Income	$45,019	--------	$56,119
Persons in Poverty	8.3%	--------	13.2%
Homeowners	75.5%	77.2%	---------

Municipalities

	2000 Census	2010 Census	2017 Census Estimates
Auburn	6,904	6,887	7,622
Bethlehem	716	601	696
Statham	2,040	2,408	2,694
Winder	10,201	14,099	16,244
Braselton	1,206	7,501	10,947
Carl	205	255	225

Economy

Barrow County's economy is primarily agricultural with some light industry. Barrow County's cost of living is 3.6% above the national average. The unemployment rate in Barrow County is 3.0%, which is below the State average of 4.1% and the National average of 4.0%. Barrow County has a median household income of $56,119 which is above the national average of $51,914. Recent economic problems in Georgia and nationwide have affected these figures.

The ten largest employers in Barrow County are:

Company	Product/Service
Barrow County Schools	Education
Chico's FAS, Inc.	Distribution/Call Center
Harrison Poultry	Poultry
Republic Services	Environmental Services
Barrow County Commission	Government
Chateau Elan Resort and Winery	Tourism
Johns Manville	Fiberglass Insulation
Barrow Regional Medical Center	Healthcare
Walmart	Retail
Schuetz Container Systems	Plastics Manufacturing

The above list is in order of company size.

Source: Barrow Economic Development website

Government

The form of government specified in the County Charter is known as Commission-Administrator form of government, which provides for an elected body of Commissioners, one from each of six geographic districts, who are elected in staggered four-year terms, a chairman, who is elected county-wide, and a County Manager to oversee the day to day management of the County. Although each County Commissioner is elected as a representative from their respective districts, they represent the interests of the entire county and all its citizens.

The main duties of the Board of Commissioners is to pass local laws, known as ordinances, that regulate a variety of things that promote the health, safety and welfare of the citizens covered by them; to pass a balanced budget each year that funds its own operations as well as to allocate funds to the four Constitutional Officers, other elected officials, the courts and a variety of programs put in place by the State but funded locally; to ensure that necessary services are funded and provided; to set the millage rate for the County government and many other secondary duties.

The Board of Commissioners sets the County millage rate each year to fund a portion of the County budget. They also receive the millage rate that is set by the Board of Education and an assessment by the State which is submitted to the Georgia Department of Revenue each year.

The Board receives, deliberates and passes local ordinances each year and amends many others to reflect the changing times. Both require that a public hearing be held, and these are normally held during the regular Commission meetings. They also pass several resolutions and proclamations throughout the year. Generally, with some exceptions, the Board can pass any local law and ordinance they feel is needed for the County so long as it does not violate the laws of the State or Federal government or the Constitutional rights of any individual. These are researched thoroughly by legal staff before ever being brought to a hearing.

The Board of Commissioners provide many services that citizens expect through the revenues that are raised annually. These include Fire and Ambulance protection; E-911 dispatch services; Planning and Community Development; Inspections; Code Enforcement; Animal Control; Public Library; Parks and Recreation; Public Works; Waste Management Collection Centers; and agencies that service all of these such as Building Maintenance, Wastewater, Storm Water, Vehicle Maintenance, and Emergency Management Services. The budget also funds state mandated services such as Law Enforcement and Detention; Superior, Probate, Magistrate and Juvenile courts; Tax Assessment and Tax Collection services; Elections management; District Attorney (shared with other counties) and some smaller funding for local agencies under the State of Georgia.

Transportation

Barrow County's transportation system consists primarily of state highways and county-maintained roads. Interstate 85, US Highway 29, as well as State highways 8, 11, 53, 81, 82, 124, 211, 316, 324, and 330 are major transportation routes that carry the majority of passenger and commercial traffic in and out of Barrow County. Congestion in these transportation corridors create traffic problems, primarily because of population growth and increased commercial traffic in and around Barrow County. Interstate 85, US Highway 29, and Georgia Highway 316 provide the greatest amount of additional congestion and commercial transport.

Freight rail services owned and operated by CSX traverse Barrow County and directly impacts the cities of Auburn, Winder, and Statham.

Barrow County is serviced by the Barrow County Airport, which has a 3,610-foot runway and a 5,500-foot runway and is located approximately 3 miles east of the central business district of the City of Winder.

Climate

Barrow County, like much of Georgia, enjoys a temperate climate with four well-defined seasons: warm to hot summers; brisk fall temperatures; relatively brief, cool winters; and a warm spring season. As a result, there exists a long growing season in Georgia, perfect for ornamental and economic-boosting agricultural plants.

AVERARE MONTHLY TEMPERATURES IN GEORGIA (FAHRENHEIT)

Month	Average Georgia Temperature	Average Barrow County Temperature
January	46	45
February	49	45
March	56	55
April	63	59
May	70	68
June	77	75
July	80	77
August	79	80
September	74	75
October	64	64
November	56	52
December	48	44

Utilities

Barrow County's utility needs are met by a variety of public and private entities.

Electrical power to Barrow County is provided by Jackson EMC, Walton EMC, and Georgia Power.

NFIP Compliance

Jurisdiction	Participating?	Participation Date
Barrow County	Yes	10/16/1991
Auburn	Yes	12/15/1992
Bethlehem	Yes	3/24/2016
Statham	Yes	6/17/1986
Winder	Yes	1/15/1988
Braselton	Yes	9/29/2006
Carl	No	----------

The Town of Carl is currently exploring the NFIP participation requirements

Municipalities

Winder

The area now known as the City of Winder was first settled by the Creek Indians, who called the site Snodon. Settlers first came to the area in 1793, the area was named The Jug, which was later changed to Jug Tavern in the early 1800s. Jug Tavern was incorporated by the Georgia General Assembly in 1884. Just prior to incorporation, the Gainesville Midland Railroad built tracks through Jug Tavern to connect Gainesville to Social Circle. By 1892, Jug Tavern has secured a second railroad line as the Georgia, Carolina, and North Railroad began operating through the area, which established Jug Tavern as a depot station on the Athens-to-Atlanta line. Most of the early commercial growth in the area occurred between these two railways.

After approval by local officials in 1893, the name was changed to the City of Winder by the Georgia General Assembly in 1894. The city was named after the general manager of the Seaboard Railway, John H. Winder. As part of this renaming, the boundaries of the city were expanded to a one-mile circle from the railroad crossing on Broad Street. As the turn of the century approached, farming remained the primary occupation in the area, although manufacturing jobs were on the rise in Winder with the establishment of several manufacturing enterprises, such as Winder Foundry and Machinery, Bell Overall, Smith Hardware, and the Winder Cotton Mill. Along with the growth of the city's manufacturing sector, retail business grew tremendously in the downtown area, as well. This overall growth and location along the railway made Winder an important trade center in Eastern Georgia.

Winder became the county seat of the newly formed Barrow County in 1914. A new courthouse for Barrow County was built in 1920. After World War I, Winder continued to grow and prosper. An electric lighting system and a waterworks were both constructed during this time. By 1948, an airport has also been built in Winder – thanks to the help of a local resident, Richard B. Russel, Jr., who had been elected governor and then United States Senator of Georgia.

The modernization of Winder continued after World War II. A hospital was built in the early 1950s and Fort Yargo State Park was established nearby in 1967. The downtown area of Winder received a round of improvements in the 1970s and new facilities for the police department, fire department, and a new civic center were completed in the mid-1980s. Since that time, Winder has continued to grow and evolve into a city with a population of over 16,000 residents – more than double was the population was just 30 years ago. It has also grown geographically and now encompasses a total of 12.4 square miles.

The City of Winder is governed by a mayor and six councilmembers. The six councilmembers are elected to rotating four-year terms. Four councilmembers represent each of the four geographic wards of Winder and two councilmembers are elected in citywide elections.

The City of Winder provides many services to its citizens. These include: Administrative, Public Works, Trash Collection, Recycling, Water, Stormwater, Wastewater, Gas Utilities, Environmental Protection, Police Service, Fire Services, Planning, and Code Enforcement.

Carl

The Town of Carl was originally incorporated in 1908 under the name "Lawson." The name was changed later, and the town was named after the infant son of an early settler of the area. Carl has a total area of 1.1 square miles and is bordered on the west by the City of Auburn. As of 2017 population estimates by the US Census Bureau, Carl has a population of approximately 225 people. Carl is governed by a mayor and four city councilmembers. The Town of Carl mostly provides administrative services to its citizens.

Bethlehem

The Town of Bethlehem occupies 2.3 square miles just south of the City of Winder and has a total population of around 600 people.

Several historians agree the town received its name from the Bethlehem Methodist Church which was established in 1796. The suggestion for naming the town came from Judson L. Moore, well-known gospel songwriter and publisher who lived there.

Because of its Biblical name and Christian significance, Bethlehem is always the scene of special activity around Christmastime. Hundreds of people bring their Christmas cards to the Bethlehem Post Office to get the Bethlehem cancellation. Inked stamps stating, "Greetings from Bethlehem," are also offered for use to those sending cards. In 2018 the Post Office cancelled more than 120,000 letters.

Bethlehem had adopted the title of "The Little town Under the Star" as its local moniker.

Auburn

The town of Auburn was surveyed, and the original plat drown in 1891 by the Seaboard Railroad Company (originally known as the Georgia-Carolina and Northern Railroad). The rail line bisects the Auburn center and extends in an east-west direction. The town served as the terminus for railroad crews operating the four daily trains to Athens to the east and Atlanta to the west. Auburn has a unique, second-track spur that parallels the main track to accommodate out-of-service cars. Warehouses and railroad buildings were constructed during this time as well as residential homes to serve the railroad and families living in Auburn. Eight commercial buildings were located on the north side of the tracks and four on the south side. Residential homes were constructed around this town center.

The history of Auburn begins much earlier than the advent of the railroad. Following the Revolutionary War (1775-1781), efforts were made to get settlers to move to Georgia. Free land was given to veterans. All lands east of the Apalachee River were allotted under the headright system, that is, several hundred acres were given to the head of the family plus 50 acres to each child. All lands west of the Apalachee were granted under the lottery system after 1805. This included the future town of Auburn which would be in the eastern part of Gwinnett County which was created in 1818.

It was not until the coming of the Seaboard Railroad in 1891 that Auburn became a booming town. The first train reached Auburn on October 19, 1891. Auburn was incorporated in 1892. A plat of the town was drawn, and land surveyed by the Seaboard Railroad. Kerosene lights lined the streets on each side of the railroad. Auburn became the terminus for working crews. Eight warehouses were built on the railroad siding. There was an influx of people to the town. Many new homes and stores were built.

Auburn grew slowly and steadily throughout the first part of the 20th century. The population had reached 374 by the 1960 census – more than double the population of 1900. After a slight dip in the 1960s, Auburn began to grow tremendously by 1980 when the town reached 692 residents. From 1980 to 2000, the city's population exploded and increased by 1000% to nearly 7,000 residents. Most of this growth can be contributed to the constant expansion of the Atlanta Metro area into the eastern suburbs and neighboring Gwinnett County began spilling over the border in Auburn.

The City of Auburn is governed by a mayor and four councilmembers – all of whom are elected citywide. The City of Auburn provides several services to its citizens. These include: Administrative, Planning and Zoning, Code Enforcement, Public Works, Garbage and Recycling, Stormwater, Water, and Parks. Auburn encompasses a total of 6.5 square miles.

Statham

Statham was first known as the Talasee Colony. In this Colony was an Indian Village by the name of Calamit on the Ocoloco Trail, and it was inhabited by the Creek and Cherokee Indians. When the first white settlers came in 1784, they purchased a part of Calamit from the Indian Chief Umausauga for 14 pounds of beads and named it Beadland.

Statham grew from a combination country store and post office owned and operated by Mr. and Mrs. M. J. C. Statham. The post office was first known as Barber's Creek, then DeLay, and changed to Statham in 1892.

The building of the railroad through Statham in 1890 and 1891 marked the beginning of Statham and was the changeover point from a place with a few homes into the creation of a town.

Statham was incorporated on December 20, 1892 and received its first Charter. The incorporated area of the town extends one mile in every direction from the Seaboard Depot which is in the center of town. The first depot was built around 1900. Another depot, which is still standing, was built in 1912.

The first bank in Statham, known as the Statham Bank, was organized in April 1904. To promote and advertise their town, the directors printed interesting facts on the back of the bank envelopes. "Statham is a growing and prosperous town on the Seaboard Air Line Railroad. It has ten mercantile establishments, a hardware and furniture store, drug store, meat market, prosperous bank, excellent hotel, fine dental parlor, two large suction cotton ginneries, cotton warehouse, brick-making plant, livery stables, blacksmith shops, barber shops, three churches and a free public school system."

Due to the coming of the automobile, better roads and the depression of the 1930s, many of the business establishments closed as people began going to larger towns for shopping. This downturn was not permanent, however. Statham's population bounced back and, but the 1980s, Statham had eclipsed the 1,000-resident park for the first time. Statham has continued to grow and prosper – now boasting a population of over 2,500.

Statham encompasses a total of 3.6 square miles in eastern Barrow County near the Clarke County and Oconee County borders. Statham is governed by a mayor, vice-mayor, and four councilmembers. The City of Statham provides several services to its citizens. These include: Administrative, Code Enforcement, Planning and Zoning, Police Services, Public Works, and Water.

Braselton

The Town of Braselton has the unique position of occupying four different counties in Georgia – Barrow, Jackson, Hall, and Gwinnett. It encompasses a total of 12.5 square miles – about 20% of which is in Barrow County.

Braselton is named after the areas first settlers – William Harrison Braselton and his family. The area grew through the 1870s and 1880s and many mercantile buildings were built in the area. Descendants of the Braseltons continued to serve on the town's council until 2001.

The town was incorporated by the Georgia General Assembly in 1916. The town remained a small community into the 1980s when the population was only between 300 and 400 people. In the early 1980s, the 3,500-acre Chateau Elan Resort and Winery was established in Braselton. It was by Donald and Nancy Panoz – who had also built the Road Atlanta racetrack in the area.

Braselton began expanding its boundaries in the 1990s and attracted several major companies to the area. These include Mayfield Dairy, Panoz Auto Development, and Haverty's, which opened a distribution center in Braselton in 2002. Throughout this geographic growth, Braselton's population boomed – exceeding 10,000 according to the latest United States Census Bureau estimates.

Braselton is governed by a mayor and four councilmembers who represent each of four districts. Braselton provides many services to their citizens. These include: Administrative, Code Enforcement, Police Services, Economic Development, Planning and Development, Water, Wastewater, Library Services, Public Works, and Stormwater.

CHAPTER THREE
–
HAZARD PROFILES

Summary of Updates for Chapter Three

The following table provides a description of each section of this chapter, and a summary of the changes that have been made to the Barrow County Hazard Mitigation Plan 2015.

Chapter 3 Section	Updates
Risk Assessment	• Expanded the explanation of the Risk Assessment • Added an explanation of each part of the Hazard Information
Natural Hazard Thunderstorms	• Updated and consolidated hazard profile with new data • Consolidated "Hailstorm" and "Lightning" sections under this hazard • Content revised
Natural Hazard Winter Storms	• Updated and consolidated hazard profile with new data • Content revised
Natural Hazard Flooding	• Updated and consolidated hazard profile with new data • Land Use and Development trends updated to include municipal NFIP information • Incorporated 2019 HAZUS Report Information • Content revised
Natural Hazard Tornado	• Updated and consolidated hazard profile with new data • Incorporated 2019 HAZUS Report Information • Content revised
Natural Hazard Drought	• Updated and consolidated hazard profile with new data • Content revised

Natural Hazard Wildfire	• Updated and consolidated hazard profile data • Content revised
Natural Hazard Earthquake	• Updated and consolidated hazard profile data • Content revised
Natural Hazard Tropical Cyclone	• Updated and consolidated hazard profile data • Content revised
Technological Hazard Hazardous Materials	• Updated hazard description • Updated and consolidated hazard profile data • Content revised
Technological Hazard Dam Failure	• Updated hazard description • Updated and consolidated hazard profile data • Content revised
Technological Hazard Transportation	• New Section – Not in 2015 Plan
Technological Hazard Terrorism	• New Section – Not in 2015 Plan
Technological Hazard Utility Failure	• New Section – Not in 2015 Plan
Technological Hazard Emergent Infectious Diseases	• New Section – Not in 2015 Plan

Risk Assessment

Requirement §201.6(c)(2)(i and ii)
Requirement §201.6(d)(3)

The Barrow County Hazard Mitigation Planning Committee conducted a comprehensive Threat and Hazard Identification and Risk Assessment (THIRA) for Barrow County and all municipalities. This assessment developed the hazard basis for this plan. The assessment includes the following components for each hazard:

1. *Hazard Identification*: The Barrow County Hazard Mitigation Planning Committee identified eight natural hazards and six technological hazards for this Hazard Mitigation Plan. This is an increase three technological hazards from the previous iteration of the plan. Each hazard was identified using statistical data and records from a variety of sources. The list of hazards is based upon frequency, severity of impact, probability, potential losses, and vulnerability.

2. *Hazard Description*: Each hazard was described in detail. Many hazard descriptions came from the Georgia Hazard Mitigation Plan since many of the hazards that could impact the state could also potentially impact Barrow County.

3. *Profile of Hazards*: Each hazard was profiled as to how it could potentially impact Barrow County.

4. *Assets Exposed to the Hazard*: The plan considers critical facilities and infrastructure as part of the vulnerability assessment. This assessment determines the vulnerability of the municipalities and attempts to identify the populations most vulnerable to each hazard, although many have potential countywide impacts.

5. *Estimated Potential Losses*: Using critical facility and past history data, an estimation of potential losses due to a particular hazard event were determined.

6. *Land Use and Development Trends*: Land use trends were considered when determining the potential future impacts of each hazard. This is of importance regarding flooding and dam failure events.

7. *Multi-Jurisdictional Concerns*: Each jurisdiction was considered when determining the potential hazard impact.

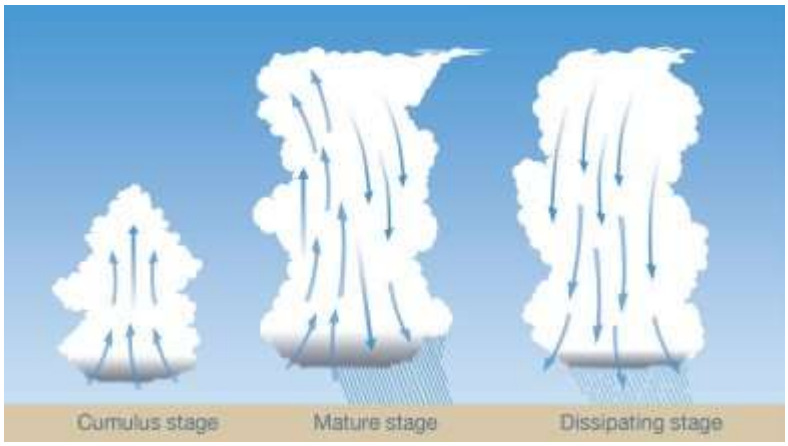
Natural Hazard: **Thunderstorms**

Hazard Description

This section provides general and historical information about thunderstorms, including high wind, lightning, and hail. Other elements of thunderstorms, such as tornadoes and flooding, are addressed in their own sections.

Thunderstorms are formed when moist air near the earth's surface is forced upward through some catalyst (convection or frontal system). As the moist air rises, the air condenses to form clouds. Because condensation is a warming process, the cloud continues to expand upward. When the initial updraft is halted by the upper troposphere, both the anvil shape and a downdraft form. This system of up-drafting and down-drafting air columns is termed a "cell."

As the process of updrafts and downdrafts feeds the cell, the interior particulates of the cloud collide and combine to form rain and hail, which falls when the formations are heavy enough to push through the updraft. The collision of water and ice particles within the cloud creates a large electrical field that must discharge to reduce charge separation. This discharge is the lightning that occurs from cloud to ground or cloud to cloud in the thunderstorm cell. In the final stage of development, the updraft weakens as the downdraft-driven precipitation continues until the cell dies.



Each thunderstorm cell can extend several miles across its base and to reach 40,000 feet in altitude. Thunderstorm cells may compound and move abreast to form a squall line of cells, extending farther than any individual cell's potential.

Natural Hazard: **Thunderstorms**

(Hazard Description Continued)

In terms of temporal characteristics, thunderstorms exhibit no true seasonality in that occurrences happen throughout the year. Convectively, driven systems dominate the summer while frontal driven systems dominate during the other seasons. The rate of onset is rapid in that a single cell endures only 20 minutes. However, various cells in different stages of development may form a thunderstorm that lasts up to a few hours as it moves across the surface.

In terms of magnitude, the National Weather Service defines thunderstorms in terms of severity as a severe thunderstorm that produces winds greater than 57 mph and/or hail of at least 1 inch in diameter and/or a tornado. The National Weather Service chose these measures of severity as parameters more capable of producing considerable damage. Therefore, these are measures of magnitude that may project intensity.

Lightning

Lightning occurs when the difference between the positive and negative charges of the upper layers of the cloud and the earth's surface becomes great enough to overcome the resistance of the insulating air. The current flows along the forced conductive path to the surface (in cloud to ground lightning) and reaches up to 100 million volts of electrical potential. In Georgia, lightning strikes peak in July, with June and August being second highest in occurrence.

Hail

Hail is a form of precipitation that forms during the updraft and downdraft-driven turbulence within the cloud. The hailstones are formed by layers of accumulated ice (with more layers creating larger hailstones) that can range from the size of a pea to the size of a grapefruit. Hailstones span a variety of shapes but usually take a spherical form. Hailstorms mostly endanger cars but have been known to damage aircraft and structures.

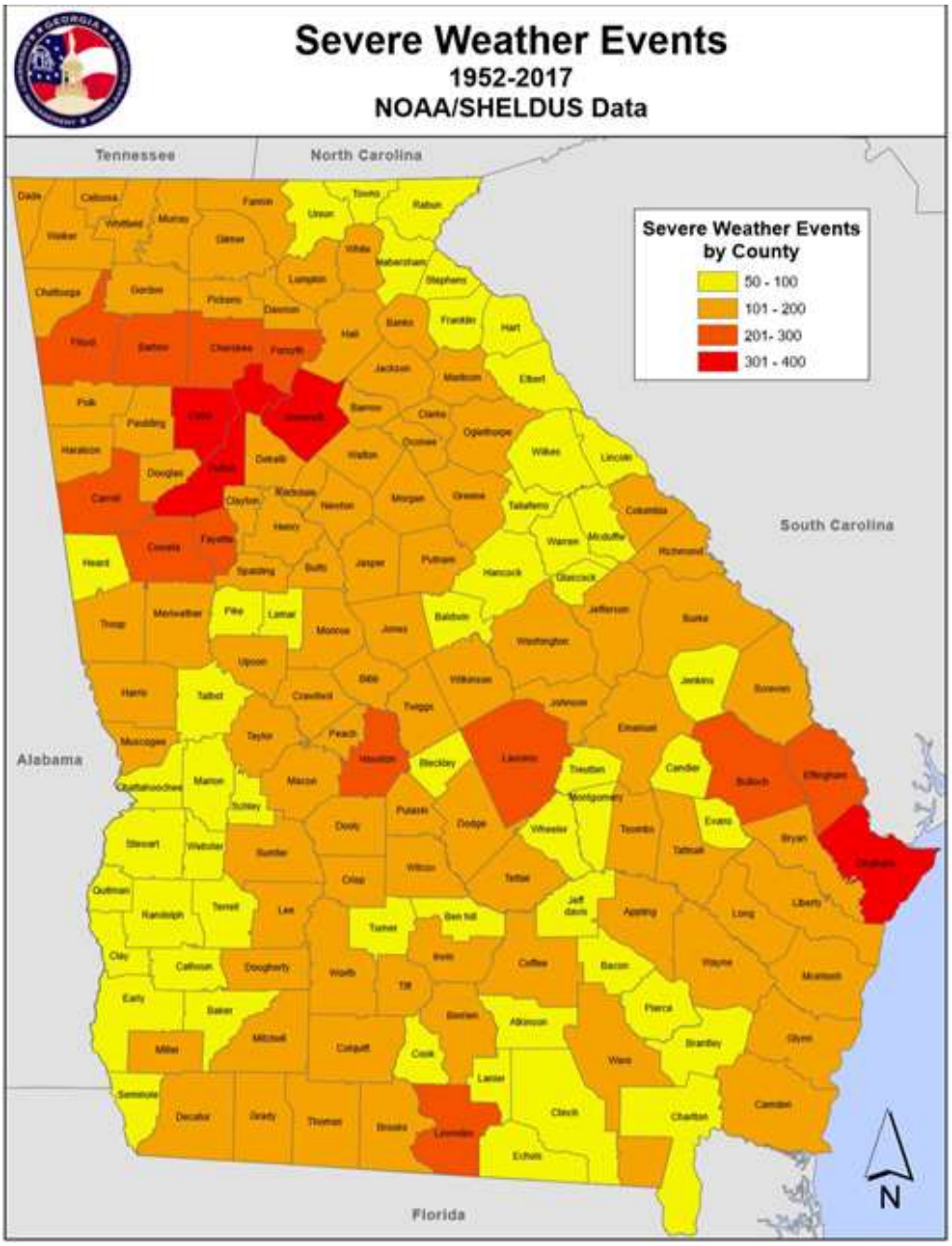
Natural Hazard: **Thunderstorms**

Hailstone size	Measurement		Updraft Speed	
	in.	cm.	mph	km/h
bb	< 1/4	< 0.64	< 24	< 39
pea	1/4	0.64	24	39
marble	1/2	1.3	35	56
dime	7/10	1.8	38	61
penny	3/4	1.9	40	64
nickel	7/8	2.2	46	74
quarter	1	2.5	49	79
half dollar	1 1/4	3.2	54	87
walnut	1 1/2	3.8	60	97
golf ball	1 3/4	4.4	64	103
hen egg	2	5.1	69	111
tennis ball	2 1/2	6.4	77	124
baseball	2 3/4	7.0	81	130
tea cup	3	7.6	84	135
grapefruit	4	10.1	98	158
softball	4 1/2	11.4	103	166

Hazard Profile

Severe thunderstorms, including high winds, hail and lightning, are a serious threat to the residents and infrastructure of Barrow County. Severe thunderstorms are the most frequently occurring natural hazard in Barrow County. Many of these storms include high winds, lightning, and hail. Hail up to 2 inches was recorded in Barrow County on several occasions, most recently in 2005. Thunderstorm winds of 70 mph have been reported on many occasions in Barrow County, with the most recent occurring in 2012. While there have been dozens of documented thunderstorm events affecting Barrow County over the last 50 years, it is likely that the official number is a low estimate due to poor record keeping in decades past. For example, only 19 thunderstorm events were recorded between 1968 and 1990, likely a vast underestimation of actual events.

Natural Hazard: **Thunderstorms**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Thunderstorms**

(Hazard Profile Continued)

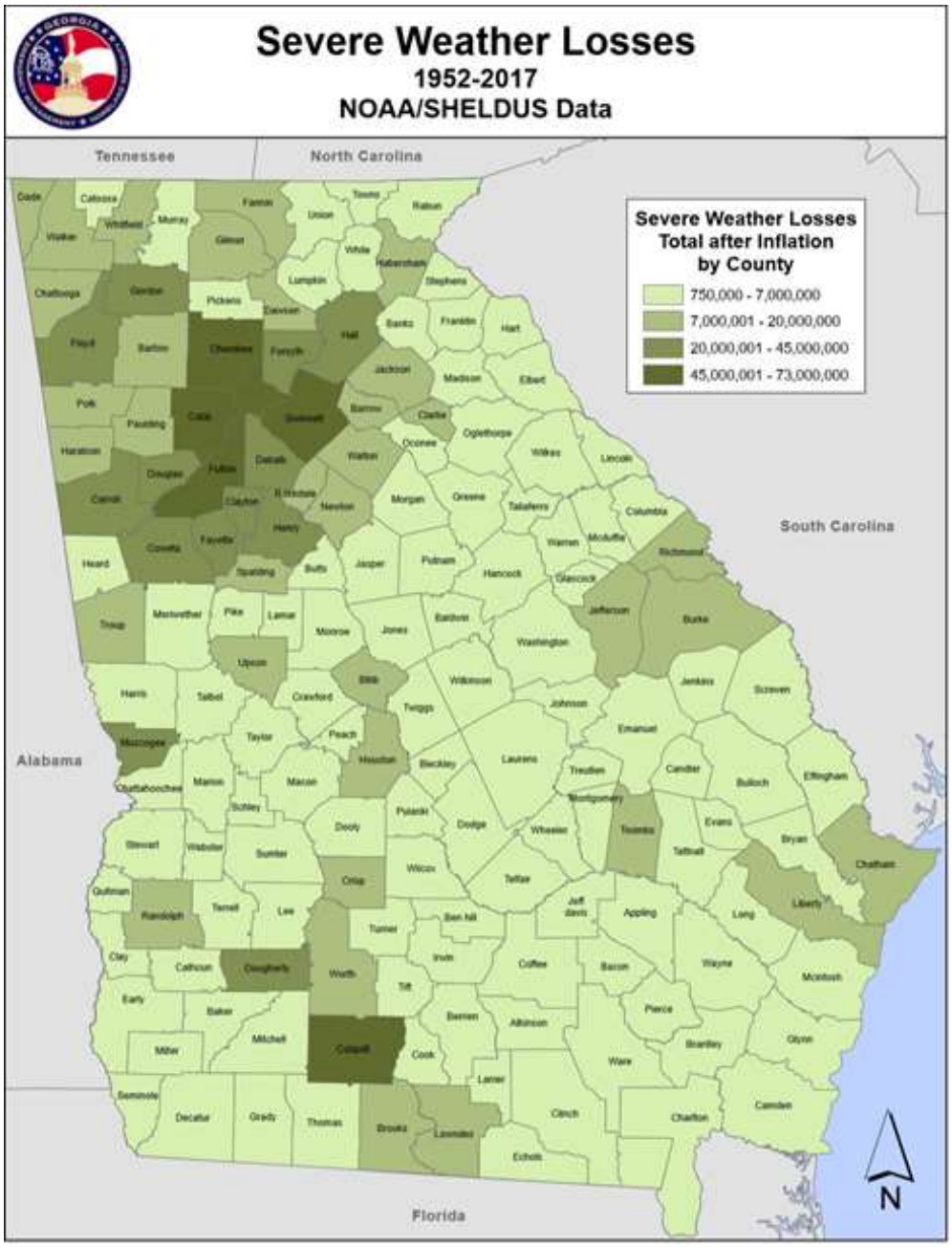
Most of the available information relating to severe thunderstorm events in Barrow County fails to describe damage estimates in any detail. With each thunderstorm event, there are likely unreported costs related to infrastructure costs, public safety response costs, utility repair costs, and personal home and business repair costs. Thunderstorms have occurred during all parts of the day and night and in every month in Barrow County.

The Barrow County Hazard Mitigation Plan Update Committee utilized data from the National Climatic Data Center, the National Weather Service, numerous weather-related news articles, and the Barrow County LEOP in researching severe thunderstorms and their potential impacts on the county. All information has been gathered on a countywide basis. All thunderstorm hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

During the last 50 years, 133 thunderstorm events were recorded in Barrow County, with 101 of those occurring in the last 25 years. This number includes 43 hail events and only 16 lightning reports. According to these records, Barrow County has a 1.1% chance daily of a thunderstorm event based upon data from the last 25 years. Over the last 10 years, Barrow County has averaged 4.3 thunderstorm events per year (43 events). Due to improved record keeping protocols, the Barrow County Hazard Mitigation Plan Update Committee believes the data from the last ten years provides a more accurate representation of the thunderstorm threat to the county. The Barrow County Hazard Mitigation Plan Update Committee has also determined that the lightning threat is severely under-reported, as shown in the NCDC data numbers. For additional historical data, please see Appendix D.

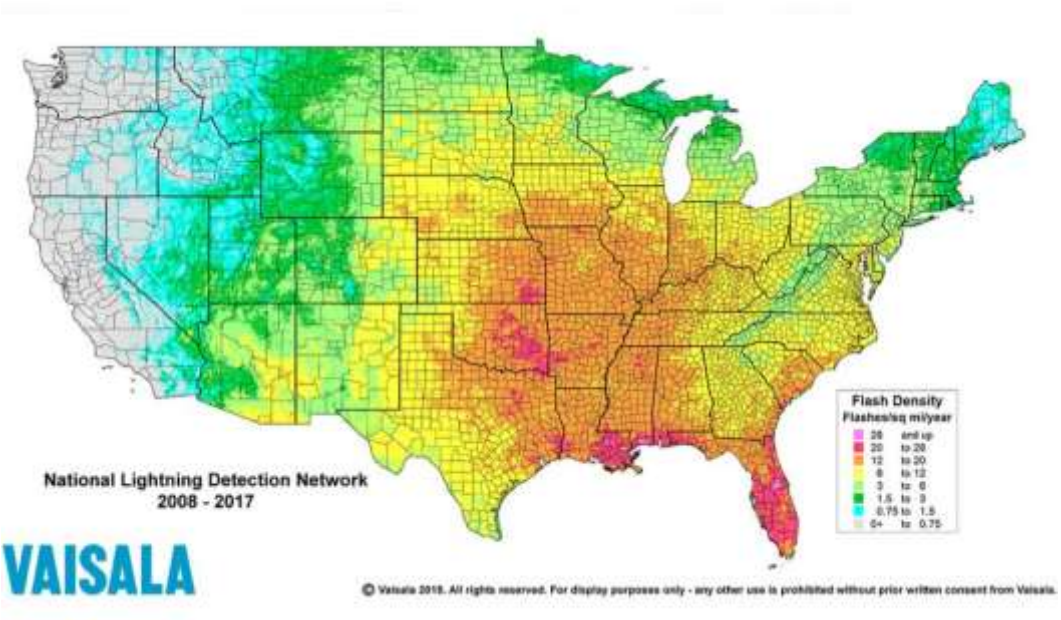
As indicated by the below graphics, Barrow County averages between 6 and 12 flashes of cloud to ground lightning per square mile per year. That equals a 1.6% to 3.3% chance of a cloud-to-ground lightning strike on any given day. This shows a much higher indication of lightning occurrences than has been reported to the National Weather Service and the National Climatic Data Center. It is the determination of the Barrow County Hazard Mitigation Plan Update Committee that this data shows a more accurate representation of the scope of the threat that lightning poses to the citizens and infrastructure of Barrow County.

Natural Hazard: **Thunderstorms**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

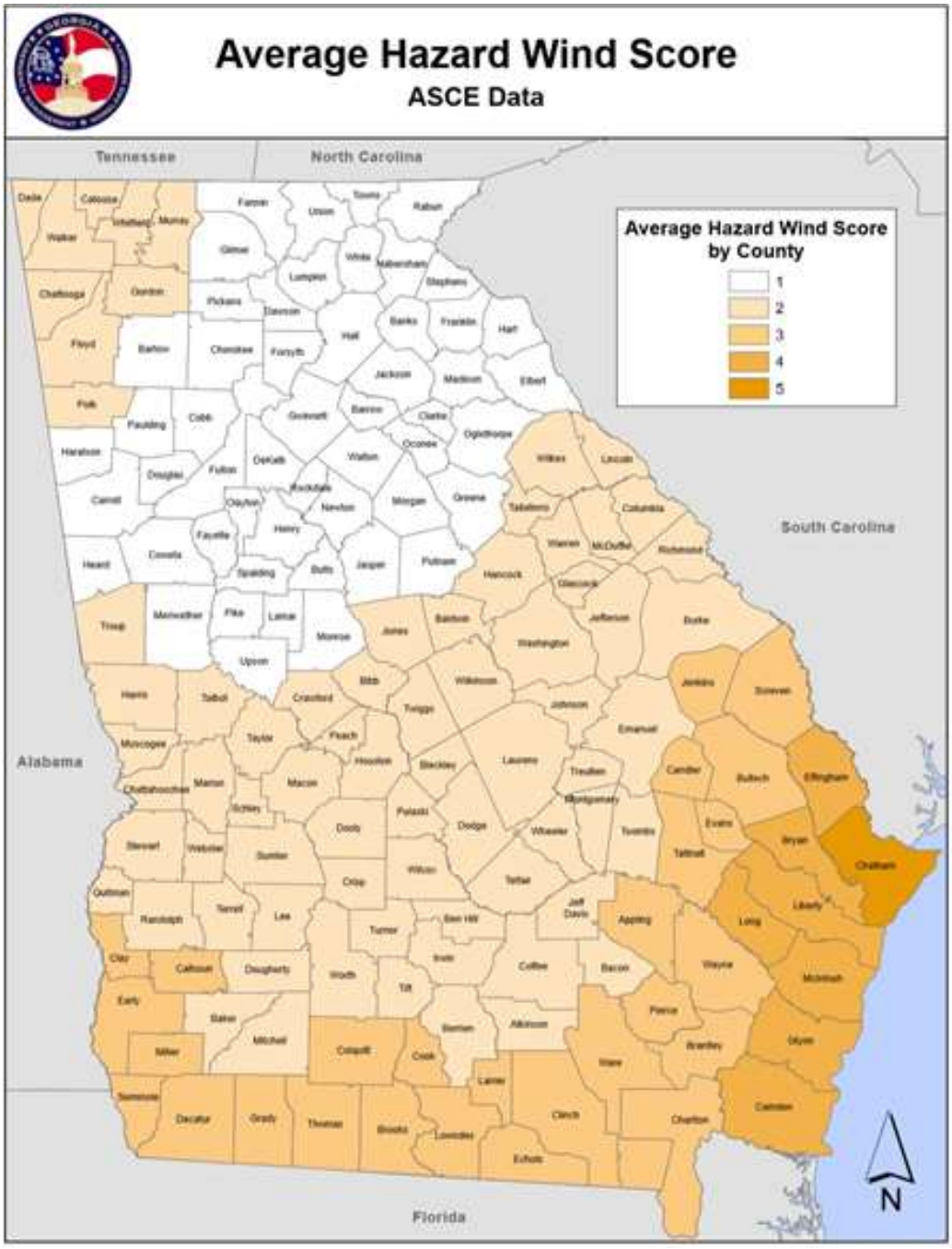
Natural Hazard: **Thunderstorms**



Severe thunderstorm winds, which are defined as winds of at least 58 mph in conjunction with a convective event, have occurred with many thunderstorms that have affected Barrow County. These winds can exceed 100 mph and cause damage comparable to weak tornadoes. Below are two maps that identify the wind risk and the hazard wind score for the State of Georgia, including Barrow County. The Hazard Wind Score maps use the following scale:

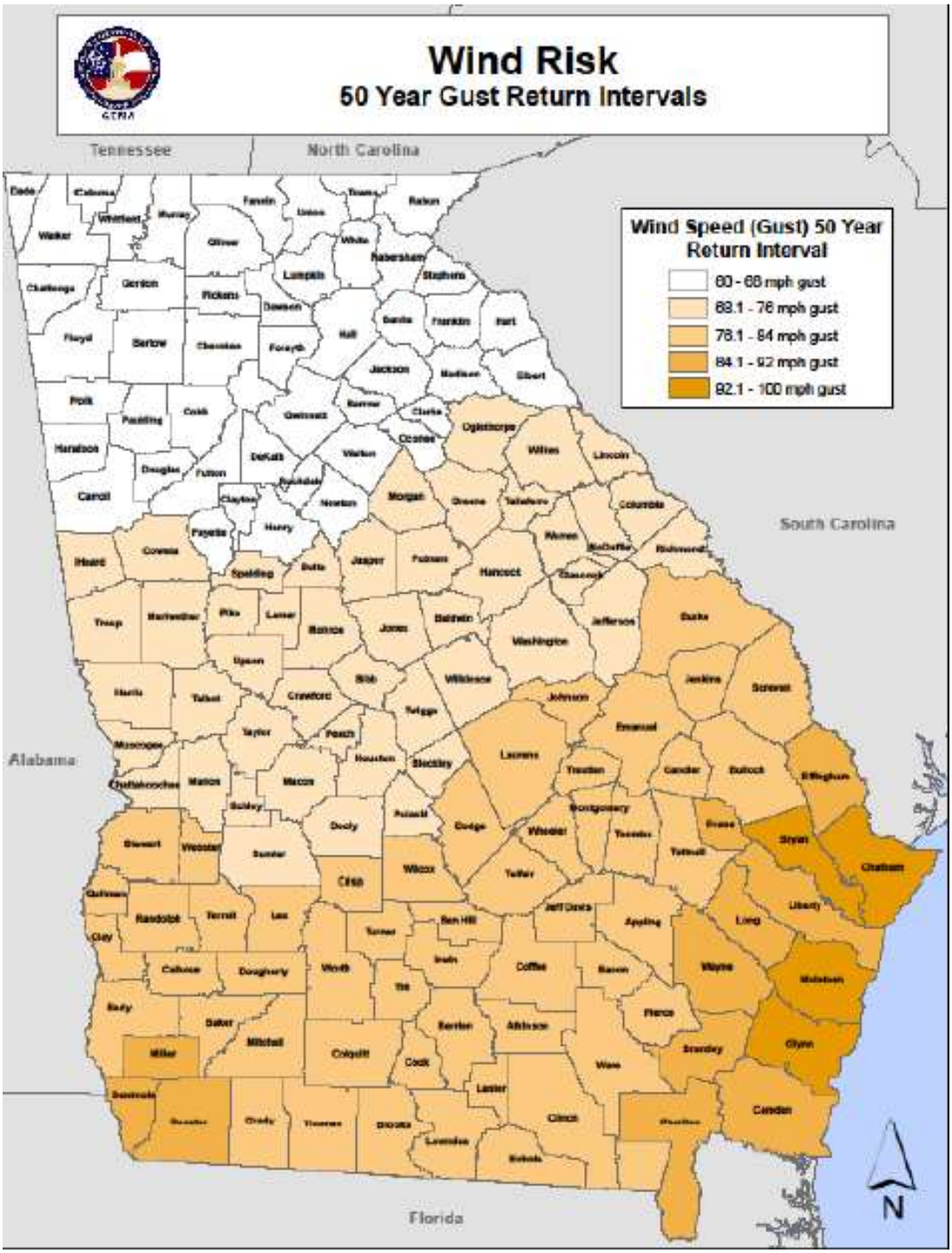
Hazard Score	Wind Speeds
1	<90 mph gust
2	91 – 100 mph gust
3	101 – 110 mph gust
4	111 – 120 mph gust
5	>120 mph gust

Natural Hazard: **Thunderstorms**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Thunderstorms**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Thunderstorms**

Assets Exposed to the Hazard

In evaluating assets that are susceptible to severe thunderstorms, the Barrow County HMPC determined that all public and private property is at threat by severe thunderstorms, including all critical facilities. This is due to the lack of spatially prejudice of severe thunderstorm events.

Estimated Potential Losses

Estimates of damage for the past events of the last 50 years are over $9 million, or $183,620 annually. These numbers are thought to be a gross underestimation of actual past damages.

Land Use & Development Trends

Barrow County currently has no land use trends related to Thunderstorms beyond continued population growth – particularly around the City of Winder and in Western Barrow County near the Gwinnett County line.

Multi-Jurisdictional Considerations

Thunderstorm events have occurred across all areas of Barrow County. Crop damage from thunderstorm events would likely have the greatest impact in the rural areas of Barrow County. However, property damage numbers would be highest in more heavily populated areas due to greater population density. Thunderstorms have the potential to impact all areas of Barrow County.

Hazard Summary

Thunderstorm events pose one of the greatest threats of property damage, injuries, and loss of life in Barrow County. Thunderstorm events are the most frequently occurring weather event that threatens Barrow County. As a result, the Barrow County HMPC recommends that the mitigation measures identified in this plan for thunderstorms should be aggressively pursued due to the frequency of this hazard and the ability for this hazard to affect any part of Barrow County.

Natural Hazard: **Thunderstorms**

Thunderstorm Events Since 2015 in Barrow County

Location	County/Zone	St.	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Totals:							0	0	224.00K	0.00K
WINDER	BARROW CO.	GA	04/20/2015	14:16	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
STATHAM	BARROW CO.	GA	05/26/2015	16:49	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
MULBERRY	BARROW CO.	GA	08/06/2015	14:22	Thunderstorm Wind	50 kts. EG	0	0	8.00K	0.00K
THOMPSONS MILL	BARROW CO.	GA	08/22/2015	22:55	Thunderstorm Wind	55 kts. EG	0	0	15.00K	0.00K
ALGERNON	BARROW CO.	GA	07/21/2016	17:05	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
STATHAM	BARROW CO.	GA	03/21/2017	18:30	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	03/21/2017	19:11	Hail	1.00 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	04/05/2017	22:07	Hail	1.50 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	07/23/2017	18:20	Lightning		0	0	1.00K	0.00K
WINDER ARPT	BARROW CO.	GA	06/11/2018	13:00	Thunderstorm Wind	55 kts. EG	0	0	150.00K	0.00K
AUBURN	BARROW CO.	GA	06/28/2018	09:35	Thunderstorm Wind	50 kts. EG	0	0	15.00K	0.00K
WHISTLEVILLE	BARROW CO.	GA	07/21/2018	19:25	Thunderstorm Wind	50 kts. EG	0	0	12.00K	0.00K
RUSSELL	BARROW CO.	GA	07/21/2018	19:30	Hail	1.50 in.	0	0	0.00K	0.00K
WHISTLEVILLE	BARROW CO.	GA	07/22/2018	17:54	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K

Natural Hazard: **Winter Storms**

Hazard Description

Severe winter storms bring the threat of ice and snow. There are many types of frozen precipitation that could create a severe winter weather event. Freezing rain consists of super cooled falling liquid precipitation freezing on contact with the surface when temperatures are below freezing. This results in an ice glazing on exposed surfaces including buildings, roads, and power lines. Sleet is easily discernable from freezing rain in that the precipitation freezes before hitting the surface. Often this sleet bounces when hitting a surface and does not adhere to the surface. However, sleet can compound into enough depths to pose some threat to motorists and pedestrians.

A heavy accumulation of ice, which is often accompanied by high winds, can devastate infrastructure and vegetation. Destructiveness in the southern states is often amplified due to the lack of preparedness and response measures. Also, the infrastructure was not designed to withstand certain severe weather conditions such as weight build-up from snow and ice. Often, sidewalks and streets become extremely dangerous to pedestrians and motorists. Primary industries, such as farming and fishing, suffer losses through winter seasons that produce extreme temperatures and precipitation.

Within Georgia, the impacts of winter storms are often contained within the northern part of the State. However, events like the 1993 “storm of the century” illustrated the vast impacts that one storm can have on the entire state. The winter storms with the greatest impacts on Georgia are the result of coastal storms coming up from the Gulf of Mexico, including the winter storms in 1973 and 1993. The 1973 storm produced snowfalls of up to 19 inches in parts of Central Georgia including the City of Thomaston in Upson County. Also, a major ice storm occurred in 2014, bringing up to 1 inch of ice to the eastern portion of the State near Augusta.

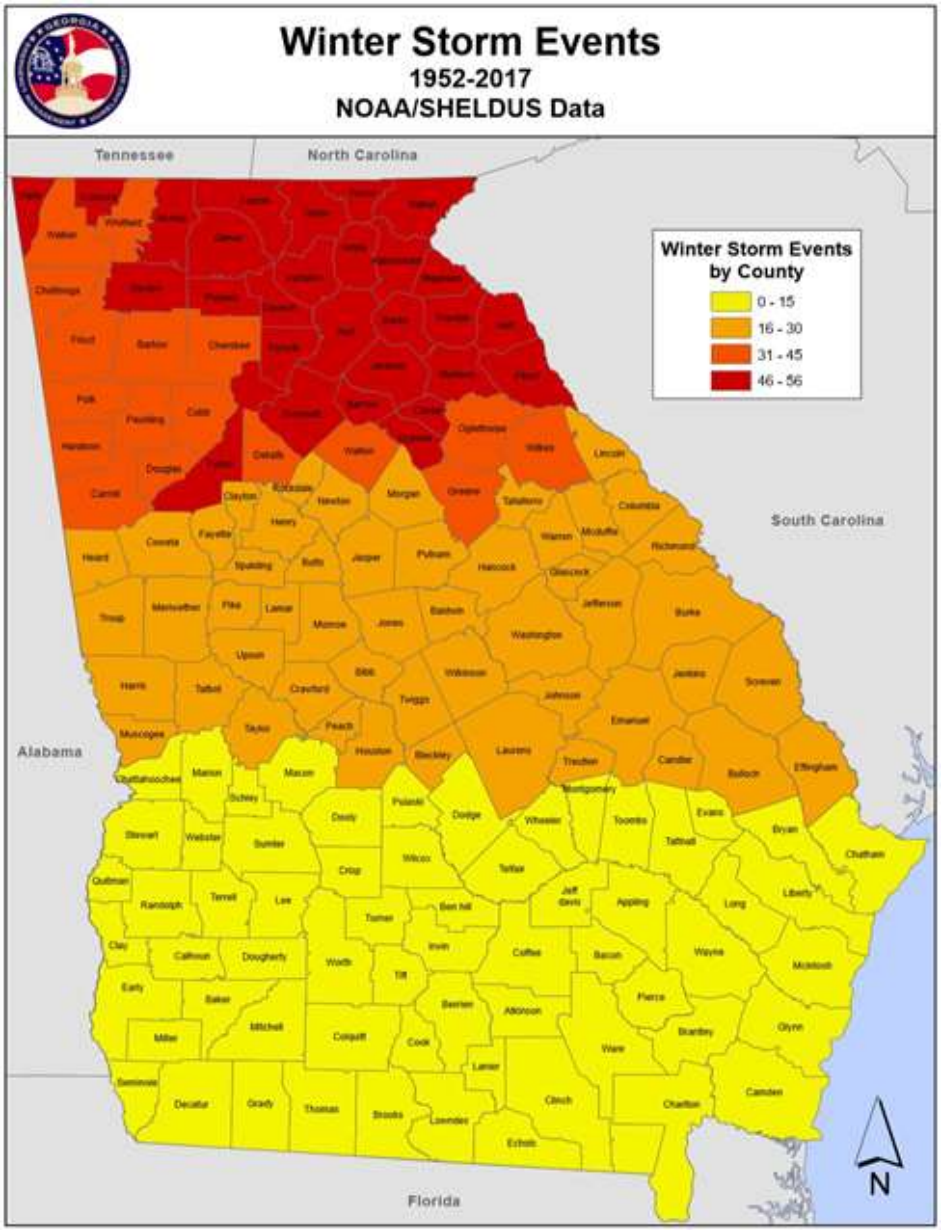
Severe winter weather exhibits seasonal qualities in that most occur within the months of January to March, with the highest probability of occurrence in February. The rate of onset and duration varies from storm to storm, depending on the weather system driving the storm. Severe winter weather rarely frequents the State of Georgia. However, the impacts of the storms substantiate severe winter weather’s inclusion in the risk assessment.

Hazard Profile

While winter storms are not as frequent of an occurrence in Barrow County as they are in areas in the Northern US, they still have the potential to wreak havoc on the community when they do occur. Winter storms in Barrow County typically cause drastic damage to infrastructure, such as roads, power lines, and bridges. They also

Natural Hazard: **Winter Storms**

can cause damage to private property, businesses, and trees throughout the county. Due to the county's elevation changes, many highways have steep grades that can become dangerous during icy conditions. The large number of trees in Barrow County can also become a hazard when the tree limbs become weighed down with snow and ice and begin to break and fall to the ground, potentially damaging private property, public property, or injuring people and animals.



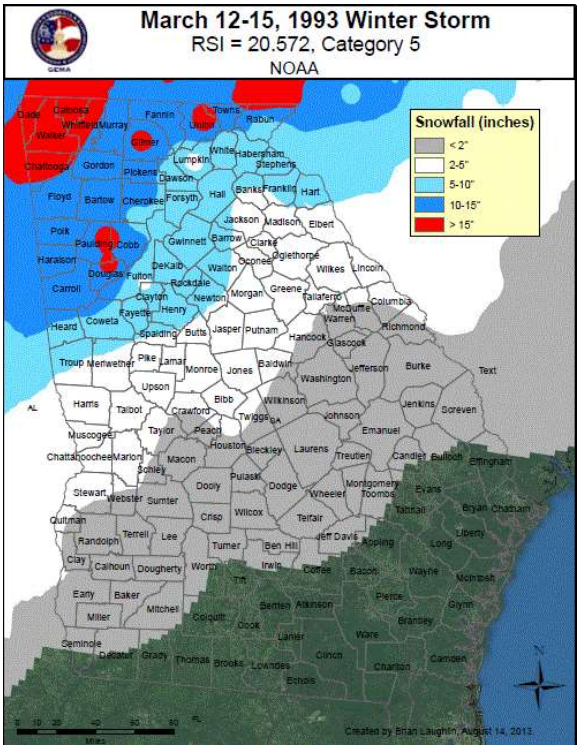
Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Winter Storms**

(Hazard Profile Continued)

During the past twenty-two years, documentation exists for 31 winter storm events in Barrow County. No consolidated data can be located prior to this timeframe. On average, a winter storm has occurred in Barrow County on a nearly annual basis. Barrow County averages 1.4 winter storms per year. Due to improved record keeping techniques, the HMPC believes that looking at the record for the last 20-year period provides a more accurate representation of the threat of winter storms for Barrow County. All winter storm data has been gathered on a countywide basis. For additional historical data, please see Appendix D. All winter storm hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

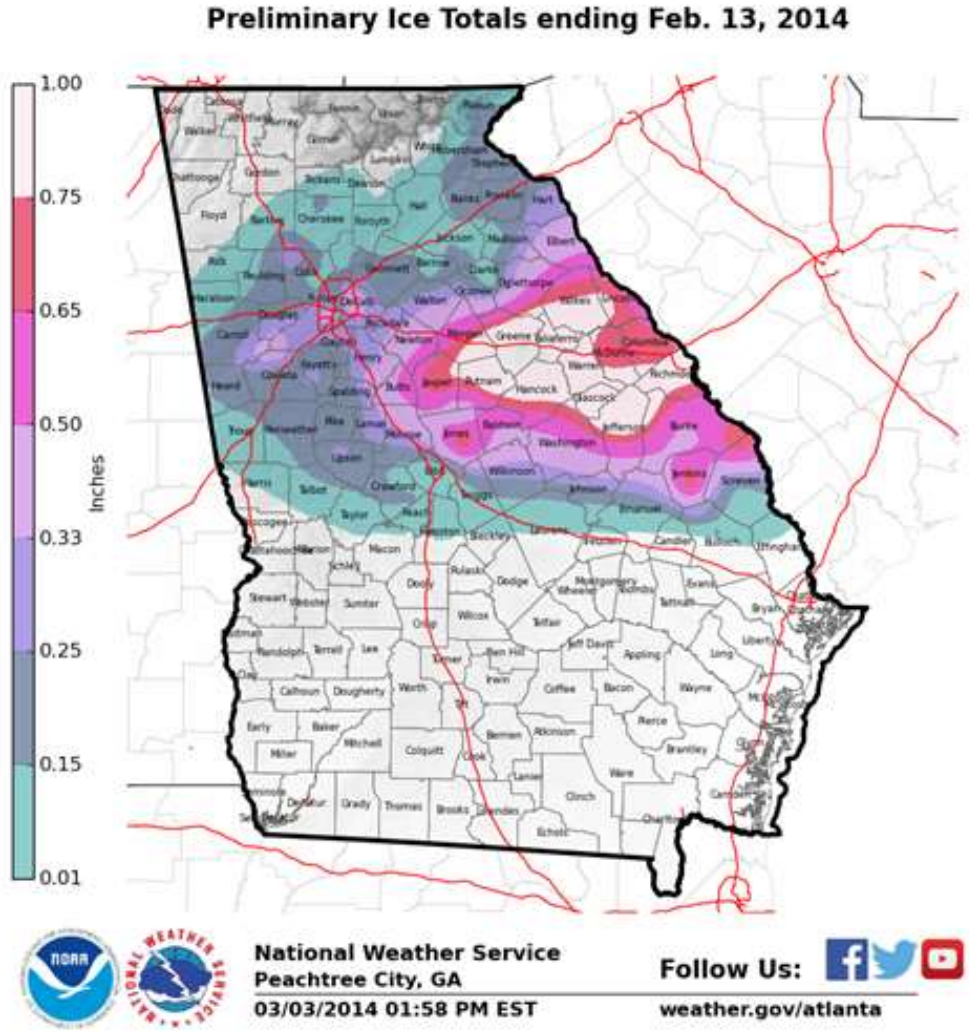
Individual events of Winter Weather can be drastically different depending on many factors, including the duration of the event, the type of precipitation involved, and the depth of the precipitation. Winter Storm events can be a light dusting of snow, ¼ inch of ice, or over a foot of snow. Other factors, such as wind, can influence the strength of these events, as happened with wind-blown snow during the March 1993 Winter Storm event. During that event, parts of Barrow County reported up to 10 inches of snow and all areas received at least 3-5 inches of snow.



Source: 2014 State of Georgia Hazard Mitigation Strategy (most up-to-date version)

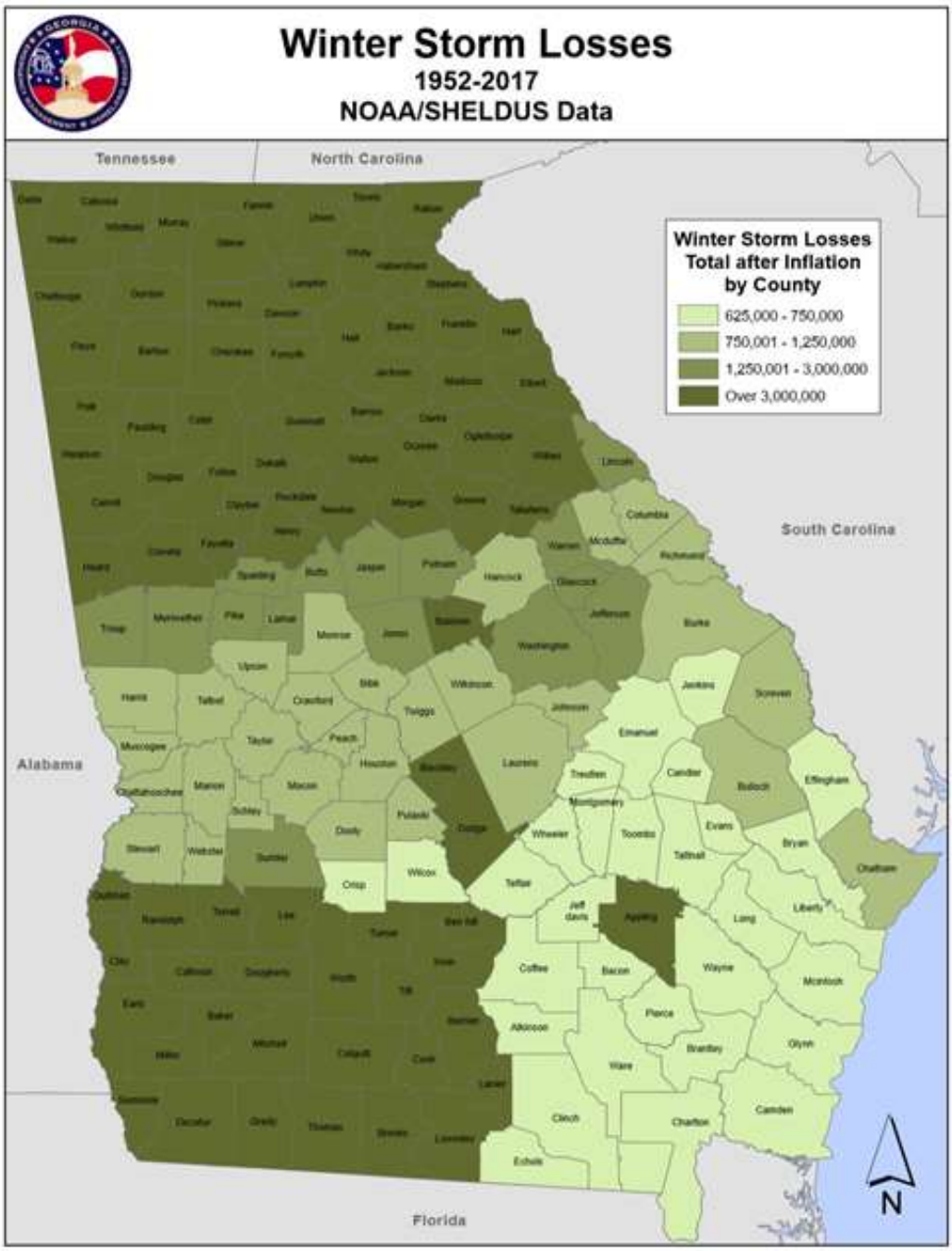
Natural Hazard: **Winter Storms**

Ice event are another type of winter storm that has impacted Barrow County in the past. These types of winter storms can be particularly crippling due to the increased threat of tree falls related to the weight of accumulated ice and subsequent utility infrastructure failure. The 2014 Ice Storm produced significant ice accumulations over much of North Central Georgia, including Barrow County. While areas farther east, such as Augusta, saw the greatest impacts, Barrow County had ice accumulations between 0.15 and 0.25 inches. This storm led to widespread power outages with some residents without power for over two days.



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard**: Winter Storms**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Winter Storms**

Assets Exposed to the Hazard

Since winter storms are indiscriminate regarding location, the Barrow County HMPC determined that all public and private property, including all critical infrastructure, are susceptible to impacts from winter storms.

Estimated Potential Losses

Total estimated losses for winter storm events of the last 50 years indicate a total of over $1.2 million in losses. Extrapolated over 50 years, this averages out to $24,860 per year. However, nearly all the documented winter storms with loss information have occurred over the last 20 years. As such, the average loss per year for the last 20 years is $62,150 per year. It is estimated that these numbers are a gross underestimation of the impact of past winter storms and caution is expressed when using these figures to make loss determinations for winter storms in Barrow County.

Land Use & Development Trends

Barrow County currently has no land use trends related to Winter Storms beyond continued population growth – particularly around the City of Winder and in Western Barrow County near the Gwinnett County line.

Multi-Jurisdictional Considerations

All portions of Barrow County could potentially be impacted by a winter storm, including freezing rain, sleet, and snow. Therefore, all mitigation actions identified regarding winter storms should be pursued on a countywide basis and including all municipalities.

Hazard Summary

Winter storms, which can include freezing rain, sleet, or snow, typically afford communities some advance warning, which is different from many other severe weather phenomena. The National Weather Service issues winter storm watches, advisories, and warnings as much as a day before the storm's impacts begin. Unfortunately, communities in the Southern United States are not equipped to handle winter storms due to their relative infrequent nature. Oftentimes, communities can face severe impact from these storms. The Barrow County HMPC recognizes the potential threats winter storms could have on the community and have identified specific mitigation actions as a result.

Natural Hazard: **Winter Storms**

Winter Storm Events since 2015 in Barrow County

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/16/2015	18:00	EST-5	Ice Storm		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/22/2016	16:00	EST-5	Winter Weather		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/08/2017	21:00	EST-5	Winter Storm		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/16/2018	20:00	EST-5	Winter Weather		0	0	0.00K	0.00K

Natural Hazard: **Flooding**

Requirement §201.6(c)(2)(ii)
Requirement §201.6(c)(3)(ii)

Hazard Description

Flooding is a temporary overflow of water on normally dry lands adjacent to the source of water, such as a river, stream, or lake. The causes of flooding include mass sources of precipitation, such as tropical cyclones, frontal systems, and isolated thunderstorms combined with other environmental variables, such as changes to the physical environment, topography, ground saturation, soil types, basin size, drainage patterns, and vegetative cover. Adverse impacts may include structural damages, temporary backwater effects in sewers and drainage systems, death of livestock, agricultural crop loss, loss of egress and access to critical facilities due to roads being washed-out or over-topped and unsanitary conditions by deposition of materials during recession of the floodwaters.

Floods are loosely classified as either coastal or riverine. Coastal flooding occurs when normally dry, low-lying land is flooded by sea water. Coastal flooding is usually associated with tropical cyclones in Georgia. Riverine flooding occurs from inland water bodies such as streams and rivers. Riverine flooding is often classified based on rate of onset. The first is slow to build, peak, and recede, often allowing enough time for evacuations. The other type of riverine flood is referred to as a "flash" flood, which rapidly peaks and recedes, thus giving insufficient time for evacuations. Flash floods are typically considered the most dangerous of these types.

On a broad scale, flooding can occur around any body of water or low-lying surface given enough precipitation or snowmelt. The spatial extent of the flooding event depends on the amount of water overflow but can usually be mapped because of existing floodplains (areas already prone to flooding).

Flooding in Georgia is highly dependent on precipitation amounts and is highly variable. Certain seasons are more prone to flooding to a greater likelihood of excessive precipitation. Typically, the wet seasons are during the winter, early spring, and midsummer. Late spring and fall are usually drier seasons.

Hazard Profile

The Barrow County HMPC researched flooding information for the last fifty years. The main sources of information used by the Barrow County HMPC came from the National Climatic Data Center, the Barrow County Emergency Operations Plan, and news media sources. It was determined that flooding has caused

Natural Hazard: **Flooding**

(Hazard Profile Continued)

significant damage on many occasions over the last 20 years. One significant flooding event that affected Barrow County occurred in 2009. This event caused over $100,000 in reported damages. Most of the damages associated with this event were related to roadway and bridge damage. While data was collected for the entire 50-year timeframe, little information was available regarding flood events over that period, possibly due to poor record keeping. All flood data was gathered on a countywide basis.

Flood events within Barrow County are typically associated with areas of special flood hazard as identified on Flood Rate Insurance Maps (FIRMs) published by FEMA. Relatively little information is available regarding flooding damage estimates. However, with each flooding event, it is likely that significant costs arose related to road repair, infrastructure repair, and public safety response operations. Most of the flood damage in Barrow County's history appears to be related to roads and culverts washing out as a result of flood waters. All flooding hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

The Middle Oconee River gauge near Arcade provides adequate data to show how a flood near that area would impact the jurisdiction. When the Middle Oconee River reaches 21 feet, moderate flooding begins and the foundation of one residence will begin to be impacted by flood waters. At 23 feet, one residence will begin to flood, and low-lying portions of Bismark Circle Road begin to flood. At 25 feet, water reaches the bottom of the bridge at Highway 82 and flood waters will reach two feet deep within one residence. At 27 feet, Major flood stage is reached and flooding of homes along Bismark Circle Road begins. This river gauge has a high mark of 25.35 in March of 1990.

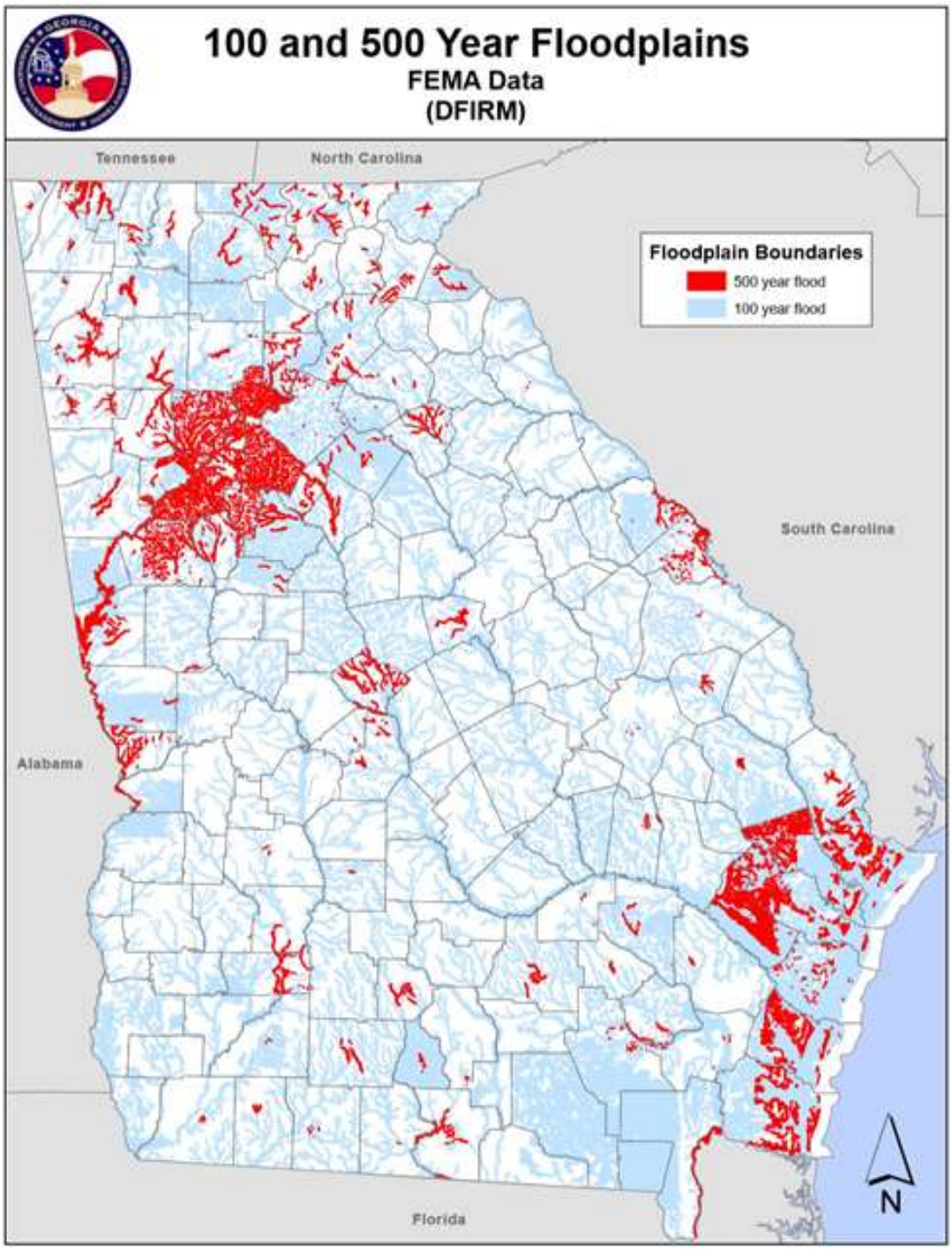
There are 11 documented flood events over the last 50 years. Based on the 50-year record, it can be inferred that such an event is likely to occur every 4.5 years in Barrow County. This relates to a 22% chance of a flood event occurring in a given year.

For additional historical data, please see Appendix D.

Assets Exposed to the Hazard

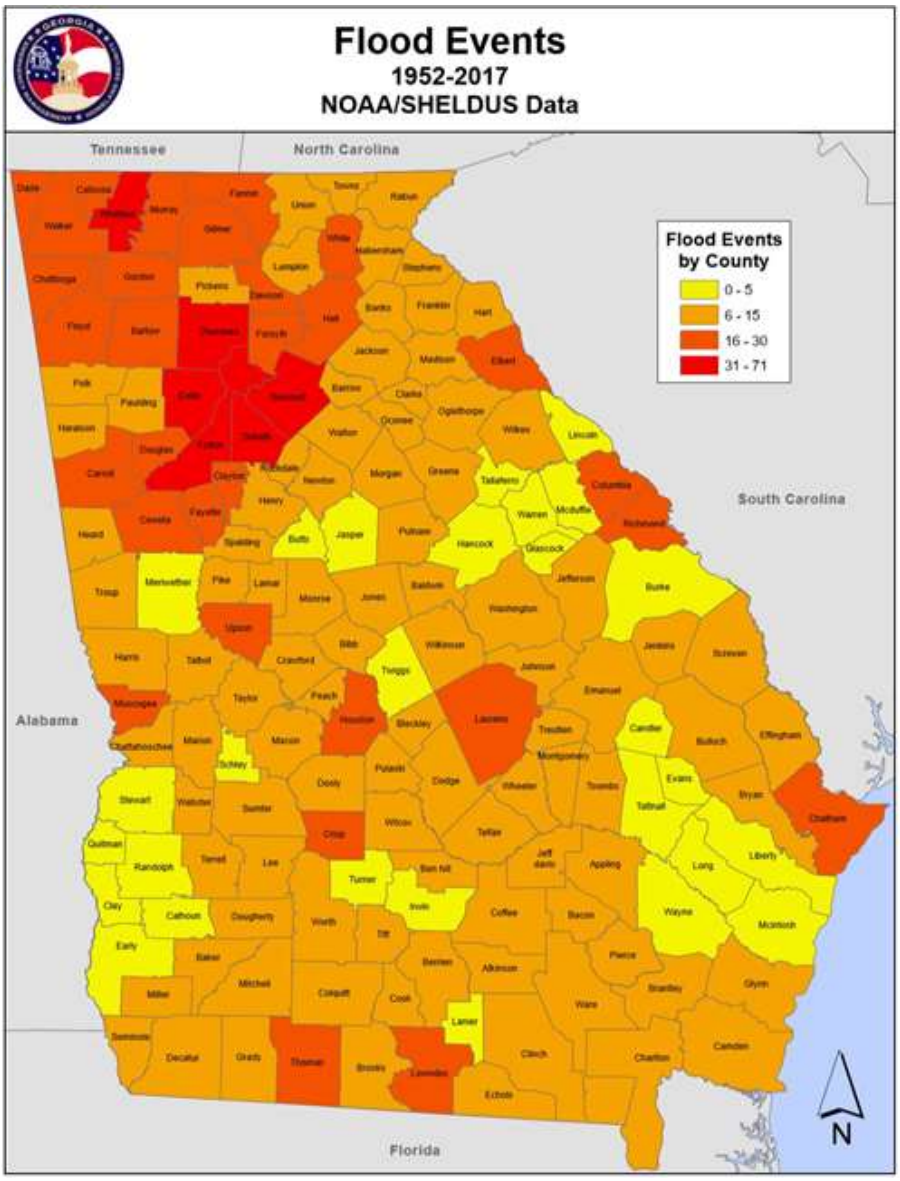
To evaluate the assets that would potentially be impacted by flooding, the Barrow County HMPC attempted to identify known structures within, or close to, the 100-year floodplain. There are 675 buildings identified in the flood plain.

Natural Hazard: **Flooding**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Flooding**



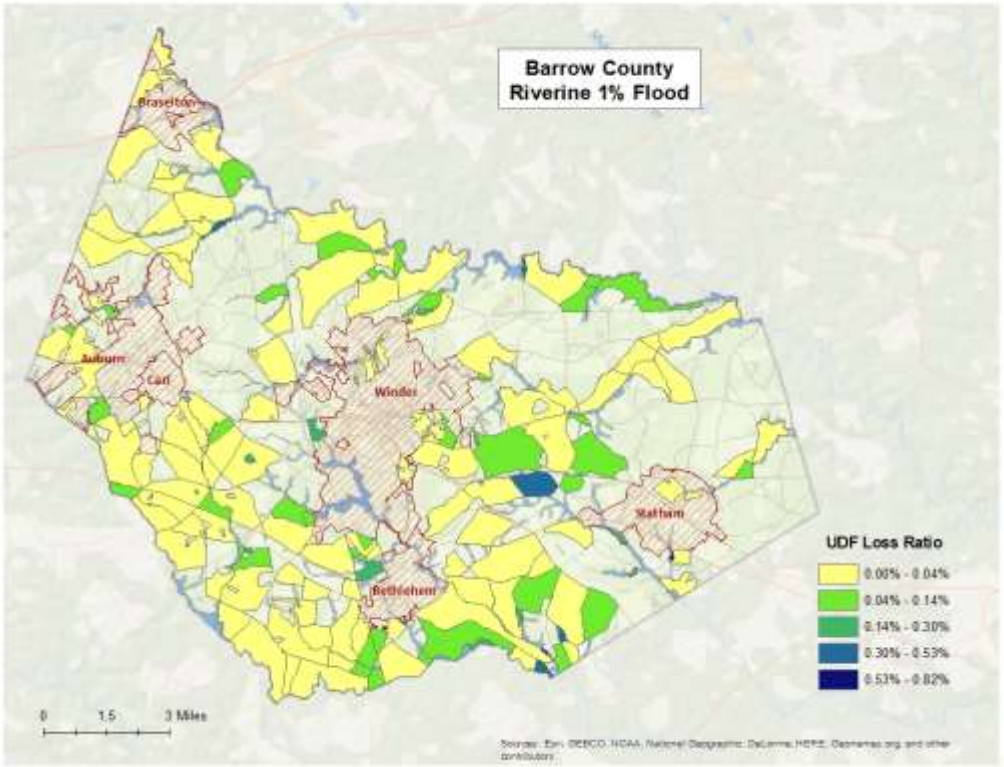
Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Estimated Potential Losses

The flooding events in Barrow County over the last 50 years have led to over $185,000 in damages. Extrapolated over 50 years, this results in an annual average of $3,700 per year. However, all reported damages have occurred in the last 15 years. As a result, the average over the last 15 years is $12,333 annually. These estimations are believed to be a gross underestimation of both prior and potential damages from flood events.

Natural Hazard: **Flooding**

Based upon the 2019 Barrow County HAZUS report, a flood equivalent to the 1% riverine flood levels could result in losses in excess of $37 million (675 buildings). However, it is possible that some areas may not experience total losses while others may be inundated with flood water who are not designated in the 1% riverine flood areas. Additionally, there are no critical facilities located in the 1% riverine flood areas.

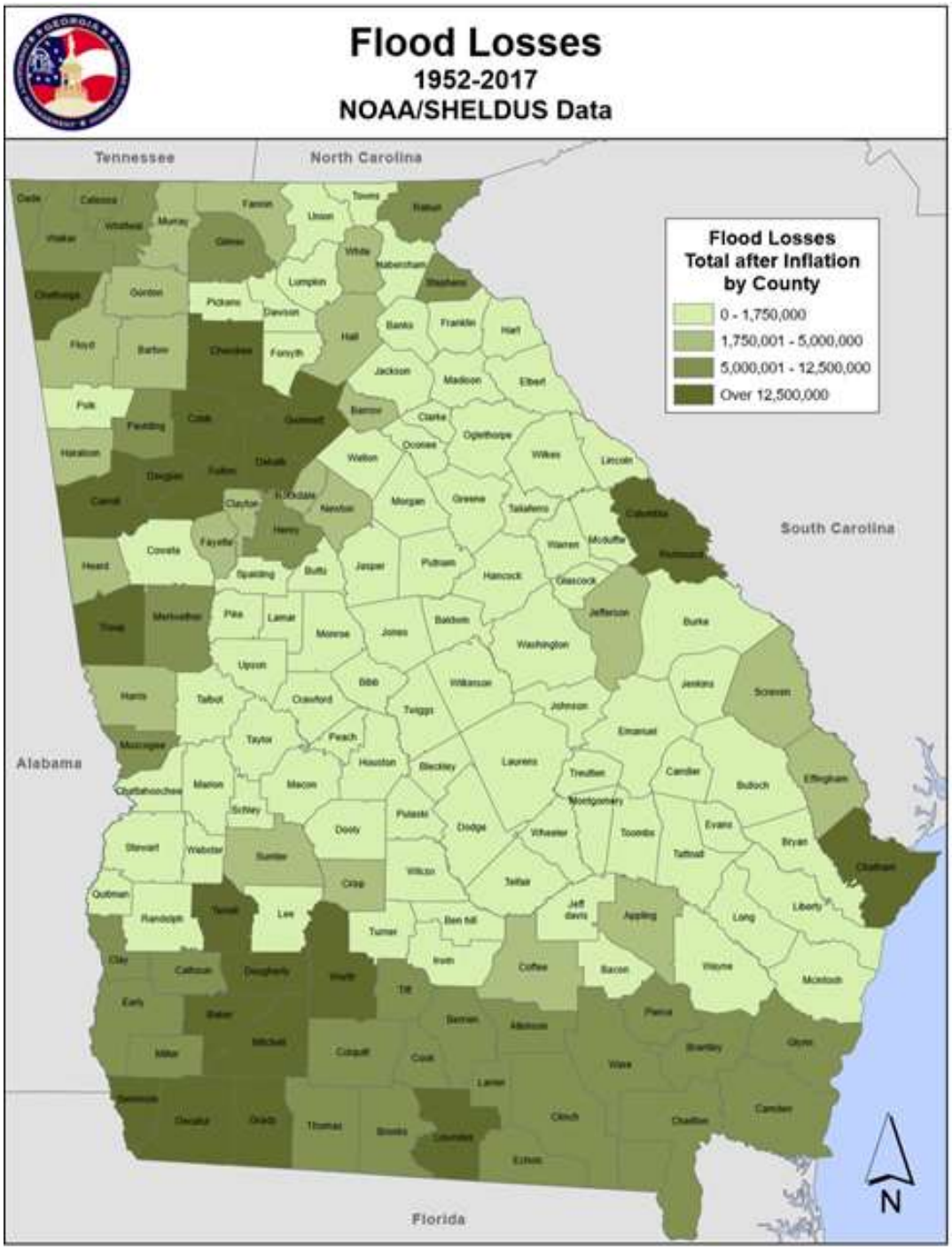


Source: 2019 Barrow County HAZUS Report

Land Use & Development Trends

Barrow County participates in the National Flood Insurance Program (NFIP) and follows the program's guidelines to ensure future development is carried out in the best interests of the public. The County (CID No. 130497) first entered the NFIP on October 16, 1991. According to the NFIP guidelines, the County has executed a Flood Damage Prevention Ordinance. This ordinance attempts to minimize the loss of human life and health as well as minimize public and private property losses due to flooding. The ordinance requires any potential flood damage be evaluated at the time of initial construction and that certain uses be restricted or prohibited based on this evaluation. The ordinance also requires that potential homebuyers be

Natural Hazard: **Flooding**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

notified that a property is located in a flood area. In addition, all construction must adhere to the Georgia State Minimum Standard Codes and the International Building Codes. Currently, the Barrow County municipalities of Auburn, Bethlehem, Braselton, Statham, and Winder also participate in NFIP through the application of appropriate NFIP-compliant ordinances and regulations.

The Town of Carl is currently researching ordinance requirements to achieve NFIP compliance.

There are no repetitive loss properties identified in Barrow County.

Multi-Jurisdictional Considerations

During a large-scale flood event, many portions of Barrow County would potentially be impacted by flooding. However, the area's most prone to flooding have historically been those areas located within the 100-year floodplain – particularly those areas along the Apalachee and Mulberry Rivers and their tributaries and distributaries. All of Barrow County, including all municipalities, could potentially be impacted.

Hazard Summary

Flooding has the potential to inflict significant damage within Barrow County, particularly along the Apalachee and Mulberry Rivers and their tributaries and distributaries. Mitigation of flood damage requires the community to be aware of flood-prone areas, including roads, bridges, and critical facilities. The Barrow County HMPC identified flooding as a hazard requiring mitigation measures and identified specific goals, objectives, and action items they deemed necessary to lessen the impact of flooding for their communities. These maps were updated since the previous plan.

There are no repetitive loss properties identified in Barrow County.

There have been no flood events in Barrow County since the adoption of the 2015 Barrow County Hazard Mitigation Plan.

Natural Hazard: **Flooding**

Barrow County

Natural Hazard: **Flooding**

Statham

Bethlehem

Natural Hazard: **Flooding**

Winder

Natural Hazard: Flooding

Auburn and Carl

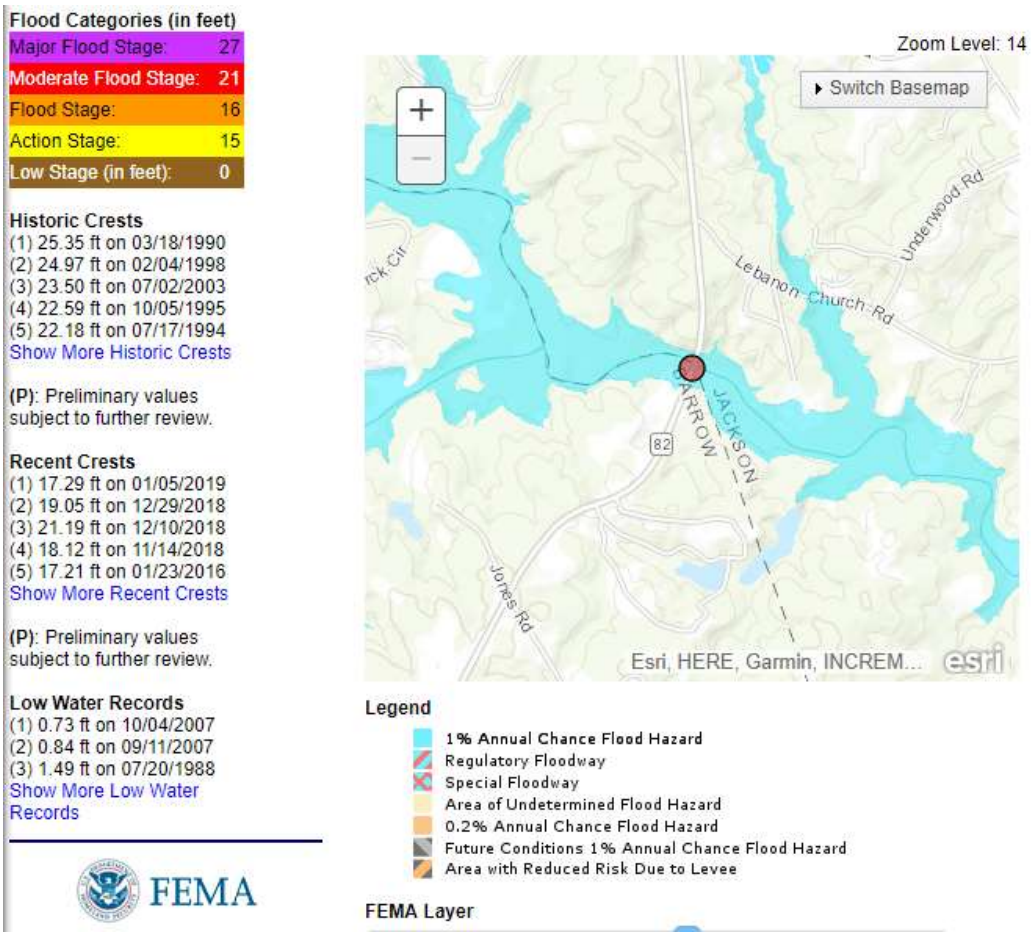
Braselton

Note: All "light blue" shaded areas indicate the extent of the 100-year (or 1% annual) flood risk

All Flood Maps are from the Georgia DFIRM Flood Map Program

Natural Hazard: Flooding

Middle Oconee River near Arcade



Natural Hazard: **Tornado**

Hazard Description

A tornado is a violently rotating column of air (seen only when containing condensation, dust, or debris) that is in contact with the surface of the ground. Exceptionally large tornadoes may not exhibit the classic "funnel" shape, but may appear as a large, turbulent cloud near the ground or a large rain shaft. Destructive because of strong winds and windborne debris, tornadoes can topple buildings, roll mobile homes, uproot vegetation and launch objects hundreds of yards.

Most significant tornadoes (excluding some weak tornadoes and waterspouts) stem from the right rear quadrant of large thunderstorm systems where the circulation develops between 15,000 and 30,000 feet. As circulation develops, a funnel cloud, a rotating air column aloft, or tornado descends to the surface. These tornadoes are typically stronger and longer-lived. The weaker, shorter-lived tornadoes can develop along the leading edge of a singular thunderstorm. Although tornadoes can occur in most locations, most of the tornado activity in the United States in the Midwest and Southeast. Tornadoes can occur anywhere within the State of Georgia.

In terms of the continuum of area of impact for hazard events, tornadoes are fairly isolated. Typically ranging from a few hundred to one or two miles across, tornadoes affect far less area than larger meteorological events such as tropical cyclones, winter storms and severe weather events. An exact season does not exist for tornadoes. However, most occur between early spring to mid-summer (February-June). The rate of onset of tornado events is rapid. Typically, the appearance of the first signs of the tornado is the descending funnel cloud. This sign may be only minutes from the peak of the event, giving those in danger minimal sheltering time. However, meteorological warning systems attempt to afford those in danger more time to shelter. The frequency of specific tornado intensities is undetermined because no pattern seems to exist in occurrence. Finally, the duration of tornado events ranges from the few minutes of impact on a certain location to the actual tornado lasting up to a few hours.

Tornadoes are measured after the occurrence using the subjective intensity measures. The Enhanced Fujita Scale describes the damage and then gives estimates of magnitude of peak 3-second gusts in miles per hour.

Natural Hazard: **Tornado**

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	86–110	**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	More than 200	**Incredible damage.** Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena occur.

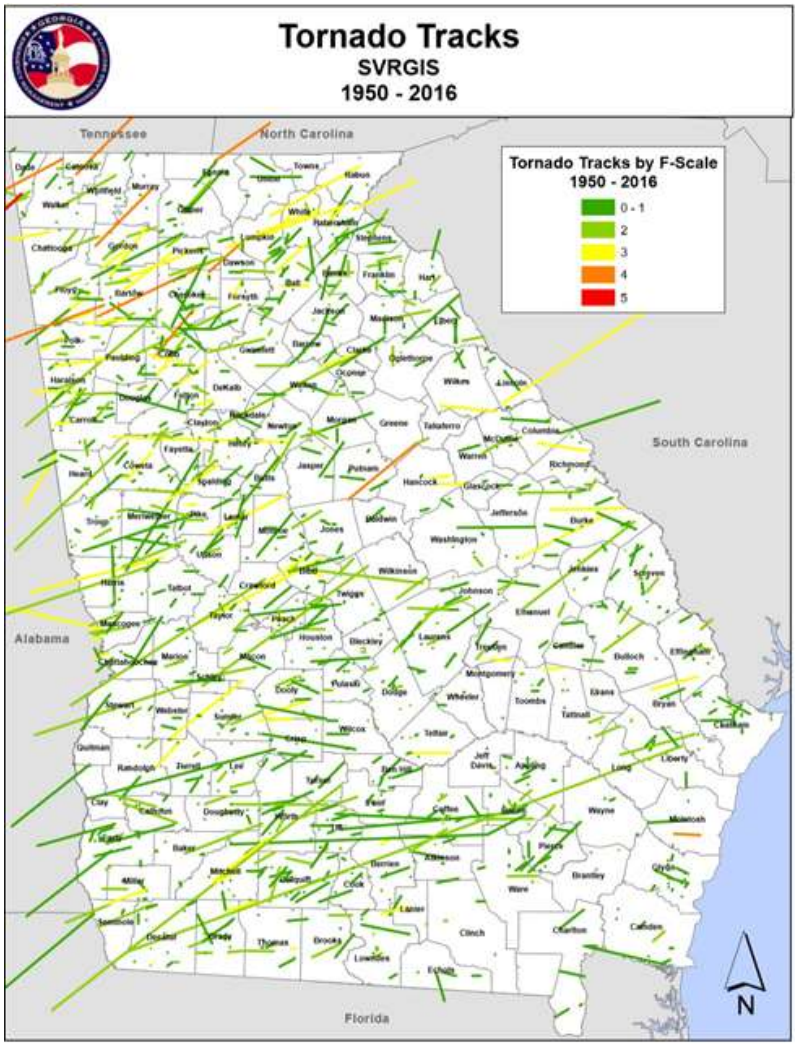
Hazard Profile

All areas within Barrow County are vulnerable to the threat of a tornado. Due to the indiscriminate and unpredictable nature of tornadoes, there is no reliable method to determine where or when a tornado will strike. There have been 4 documented tornadoes in the last 50 years in Barrow County. It is likely that other tornadoes have occurred within this timeframe, but available records are limited in nature.

Based on the 50-year information available for Barrow County, a tornado occurs every 12.5 years. On an annual basis, Barrow County has an 8% chance of being impacted from a tornado event. When only the last twenty years are considered, the likelihood of a tornado affecting Barrow County increases slightly to 10% (2 tornadoes since 1998).

Natural Hazard: **Tornado**

Individual tornado events can cause extreme damage to an area. This holds true for Barrow County, as well. The strongest and costliest documented tornado to impact Barrow County was a F1 in 1984. This storm traveled 12 miles through Barrow County, caused over $250,000 in damages, and injured one person. For additional historical data, please see Appendix D. All tornado hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

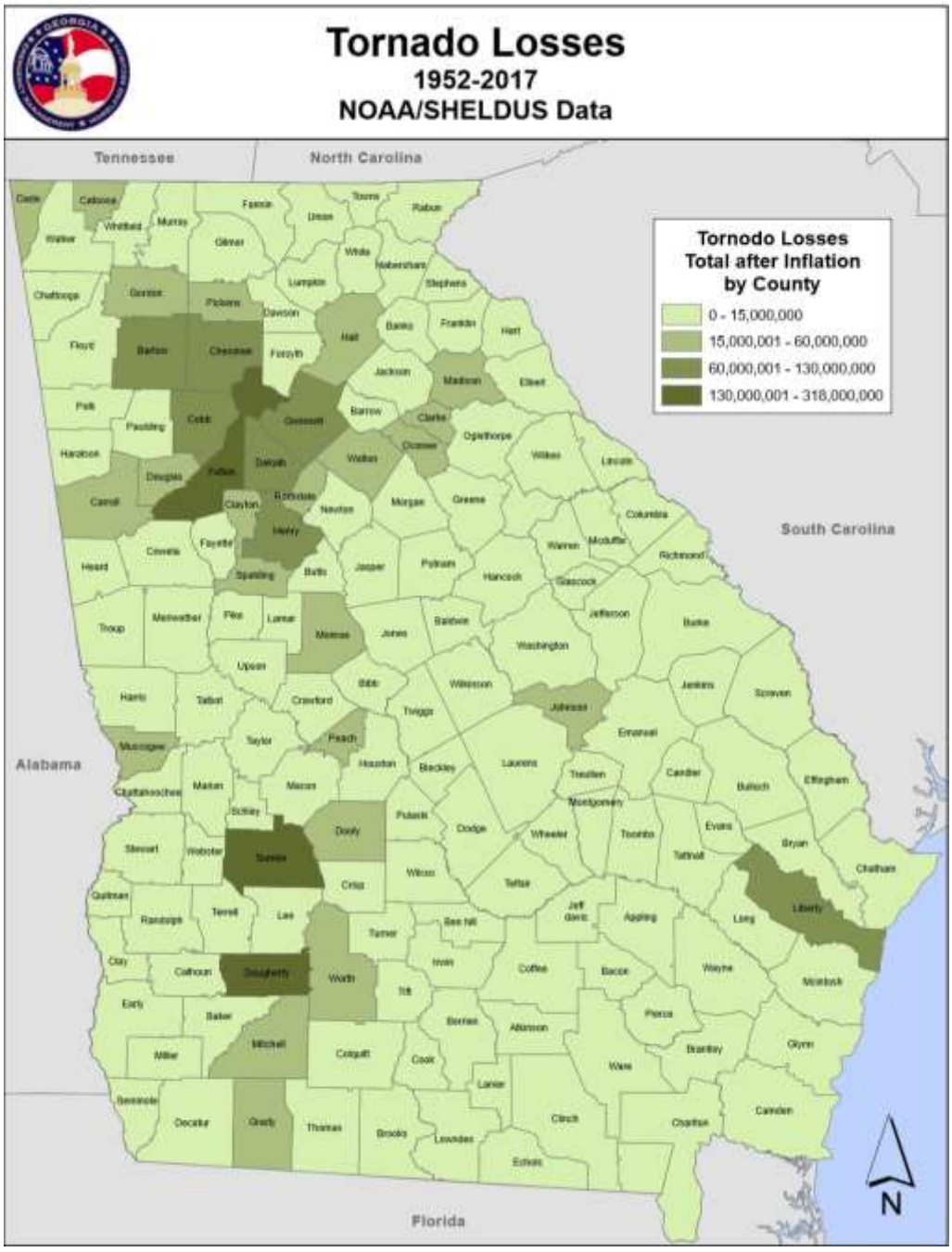


Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Assets Exposed to the Hazard

In evaluating assets that are susceptible to tornadoes, the Barrow County HMPC determined that all public and private property is threatened by tornadoes, including all critical facilities. This is due to the lack of spatial prejudice of tornadoes.

Natural Hazard: **Tornado**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Tornado**

Estimated Potential Losses

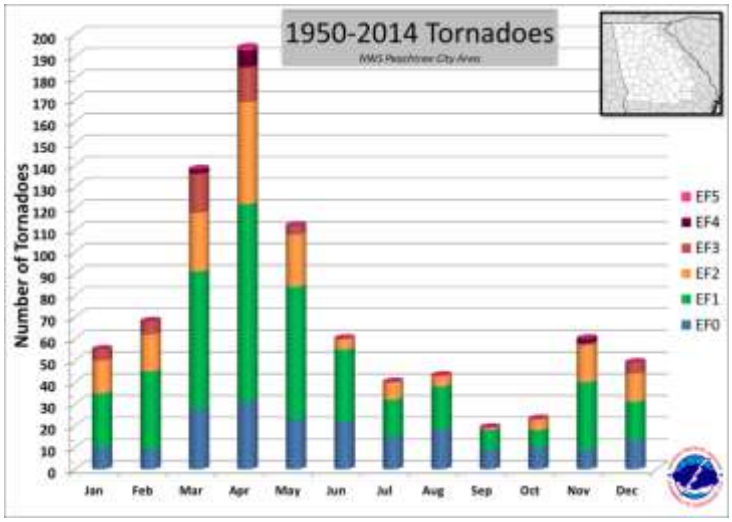
Estimates of damage for the past events of the last 50 years are $445,000, or $8,900 annually.

Within the 2019 Barrow County HAZUS report, a theoretical tornado path for an EF3 was identified that would inflict maximum damage. HAZUS estimated that this theoretical tornado would result in losses in excess of $81 million with the City of Winder suffering the greatest economic impacts.

Source: 2019 Barrow County HAZUS Report

Land Use & Development Trends

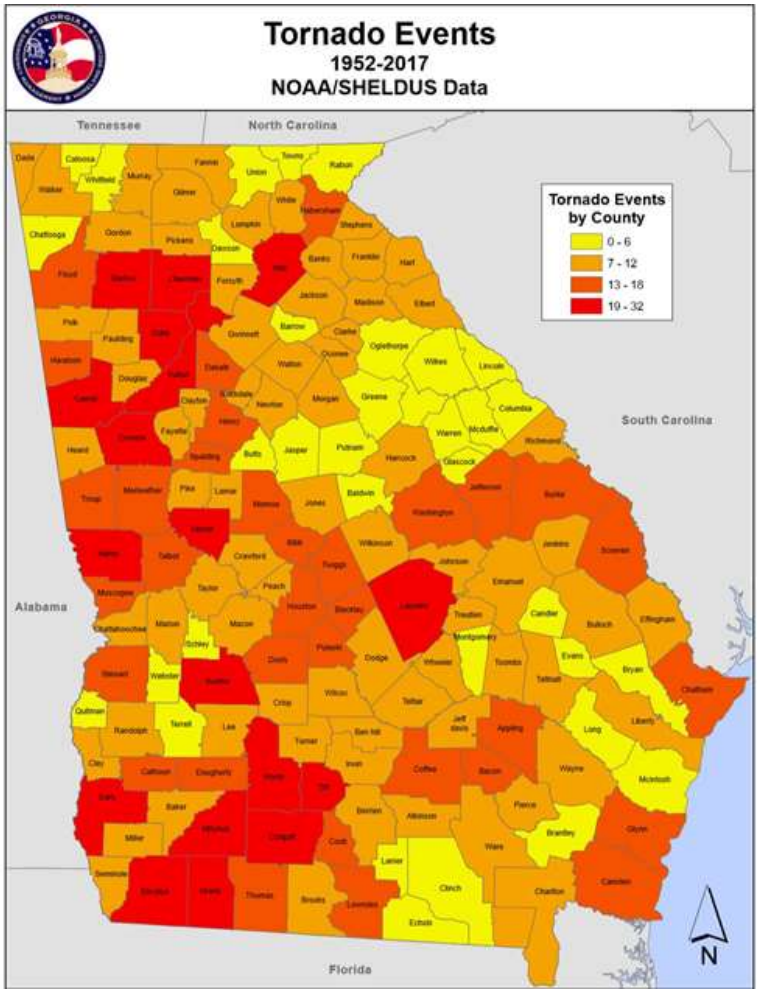
Barrow County currently has no land use trends related to Tornadoes beyond continued population growth – particularly around the City of Winder and in Western Barrow County near the Gwinnett County line.



Multi-Jurisdictional Considerations

All portions of Barrow County could potentially be impacted by a tornado due to the indiscriminate nature of tornadic events. Therefore, all mitigation actions identified regarding tornadoes should be pursued on a countywide basis and included all municipalities.

Natural Hazard: **Tornado**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Hazard Summary

Barrow County remains at risk to potential damage from tornadoes, especially considering the average of one tornado every 12.5 years over the last 50 years. Should a tornado strike in densely populated areas of the county, significant damage or loss of life could occur. Due to the destructive power of tornadoes, it is essential that the mitigation measures identified in this plan regarding tornado activity receive full consideration.

There has been one tornado event since the adoption of the 2015 Barrow County Hazard Mitigation Plan. This event was an EF0 near the Barrow County Airport. It traveled between 0.1 and 0.2 miles, had winds of 85 mph, and caused approximately $20,000 in damages.

Natural Hazard: **Drought**

Hazard Description

Drought is a normal, recurrent feature of climate consisting of a deficiency of precipitation over an extended period (usually a season or more). This deficiency results in a water shortage for some social or environmental sector. Drought should be judged relative to some long-term average condition of balance between precipitation and evapotranspiration in a particular area that is considered "normal." Drought should not be viewed as only a natural hazard because the demand people place on water supply affects perceptions of drought conditions. From limited water supplies in urban areas to insufficient water for farmland, the impacts of drought are vast.

Droughts occur in virtually every climatic zone and on every continent. Because the impacts of drought conditions are largely dependent on the human activity in the area, the spatial extent of droughts can span a few counties to an entire country.

Temporal characteristics of droughts are drastically different from other hazards due to the possibility of extremely lengthy durations as well as a sluggish rate of onset. Drought conditions may endure for years or even decades. This factor implicates drought as having a high potential to cause devastation on a given area. The duration characteristic of droughts is so important that droughts are classified in terms of length of impact. Droughts lasting 1 to 3 months are considered short term, while droughts lasting 4 to 6 months are considered intermediate and droughts lasting longer than 6 months are long term. With the slow rate of onset, most populations have some inkling that drought conditions are increasingly present. However, barring drastic response measures, most only have to adapt to the changing environment.

Seasonality has no general impact on droughts in terms of calendar seasons. However, "wet" and "dry" seasons obviously determine the severity of drought conditions. In other words, areas are less susceptible to drought conditions if the area is experiencing a wet season. The frequency of droughts is undetermined, because the hazard spans such a long period of time. However, climatologists track periods of high and low moisture content similarly to the tracking of cooling and warming periods.

Hazard Profile

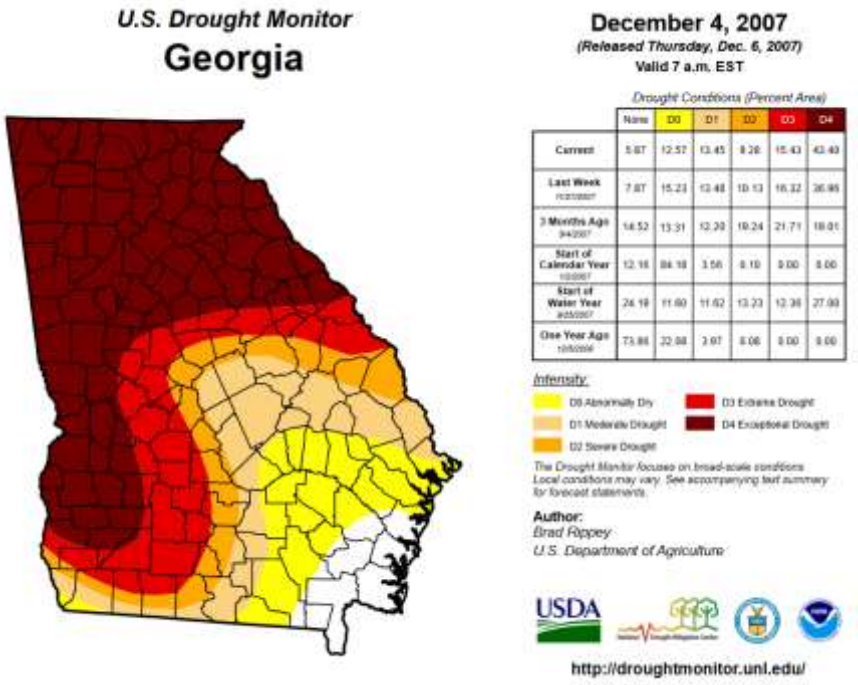
The Barrow County HMPC reviewed data for the last 50 years regarding drought conditions. Historically, agricultural losses have accounted for the vast amount of losses related to drought conditions.

Natural Hazard: **Drought**

(Hazard Profile Continued)

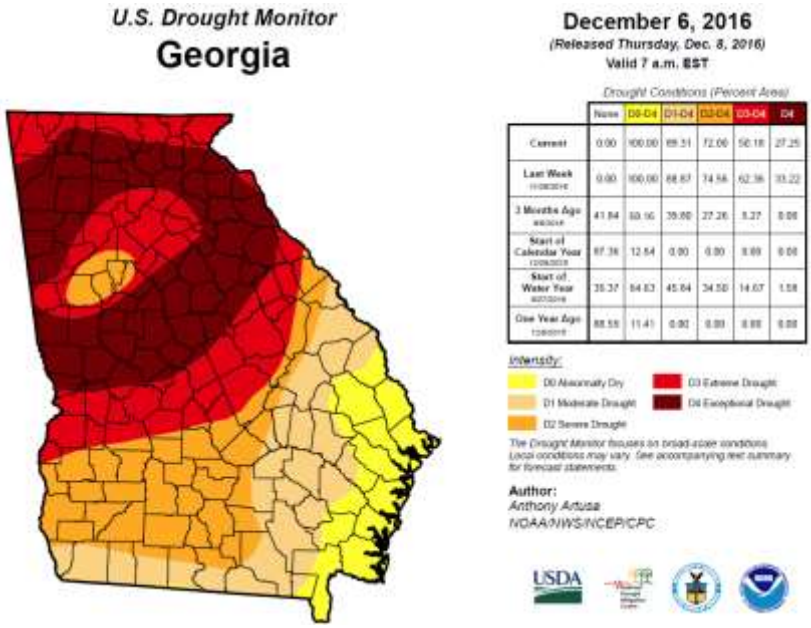
Due to poor record keeping and the unpredictable nature of drought conditions, reliability of historical data for the last 50 years is low. Barrow County has been impacted by 10 drought events in the last 20 years, according to data from the National Climatic Data Center. This amounts to a 50% chance of a drought for a given year over the last 20 years. The economic impact of these droughts, including crop damage, is not available. However, the National Climactic Data Center documents $2.9 million in crop damage for the 2000 Drought. All drought hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

There have been two recent examples of "exceptional" drought events affecting Barrow County. These events occurred in 2007 and 2016. Both events reached the D4 (Exceptional Drought) designation, according to data from the United States Drought Monitor. Below are maps of these two events.



Source: USDA Drought Monitor – University of Nebraska-Lincoln

Natural Hazard: **Drought**



Source: USDA Drought Monitor – University of Nebraska-Lincoln

Events of this extent can cause water shortages for residential and corporate needs, as well as affecting the ability for firefighting operations to be properly effective. Drought conditions of this extent can have devastating effects on the local agricultural industries, which has occurred in previous D4 level droughts.

Assets Exposed to the Hazard

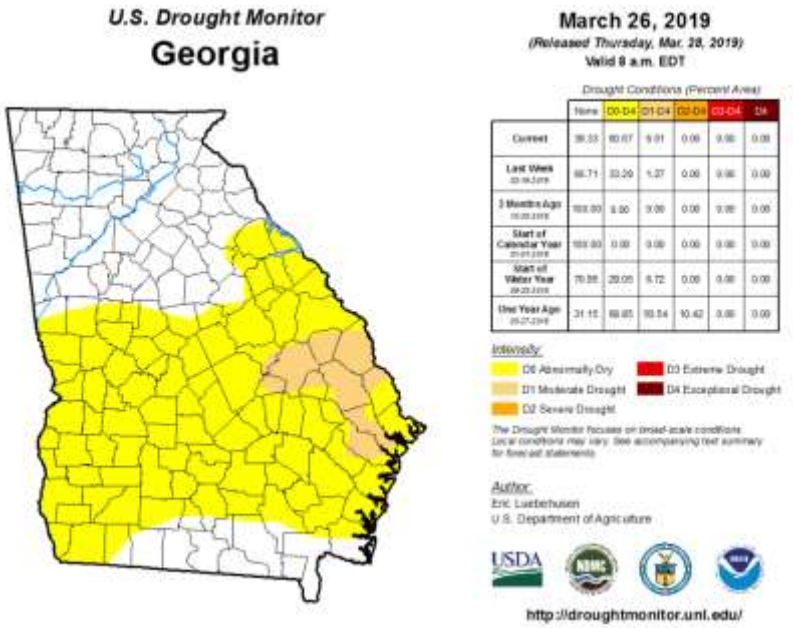
While drought conditions do not typically pose a direct threat to structures, secondary hazards from drought such as increased wildfire threat, does pose a significant threat to all public and private property in Barrow County, including all critical facilities. Water resources could also become scarce during a drought, a condition that would potentially affect all Barrow County residences and critical facilities.

Estimated Potential Losses

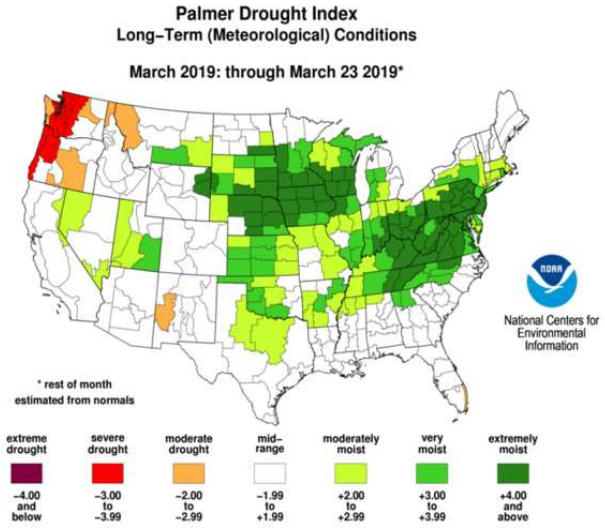
No damage to structures or critical facilities is expected as a direct result of drought conditions. However, crop damage and subsequent losses can be expected to occur as a result of drought conditions. The degree of losses would depend on the duration of the drought, severity of the drought, temperatures during the drought, season in which the drought occurs, and the specific needs of the involved crops. Water system shortages and need for supply assistance for those systems could also lead to economic losses associated with the drought.

Natural Hazard: **Drought**

According to the 2012 Agriculture Census data, Barrow County's market value of products sold was $39,917,000. $570,000 of that total represented crop sales, accounting for 1.4% of the total. Livestock sales accounted for 98.6%, or $39,347,000, of the total value.



Source: United States Drought Monitor (University of Nebraska-Lincoln)



Source: National Integrated Drought Information System

Natural Hazard: **Drought**

Land Use & Development Trends

As growth continues, drought can become a larger threat for Barrow County due to the increased reliance on water infrastructure and wells countywide. This increased pull on these resources in Barrow County could quicken or deepen the impacts of a drought for residential, commercial, and industrial areas.

Multi-Jurisdictional Considerations

All portions of Barrow County could potentially be impacted by a drought, but agricultural areas of the county are potentially more at risk. Therefore, all mitigation actions identified regarding drought should be pursued on a countywide basis and include all municipalities.

Hazard Summary

Drought conditions can cause significant economic stress on the agriculture and forestry interests of Barrow County. The potential negative secondary impacts of drought are numerous. They include increased wildfire threat, decreased water supplies for residential and industrial needs, stream-water quality, and water recreation facilities. The Barrow County HMPC recognizes the potential threats drought conditions could have on the community and have identified specific mitigation actions as a result.

Drought Events since 2015 in Barrow County

Location	County/Zone	St.	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Totals:							0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	06/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	07/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	08/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	09/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	10/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	11/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/01/2016	00:00	Drought		0	0	0.00K	0.00K

BARROW (ZONE)	BARROW (ZONE)	GA	01/01/2017	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/01/2017	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	03/01/2017	00:00	Drought		0	0	0.00K	0.00K

Natural Hazard: **Wildfire**

Hazard Description

A wildfire is an uncontained fire that spreads through the environment. Wildfires can consume large areas, including infrastructure, property, and resources. When massive fires, or conflagrations, develop near populated areas, evacuations could 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 nearby populations.

Wildfires result from the interaction of three crucial elements: fuel, ignition (heat), and oxygen. Natural and manmade forces cause the three crucial elements to coincide in a manner that produces wildfire events. Typically, fuel consists of natural vegetation. However, as the urban and suburban footprint expands, wildfires may utilize other means of fuel, such as buildings. In terms of ignition or source of heat, the primary source is lightning. However, humans are more responsible for wildfires than lightning. Manmade sources vary from the unintentional, such as fireworks, campfires or machinery, to intentional arson. With these two elements provided, the wildfires may spread as long as oxygen is present.

Weather is the most variable factor affecting wildfire behavior. Strong winds propel wildfires quickly across most landscapes unless firebreaks are present. Shifting winds create erratic wildfires, which can complicate fire management efforts. Dry conditions provide faster-burning fuels, either making the area more vulnerable to wildfire or increasing the mobility of preexisting wildfires.

Wildfires are notorious for spawning secondary hazards, such as flash flooding and landslides, long after the original fire is extinguished. Both flash flooding and landslides result from fire consuming the natural vegetation that provides precipitation interception and infiltration as well as slope stability.

All of Georgia is prone to wildfire due to the presence of wildland fuels associated with wildfires. Land cover associated with wildland fuels includes coniferous, deciduous, and mixed forest; shrubland; grassland and herbaceous; transitional; and woody and emergency herbaceous wetlands. The spatial extent of wildfire events greatly depends on both the factors driving the fire as well as the efforts of fire management and containment operations.

Natural Hazard: **Wildfire**

(Hazard Description Continued)

In terms of seasonality, wildfires can occur during any season of the year. However, drier seasons, which vary within the State of Georgia, are more vulnerable to severe wildfires because of weather patterns and the abundant quick-burning fuels. In terms of rate of onset and duration, wildfires vary depending on the available fuels and weather patterns. Some wildfires can engulf an area in a matter of minutes from the first signs whereas others may be slower burning and moving. The frequency of wildfires is not typically measured because of the high probability of human ignition being statistically unpredictable. Magnitude and intensity are typically only measured by size of the wildfire and locations of burning.

Three classes of fires include understory, crown, and ground fires. Naturally induced wildfires burn at relatively low intensities, consuming grasses, woody shrubs, and dead trees. These understory fires often play an important role in plant reproduction and wildlife habitat renewal and self-extinguish due to low fuel loads or precipitation. Crown fires, which consist of fires consuming entire living trees, are low probability but high consequence events due to the creation of embers that can be spread by the wind. Crown fires typically match perceptions of wildfires. In areas with high concentrations of organic materials in the soil, ground fires may burn, sometimes persisting undetected for long periods until the surface is ignited.

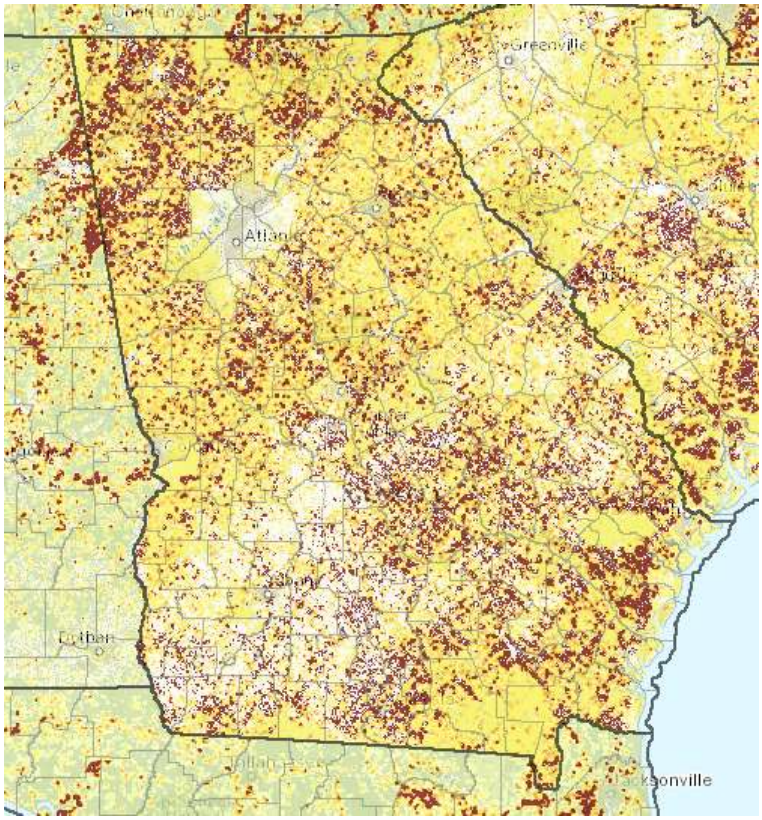
Hazard Profile

Wildfires pose a serious threat to Barrow County. This is a result of the high amount of forestland and vegetation available to fuel potential wildfires. Also, there is an increasing amount of wildland-urban interface (WUI) in Barrow County, which is defined as areas where structures and other human development meets undeveloped wildland properties. 97.2% of Barrow County's population lives within the WUI. All wildfire hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

Wildfire statistics were not available for the 50-year timeframe at the time of this profile. According to the 2017 Barrow County Community Wildfire Protection Plan (CWPP) produced by the Georgia Forestry Commission, Barrow County had 18 wildfires in 2017 that consumed a total of 21.14 acres. From 2004 to 2017, Barrow County has average 11.85 wildfires per year and these fires consume an average of 21.27 acres per year. This equates to a 3.2% daily chance of a wildfire occurring in Barrow County.

Natural Hazard: **Wildfire**

Georgia Wildfire Ignition Density



Source: Southern Group of State Foresters Wildfire Risk Assessment Portal

Assets *Exposed to the Hazard*

All public and private property located within the Wildland-Urban Interface, including critical infrastructures, are susceptible to impacts from wildfires. Due to the large area of wildland area in Barrow County and the large amount of WIU, all public and private property, including critical infrastructures, could be directly or indirectly impacted by the threat of wildfire. Of the 43 community areas reviewed in the CWPP, 4 were classified as "extreme risk", 1 was classified as "high risk," 28 communities were classified as having a "moderate risk", and the other 10 were classified as having a "low risk" to wildfire.

Estimated Potential Losses

Little information is available regarding damages, in terms of dollars, for wildfire losses in Barrow County. According to the 2012 Ag Census by the USDA, Barrow County has just over $500,000 in annual crop sales. These areas would potentially be impacted by a wildfire event.

Natural Hazard: **Wildfire**

Land Use & Development Trends

With the continued increase in population, Wildland-Urban Interface (WUI) is increasing in Barrow County. The WUI creates areas where fire can easily move from wildland areas into developed areas and threaten structures and human life. The expansion of the WUI in Barrow County complicated wildland fire management operations and planning initiatives. This development trend is expected to continue in the future.

Multi-Jurisdictional Considerations

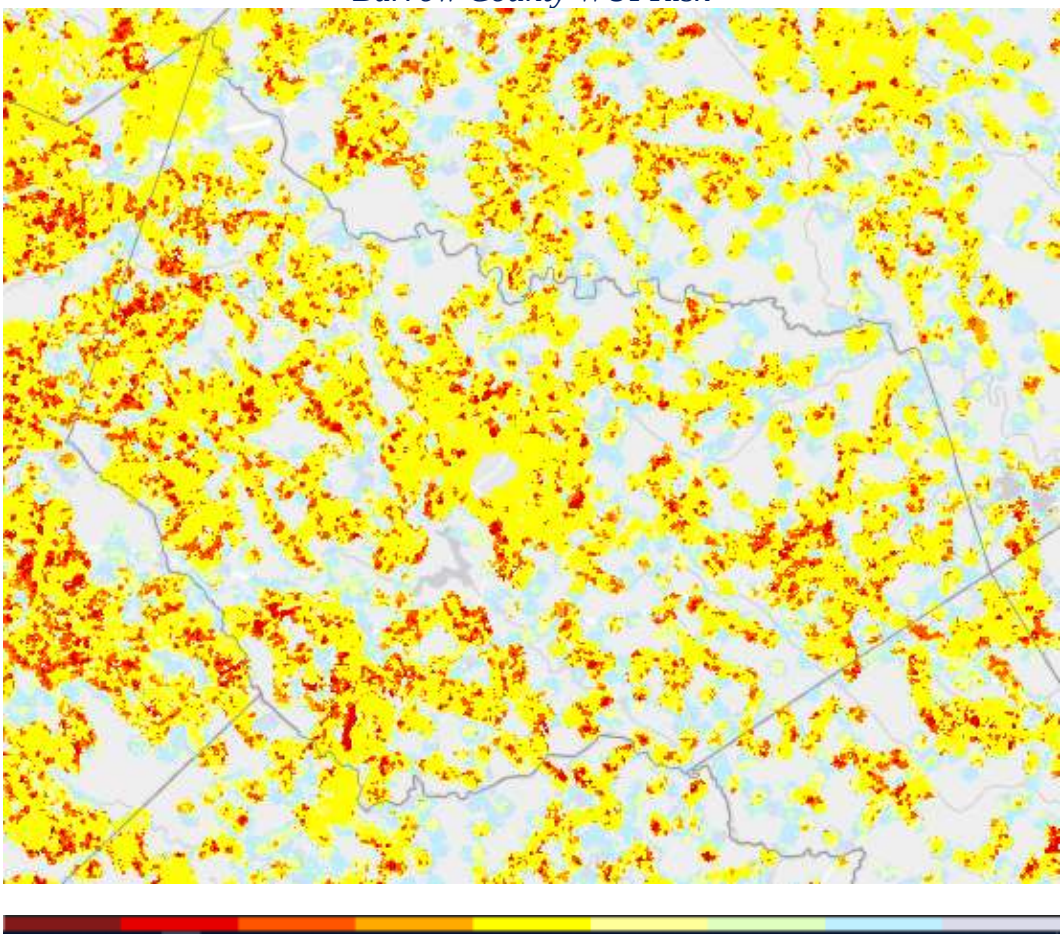
All portions of Barrow County, including all municipalities, could potentially be impacted by a wildfire due to the large amount of Wildland-Urban Interface, but the less developed areas of the county are more vulnerable. Therefore, all mitigation actions identified regarding wildfires should be pursued on a countywide basis and include all municipalities.

Hazard Summary

Wildfire is a significant threat to Barrow County due to the increased amount of Wildland-Urban Interface. The increasing amount of area where structures and other human development meets undeveloped, wildland property is where 98% of Barrow County's population lives. The mitigation measures identified in this plan should be aggressively pursued based on the high frequency of this hazard and the ability for wildfires to inflict devastation anywhere in Barrow County.

Natural Hazard: **Wildfire**

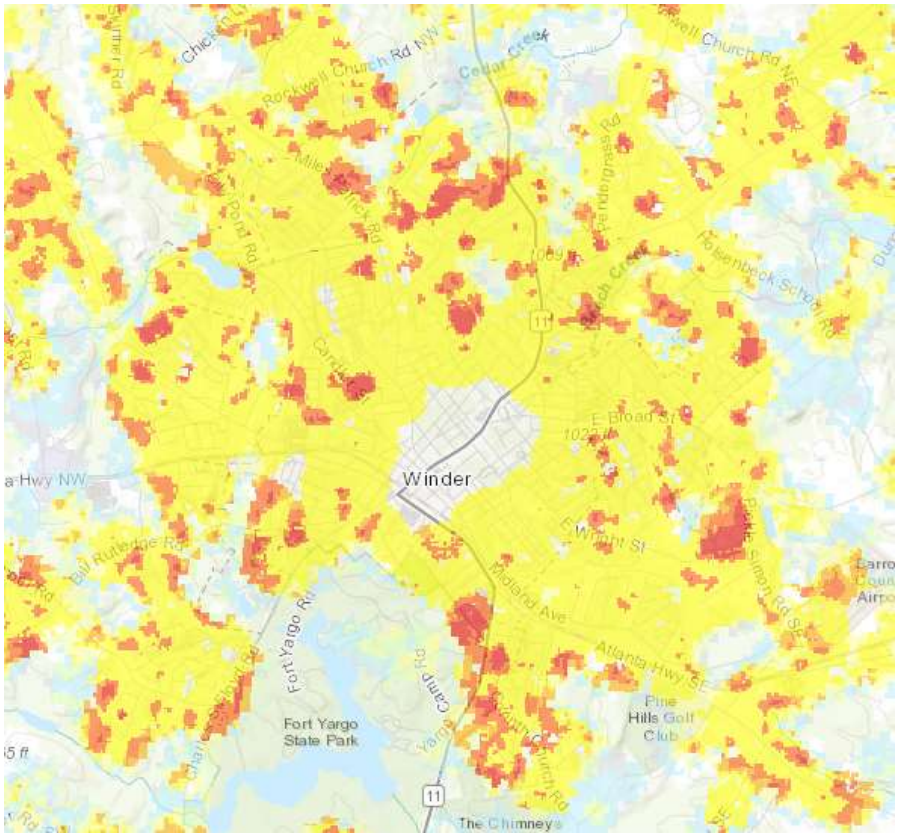
Barrow County WUI Risk



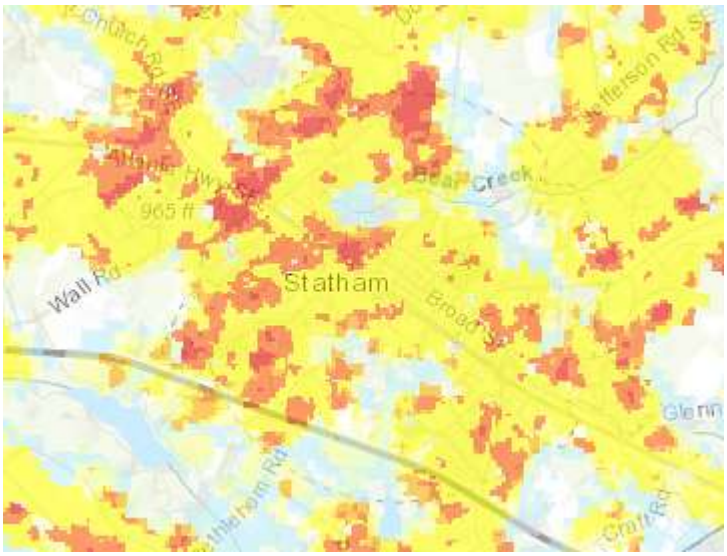
Major Impact----------Moderate Impact----------Minor Impact

Natural Hazard: **Wildfire**

Winder WUI Risk

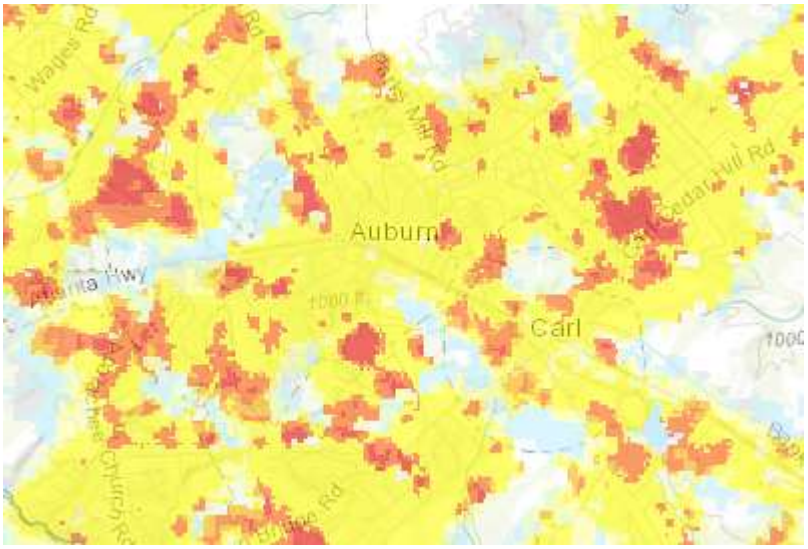


Statham WUI Risk

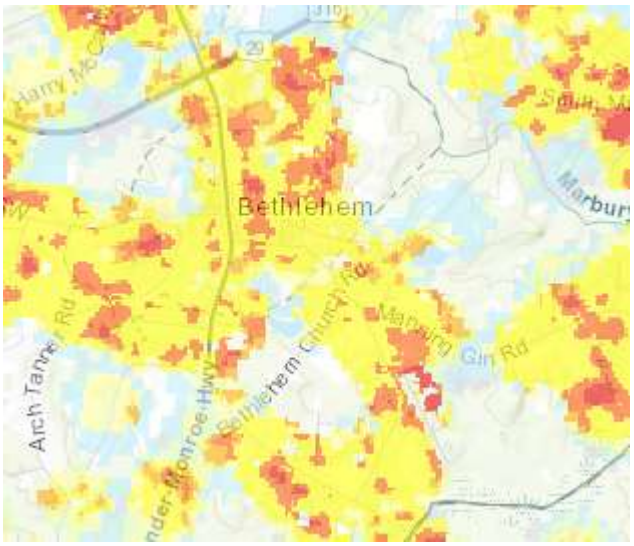


Natural Hazard: **Wildfire**

Auburn and Carl WUI Risk

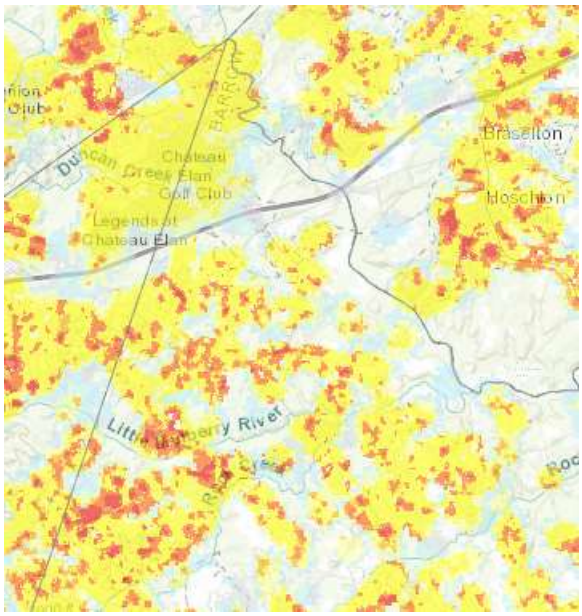


Bethlehem

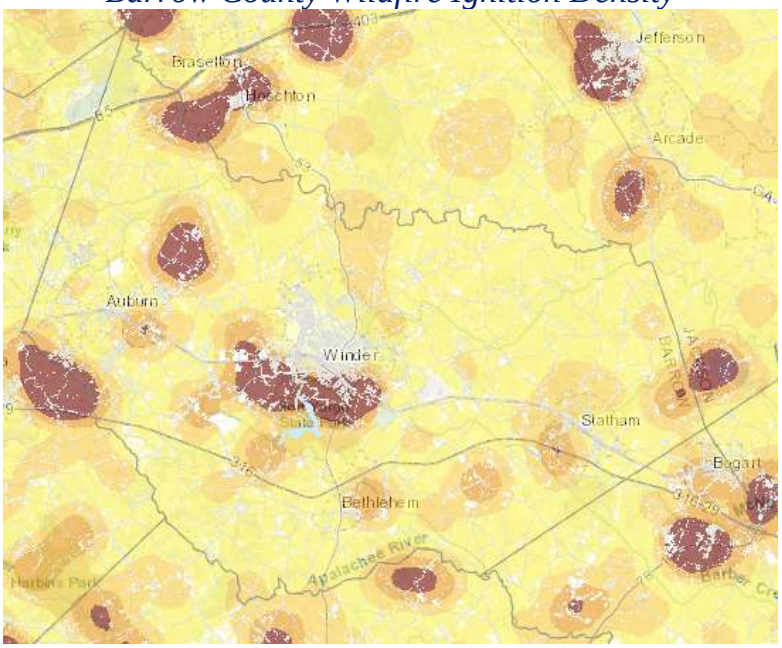


Natural Hazard: **Wildfire**

Braselton WUI Risk



Barrow County Wildfire Ignition Density



Very Low----------Low----------Moderate----------High----------Very High

All maps in this section are from the Southern Group of State Foresters Wildfire Risk Assessment Portal

Natural Hazard: Earthquakes

Hazard Description

Earthquakes are generally defined as the sudden motion or trembling of the Earth's surface caused by an abrupt release of slowly accumulated strain. This release typically manifests on the surface as ground shaking, surface faulting, tectonic uplifting and subsidence, or ground failures, and tsunamis. In the United States, earthquake activity east of the Rocky Mountains is relatively low compared to the Western states because it is away from active plate boundaries and the plate interior strain rates are known to be very low.

The physical property of earthquakes that causes most of the damage within the United States is ground shaking. The vibrations from the seismic waves that propagate outward from the epicenter may cause failure in structures not adequately designed to withstand earthquakes. Because the seismic waves have different frequencies of vibration, the waves disseminate differently through sub-surface materials. For example, high frequency compression and shear waves arrive first, whereas lower frequency Rayleigh and love waves arrive later. Not only are the speeds varied between seismic waves, but also the types of movement. The surface vibration may be horizontal, vertical, or a combination of the two, which causes a wider array or structures to collapse.

Another manifestation of earthquakes is surface faulting. This phenomenon is defined as the offset or tearing of the earth's surface by a differential movement across a fault. Structures built across active faults tend to sustain damage regularly. There are no active faults within or near Georgia. Distinct inactive faults are known within the state north or the Columbus to Macon to Augusta fall line and running generally northeast-southwest.

The third earthquake phenomenon that causes damage is tectonic uplift and subsidence. Tectonic uplift can cause shallowing of the harbors and waterways while tectonic subsidence can cause permanent or intermittent inundation. Due to the association of tectonic uplift and subsidence with active faults, Georgia is not at risk to these phenomena.

The fourth earthquake damage-causing phenomena are earthquake-induced ground failures, including liquefaction and landslides. During an earthquake, the areas that are rich in sand and silt have groundwater within 30 feet of the surface temporarily behave as viscous fluids during strong ground shaking. Structures built on these materials can settle, topple, or collapse as the ground "liquefies" beneath it. Landslides can also form when earthquake shaking or seismic activity dislodges rock and debris on steep slopes, triggering rock falls, avalanches, and slides.

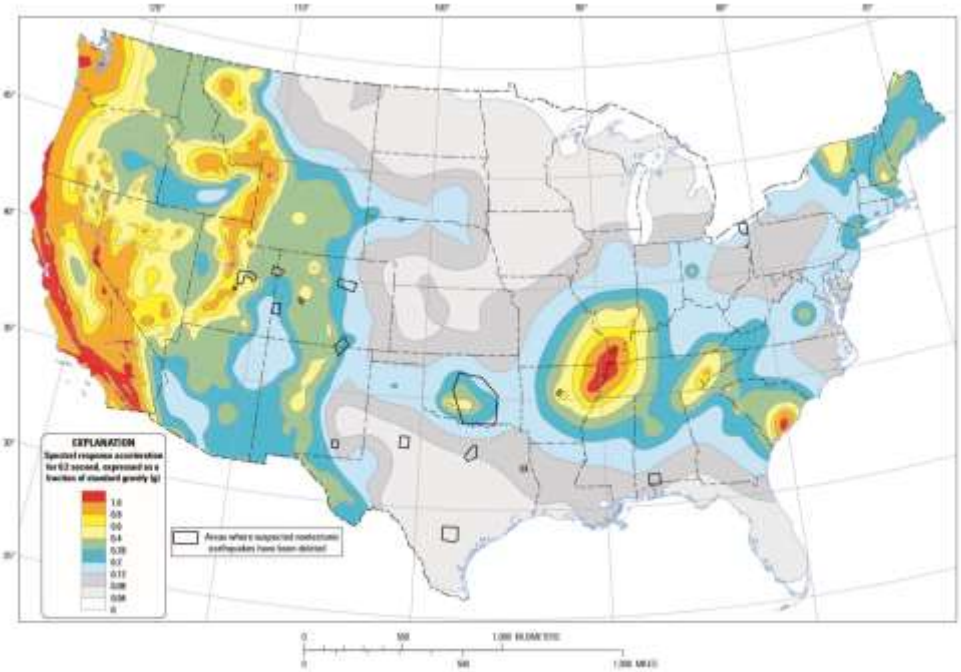
Natural Hazard: **Earthquakes**

(Hazard Description Continued)

Also, unstable or nearly unstable slopes consisting of clay soils may lose shear strength when disturbed by ground shaking and fail, resulting in a landslide. Georgia is at very low risk of seismic induced liquefaction or landslides.

The last of the earthquake-induced phenomena are tsunamis, which are large, gravity-driven waves triggered by the sudden displacement of a large volume of water. The waves produced travel in all directions from the origin at speeds of up to 600 miles per hour. In deep water, tsunamis normally have small wave heights. However, as the waves reach shallower water near land, the wave speed diminishes, and the amplitude drastically increases. Upon impact with a shoreline, the waves can inundate land rapidly, engulfing everything in its path. Successive wave crests follow, typically arriving minutes to hours later, frequently with later arrivals being more dominant. Frequently, the first tsunami waves are downward, causing dramatic exposure of the beach. Because of this, people are often killed trying to collect newly exposed seashells when the positive waves then arrive.

Although large tsunamis are rare in the eastern coast of the US, the possibility of such events occurring anywhere along the Atlantic and Gulf coast exists.



Two-percent probability of exceedance in 50 years map of 0.2 second spectral response acceleration

Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Earthquakes**

Hazard Profile

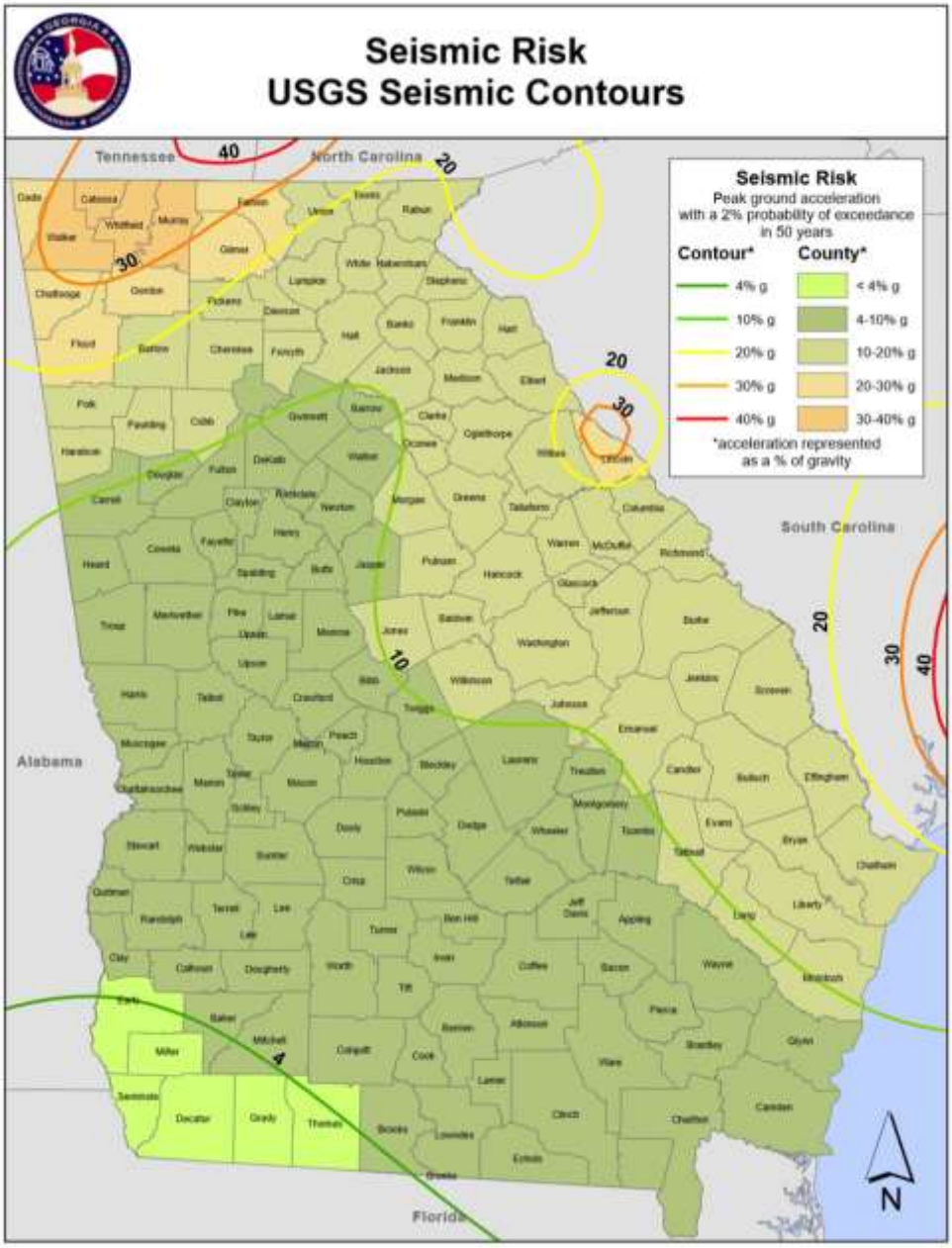
Barrow County is not one of the 37 Georgia counties with the highest earthquake risk, according to GEMA and Georgia Tech School of Earth and Atmospheric Sciences. In reviewing data of the last 50 years, no earthquakes have originated from within Barrow County. However, earthquakes with a magnitude of 2.0 or greater have occurred as close as Commerce, GA. 6 earthquakes have originated within 50 miles of Winder, GA in the last 50 years. The strongest earthquake to occur within this radius was a 2.5 that occurred near Union Point, GA in 2006. This equates to a 12% chance of an earthquake occurring within 50 miles of Clarkesville, GA in any given year. Historically, the 1886 Charleston, SC earthquake, estimated to be between 6.6 and 7.3 on the modern Richter Scale, likely caused impacts to Barrow County. Although no historical records exist exhibiting any damages, Barrow County was estimated to be in a level VI area of the Modified Mercalli Intensity scale for this event. This would indicate strong shaking felt by everyone inside and outside at the time of the event and characterized by broken windows, movement of heavy furniture, and slight to moderate damage for poorly built buildings. Even with this low number of occurrences, it was determined that if earthquakes occur within or close to the jurisdiction of Barrow County, significant damage could occur. Therefore, the Barrow County HMPC has determined the threat of earthquakes to be higher than the statistics would indicate. All earthquake hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction.

Instrumental Intensity	Acceleration (%g)	Velocity (cm/s)	Perceived Shaking	Potential Damage
I	< 0.17	< 0.1	Not Felt	None
II-III	0.17 - 1.4	0.1 - 1.1	Weak	None
IV	1.4 - 3.9	1.1 - 3.4	Light	None
V	3.9 - 9.2	3.4 - 8.1	Moderate	Very light
VI	9.2 - 18	8.1 - 16	Strong	Light
VII	18 - 34	16 - 31	Very Strong	Moderate
VIII	34 - 65	31 - 60	Severe	Moderate to Heavy
IX	65 - 124	60 - 116	Violent	Heavy
X+	> 124	> 116	Extreme	Very Heavy

Natural Hazard: **Earthquakes**

Assets Exposed to the Hazard

The Barrow County HMPC determined that all critical facilities and all public and private property within Barrow County are susceptible to the impacts of an earthquake due to the lower building codes with regards to earthquakes when compared to other parts of the country. This includes all municipalities.



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Earthquakes**

Estimated Potential Losses

Little information is available regarding damages, in terms of dollars, for earthquake losses in Barrow County.

Land Use and Development Trends

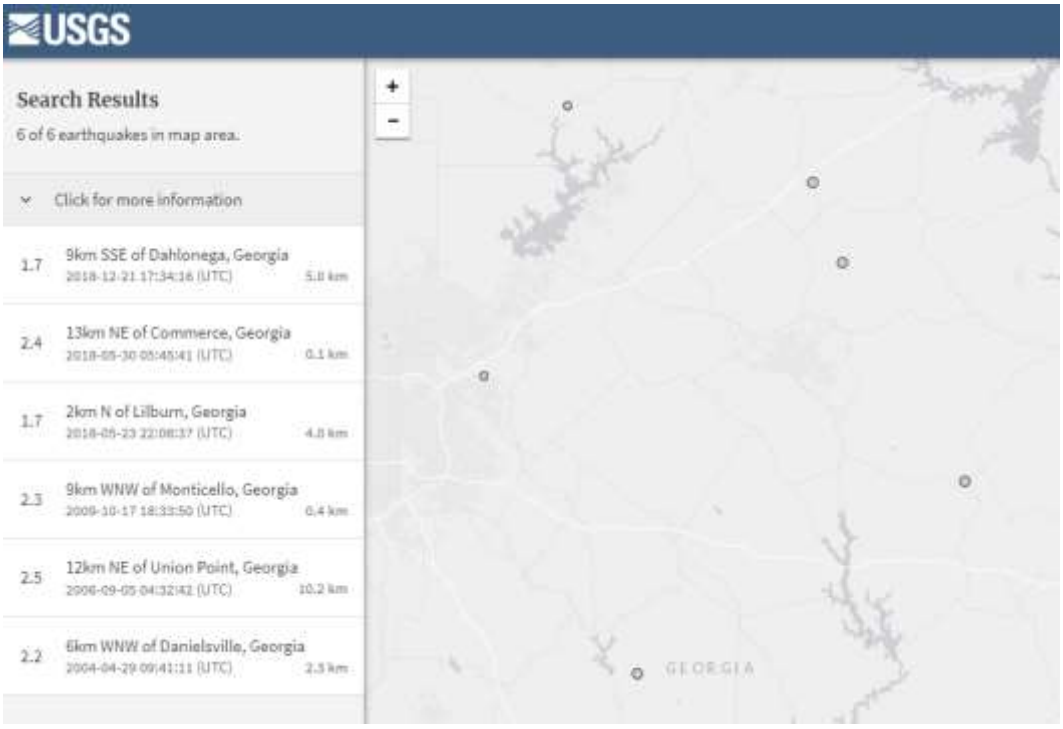
Barrow County currently has no land use trends related to Earthquakes.

Multi-Jurisdictional Considerations

All of Barrow County, including all municipalities, potentially could be threatened by earthquakes. As such, all earthquake mitigation actions should be pursued on a countywide basis and include all municipalities.

Hazard Summary

Even with the infrequency of earthquake impacts in Barrow County, the potential losses and impacts associated with the event would severely damage the infrastructure and economic viability of the County and all municipalities. The mitigation measures identified in this plan should be pursued based on the high impact potential of this hazard and the ability for earthquakes to inflict widespread devastation anywhere in Barrow County.



Source: United States Geological Survey (USGS) Earthquake Hazards Program

Natural Hazard: **Tropical Cyclone**

Hazard Description

The National Weather Service describes tropical cyclones systems in the Atlantic Basin, including the Gulf of Mexico and Caribbean Sea, into four types based on strength.

Tropical Disturbance: A discrete tropical weather system of apparently organized thunderstorms – generally 100 to 300 nautical miles in diameter – originating in the tropics or subtropics, and maintaining its identity for 24 hours or more.

Tropical Depression: An organized system of clouds and thunderstorms with a defined circulation and maximum sustained winds of 38 mph (33 knots) or less.

Tropical Storm: An organized system of strong thunderstorms with a defined circulation and maximum sustained winds of 39 mph to 73 mph (34-63 knots).

Hurricane: An intense tropical weather system with a well-defined circulation, producing maximum sustained winds of 74 mph (64 knots) or greater. Hurricane intensity is classified into five categories using the Saffir-Simpson Hurricane scale. Winds in a hurricane range from 74-95 mph for a Category 1 hurricane to greater than 156 mph for a Category 5 hurricane.

Saffir-Simpson Scale for Hurricane Classification				
Strength	Wind Speed (Kts)	Wind Speed (MPH)	Pressure (Millibars)	Pressure
Category 1	64- 82 kts	74- 95 mph	>980 mb	28.94 "Hg
Category 2	83- 95 kts	96-110 mph	965-979 mb	28.50-28.91 "Hg
Category 3	96-113 kts	111-130 mph	945-964 mb	27.91-28.47 "Hg
Category 4	114-135 kts	131-155 mph	920-944 mb	27.17-27.88 "Hg
Category 5	>135 kts	>155 mph	919 mb	27.16 "Hg
Tropical Cyclone Classification				
Tropical Depression	20-34kts			
Tropical Storm	35-63kts			
Hurricane	64+kts or 74+mph			

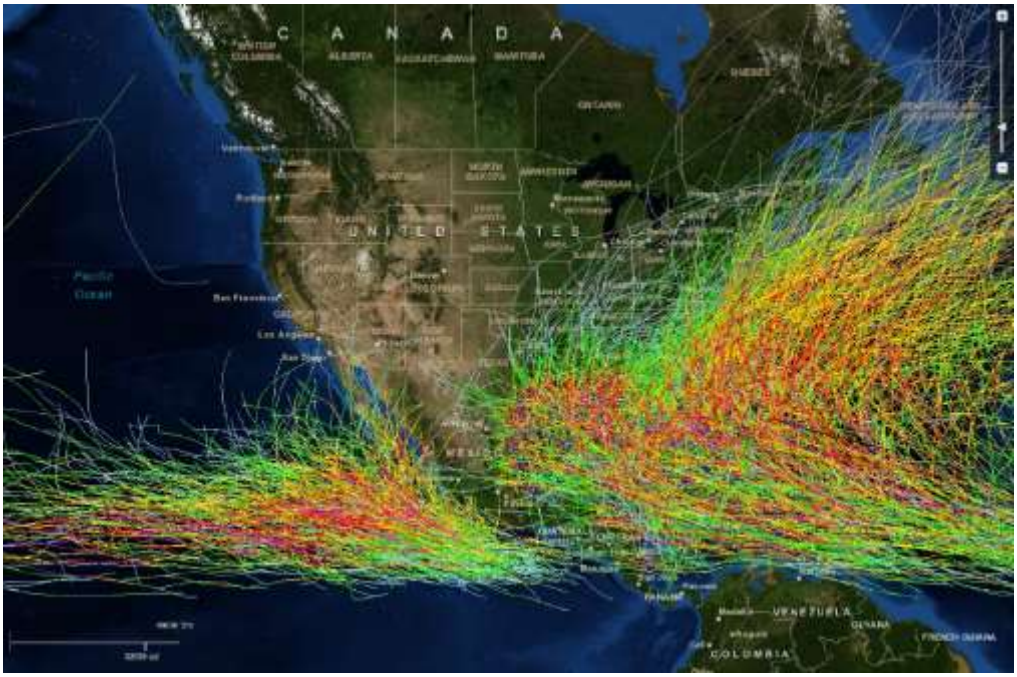
Natural Hazard: **Tropical Cyclone**

(Hazard Description Continued)

Tropical cyclones can cause catastrophic damage to coastlines and areas several hundred miles inland. Tropical cyclones can produce sustained high winds and spawn tornadoes and microbursts. Additionally, tropical cyclones can create storm surges along the coast and cause extensive damage from heavy rainfall. Floods and flying debris from the excessive winds are often the deadly and destructive results of these weather events.

Slow moving tropical cyclones traveling into mountainous regions tend to produce especially heavy rain. Excessive rain can trigger landslides or mudslides. Flash flooding can also occur due to intense rainfall.

Each of these hazards present unique characteristics and challenges; therefore, the following have been separated and analyzed as individual hazards: Tropical cyclones, Thunderstorms, Tornadoes, and Flooding. This section will focus on the direct effects of tropical cyclones.



Hazard Profile

Tropical cyclones have directly impacted Barrow County on an infrequent basis over the last 50 years. However, the possibility of a hurricane or tropical storm retaining their wind strength as far inland as Barrow County is possible. There

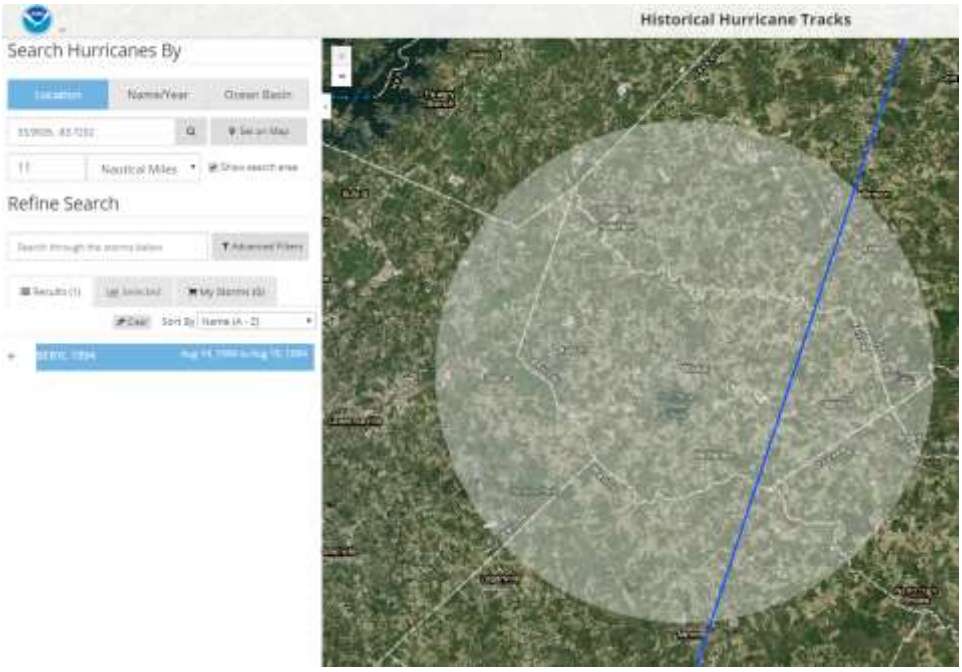
Natural Hazard: **Tropical Cyclone**

(Hazard Profile Continued)

have been 14 documented impacts from Topical Cyclones in Barrow County. This equates to a 28% chance of a tropical cyclone impacting Barrow County in any given year. The Barrow County Hazard Mitigation Update Committee believes this percentage is more representative of the potential impact.

One tropical cyclone – Tropical Storm Beryl in 1994 – has had a track that directly dissected Barrow County in the last 50 years. All tropical cyclone hazard data included for Barrow County is limited to countywide data and is not broken down by jurisdiction. In 2017, Hurricane Irma dropped 3-4 inches of rain on Barrow County and wind gusts up to 50 mph (tropical storm-strength) were reported in the county.

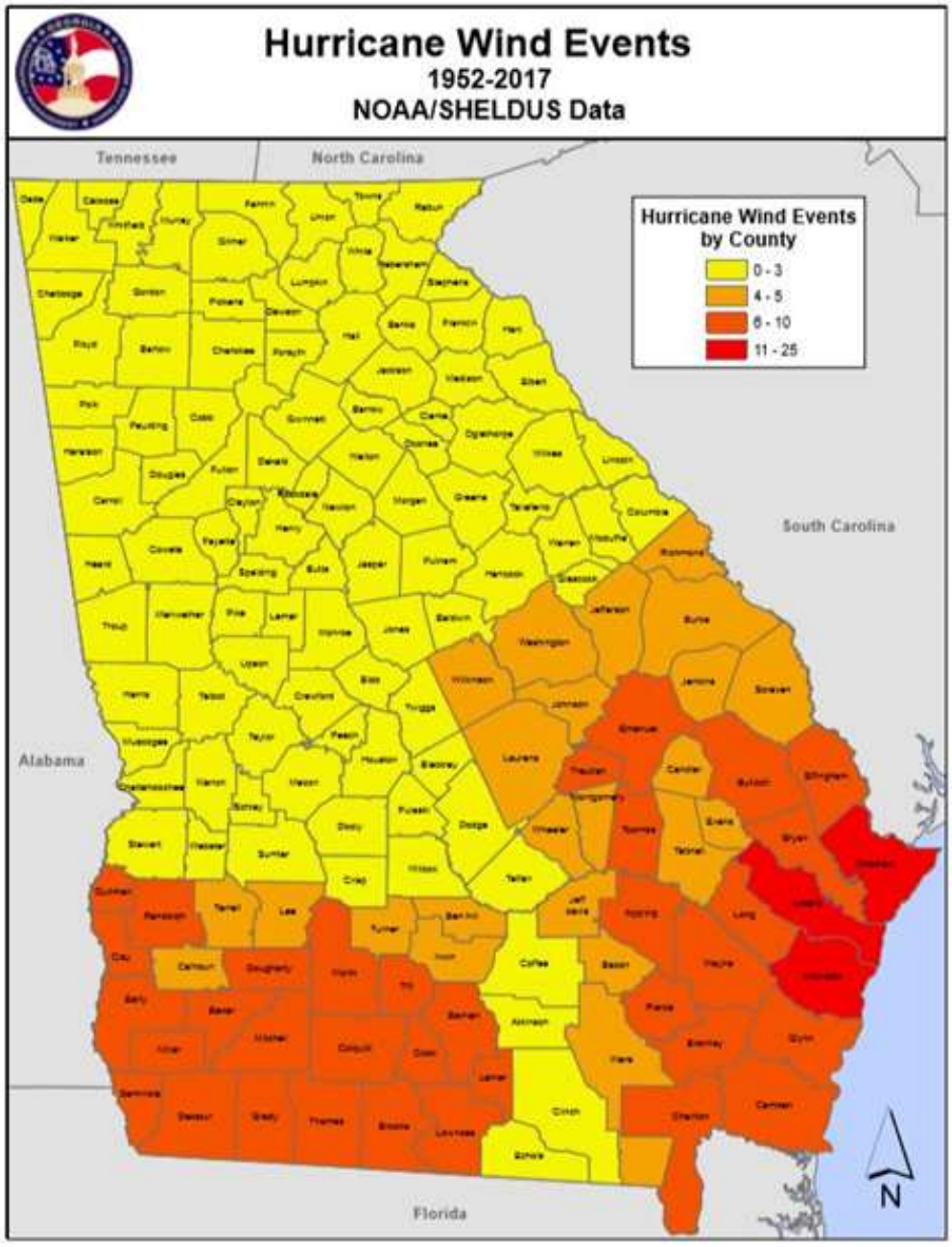
Even with the infrequent occurrences, the impacts that would result from hurricane or tropical storm forces on the citizens, infrastructure, and critical facilities of Barrow County could be potentially catastrophic in nature.



Source: Office of Coastal Management (NOAA)

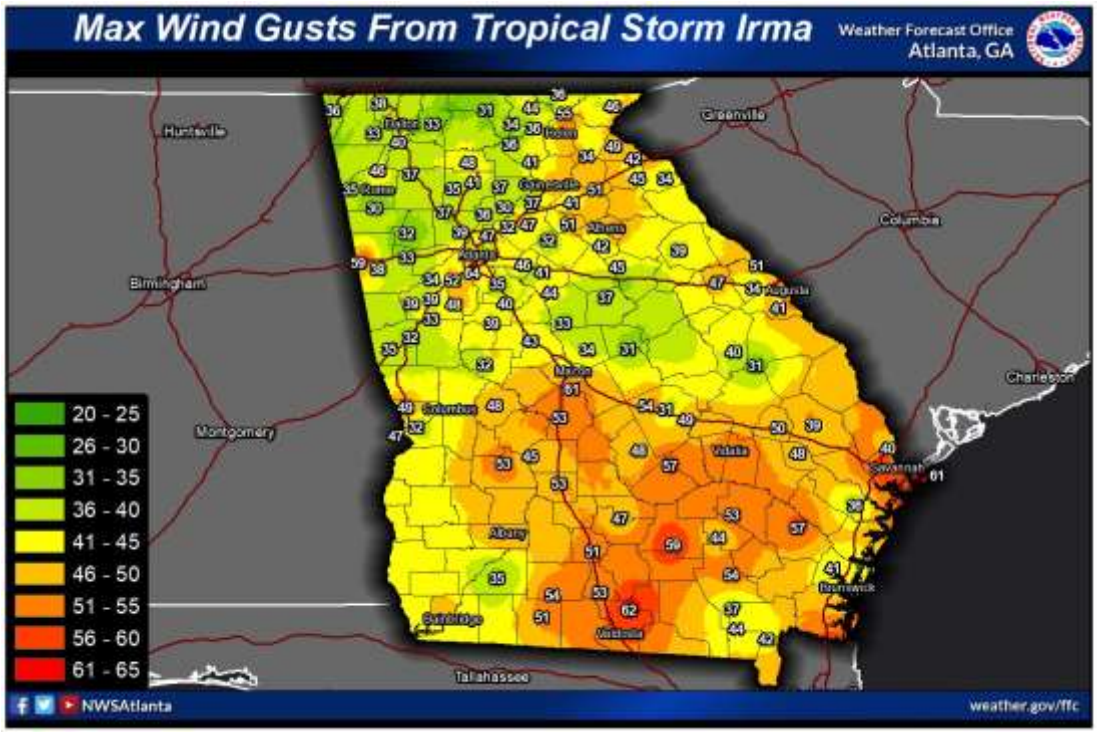
According to the 2019 Barrow County HAZUS, Barrow County has been impacted by 2 additional tropical cyclones in the last 50 years – Tropical Storm Jerry in 1995 and Hurricane Danny in 1997. Additionally, Barrow County was impacted by Hurricane Irma in 2017.

Natural Hazard: **Tropical Cyclone**



Source: 2019-2024 Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Tropical Cyclone**



Assets Exposed to the Hazard

The Barrow County HMPC determined that all critical facilities and all public and private property within Barrow County are susceptible to the direct and indirect impacts of a tropical cyclone. This includes all municipalities.

Estimated Potential Losses

Little information is available regarding damages, in terms of dollars, is available for tropical cyclone losses in Barrow County. Most losses for these events have been labeled under other impacts, such as tornadoes and flooding. However, the 2019 Barrow County HAZUS Report projected a loss ratio of 0.05% and a total loss of $2.9 million (47 buildings) for a 100-year (1% annual risk) Tropical Cyclone Event.

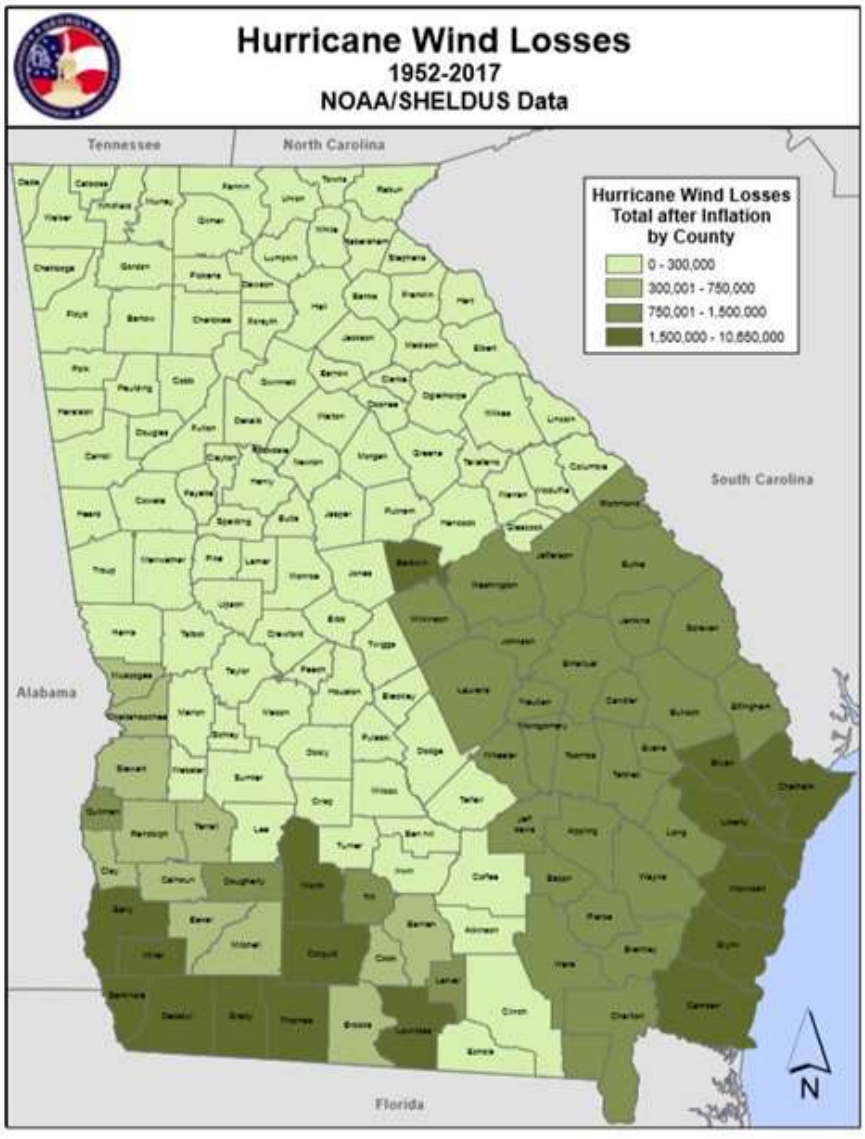
Land Use and Development Trends

Barrow County currently has no land use trends related to Tropical Cyclones.

Natural Hazard: **Tropical Cyclone**

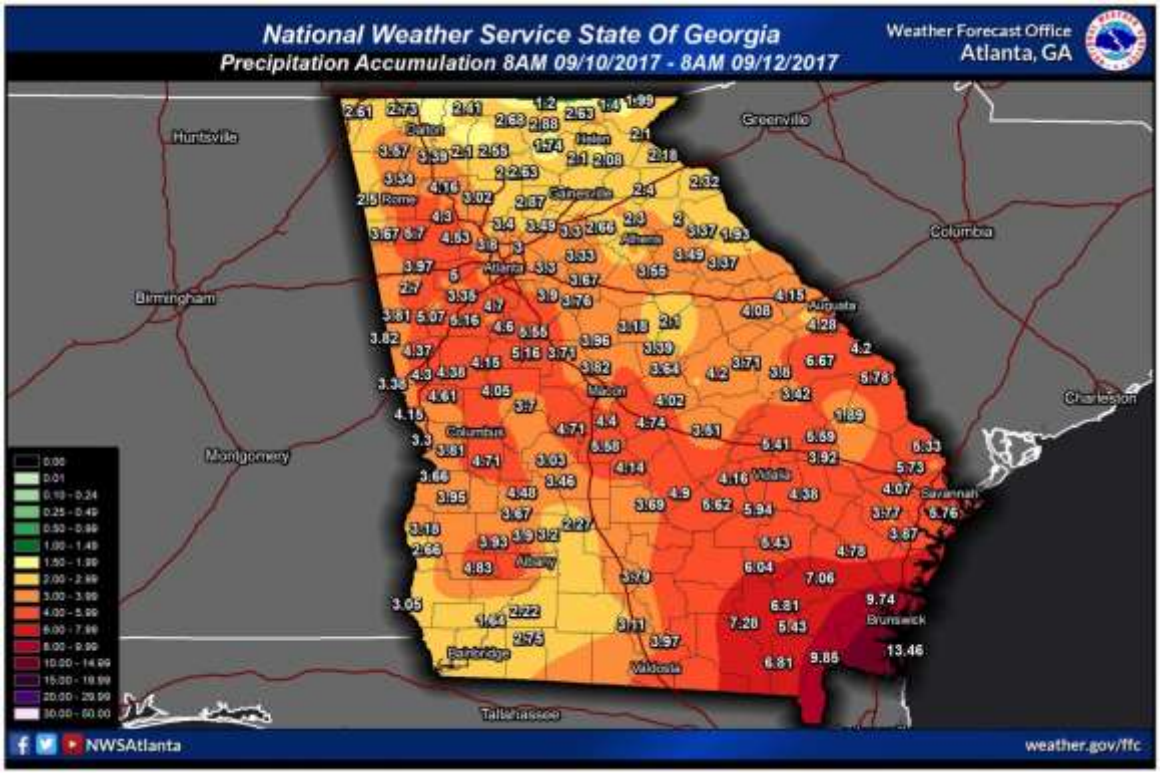
Multi-Jurisdictional Considerations

All of Barrow County, including all municipalities, could potentially be threatened by tropical cyclones. As such, all tropical cyclone mitigation actions should be pursued on a countywide basis and include all municipalities.



Source: 2019-2024 Georgia Hazard Mitigation Strategy and Enhanced Plan

Natural Hazard: **Tropical Cyclone**



Hazard Summary

Even with the relative infrequency of tropical cyclone impacts in Barrow County in the recent past, the potential losses and impacts associated with the event would severely damage the infrastructure and economic viability of Barrow County and all municipalities. Barrow County's proximity to the Atlantic coast increases the likelihood of a tropical cyclone impacting the area. The mitigation measures identified in this plan for tropical cyclones should be pursued based on the high impact potential of this hazard and the ability for tropical cyclones to inflict widespread devastation anywhere in Barrow County. Barrow County has had three Federally Declared Disaster related to Tropical Cyclones, most recently in 2017 (Individual Assistance and Public Assistance associated with Hurricane Irma).

Technological Hazard: **Hazardous Materials**

Hazard Description

Hazardous materials, or hazmat, refers to any materials that may pose a real hazard to human health and/or the environment because of its quantity, concentration, and/or physical or chemical characteristics. Hazardous materials include explosives, flammables, combustibles, oxidizers, toxic materials, radioactive substances, and corrosives. Specific federal and state regulations exist regarding the transport and storage of hazardous materials.

A hazardous materials spill or release occurs when a hazardous material gets into the environment in an uncontrolled fashion. Response to a hazmat spill or release depends greatly on the type of material involved and the subsequent physical and chemical characteristics. Major sources of hazardous materials spills include transportation accidents on roadways and railways, pipeline breaches, and spills into rivers and creeks. Jurisdictions with facilities that produce, process, or store hazardous materials are at risk, as are facilities that treat or dispose of hazardous materials.

Hazard Profile

Data from the United States Coast Guard National Response Center was reviewed regarding hazardous materials spill history in Barrow County. Data is available from 1982 to 2018 and all available data was reviewed. There were 72 NRC reported hazardous materials spills or releases in Barrow County over a 25-year period. It is anticipated that many more hazardous materials incidents have occurred over the last 25 years but have not been reported. According to the NRC data, Barrow County averages 2.9 hazardous materials incidents of a reportable amount each year. This equates to a 0.8% chance of a hazardous materials spill of a reportable amount on any given day. The greatest threat for a hazardous materials spill comes from the transportation of materials through Barrow County. This is particularly true for the Georgia Highway 316/US Highway 29 corridor that runs through the center of the county.

Hazardous materials releases can also be the result of railway or fixed facility incidents. Fixed facilities continue to be an increasing concern due to Barrow County's growing industrial footprint. 40% of reported hazardous materials incidents have occurred at fixed facilities.

Of concern to the Barrow County Hazard Mitigation Committee is the exposure of water sources to potential hazardous materials incidents. A hazardous materials incident at or near drinking water sources could have devastating effects on a large population in Barrow County.

Technological Hazard: **Hazardous Materials**

Assets Exposed to Hazard

The environment is particularly vulnerable to the threat posed by hazardous materials. Waterways are at a high risk for contamination from hazardous materials. Water contamination is of concern to the Barrow County HMPC. Public and private property located near fixed hazardous materials facilities are also a greater risk than the general population of Barrow County.

Estimated Potential Losses

Estimation of potential losses is difficult regarding hazardous materials due to the vast array of potential types of hazardous materials that could be involved in the incident and unknown costs regarding environmental damages. No recorded information was found regarding the losses associated with hazardous materials incidents in Barrow County. However, a hazardous materials release, whether in transport or at a fixed facility, would incur significant costs regarding emergency response, potential road closures, evacuations, watershed protection measures, expended man-hours, and cleanup materials, equipment, and personnel.

Land Use and Development Trends

Barrow County currently has no land use trends related to Hazardous Materials beyond continued population growth – particularly in and around the City of Winder and in the western part of Barrow County near Gwinnett County.

Multi-Jurisdictional Considerations

All of Barrow County, including all municipalities, are vulnerable to both fixed facility and transportation-related hazardous materials releases. However, areas along the Georgia Highway 316/US Highway 29 corridor.

Hazard Summary

Hazardous materials incidents pose a significant threat to the citizens, infrastructure, and critical facilities of Barrow County. Unknown quantities of hazardous materials are transported daily through Barrow County and all municipalities. These materials are transported via highways, with Georgia Highway 316/US Highway 29 being of greatest concern. Water contamination as a result of a hazardous materials spill is of significant concern to the Barrow County HMPC. As a result of the threat posed by hazardous materials, the Barrow County HMPC has identified mitigation actions directly related to this threat.

Technological Hazard: **Dam Failure**

Hazard Description

Georgia law defines a dam as any artificial barrier, which impounds or diverts water, is 25 feet or more in height from the natural bed of a stream or has an impounding capacity at maximum water storage evaluation of 100 acre-feet or more. Dams are generally constructed to provide a ready supply of water for drinking, irrigation, recreation, and other purposes. Dams can be constructed from earth, rock, masonry, concrete or any combination of these materials.

Dam failure is a term used to describe a significant breach of a dam and the subsequent loss of contained water. Dam failure can cause significant damages downstream to structures, roads, utilities, and crops. Dam failure can also put human and animal lives at risk. National statistics indicate that one-third of all dam failures in the United States are caused by overtopping due to inadequate spillway design, debris blocking spillways, or settlement of the dam crest. Another third of all US dam failures are the result of foundation defects, including settlement and slope instability.

Hazard Profile

There are 3 category I and 11 category II dams located within Barrow County. Category I dams are those that would pose a possible threat to human life if a failure were to occur. All category I dams must be inspected annually according to Georgia's Safe Dams Act.

The threat of a dam failure in Barrow County could potentially lead to downstream flooding. This downstream flooding would have many of the same hazards as a flood event, but with the onset of such an event being much quicker than in a typical flood event. The 49-foot tall Fort Yargo State Park Dam is of particular concern because of the large amount of water - nearly 7,500 acre-feet – stored behind the dam.

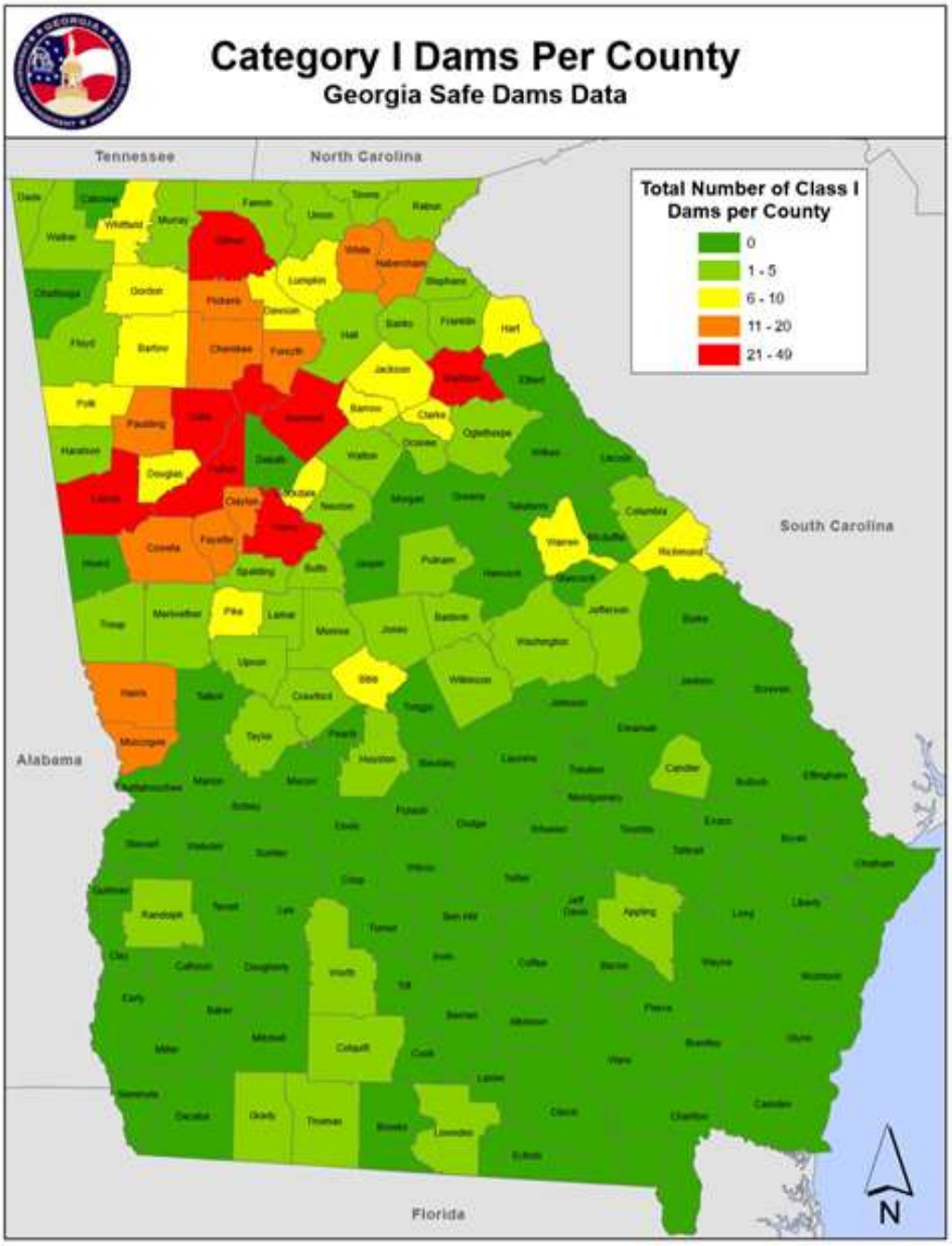
Assets Exposed to Hazard

To evaluate the assets that would potentially be impacted by a dam failure, the Barrow County HMPC attempted to identify known structures within, or close to, the 100-year floodplain. All municipalities could be exposed to the hazards of other dams or face secondary hazards from the category I dams.

Estimated Potential Losses

Loss estimations are not applicable since it is not known which dam will fail and how significant of failure will occur.

Technological Hazard: **Dam Failure**



Source: 2019-2024 State of Georgia Hazard Mitigation Strategy and Enhanced Plan

Technological Hazard: **Dam Failure**

Land Use and Development Trends

Barrow County participates in the National Flood Insurance Program (NFIP) and follows the program's guidelines to ensure future development is carried out in the best interests of the public. The County (CID No. 130497) first entered the NFIP on October 16, 1991. According to the NFIP guidelines, the County has executed a Flood Damage Prevention Ordinance. This ordinance attempts to minimize the loss of human life and health as well as minimize public and private property losses due to flooding. The ordinance requires any potential flood damage be evaluated at the time of initial construction and that certain uses be restricted or prohibited based on this evaluation. The ordinance also requires that potential homebuyers be notified that a property is located in a flood area. In addition, all construction must adhere to the Georgia State Minimum Standard Codes and the International Building Codes. Currently, the Barrow County municipalities of Auburn, Bethlehem, Braselton, Statham, and Winder also participate in NFIP through the application of appropriate NFIP-compliant ordinances and regulations.

Multi-Jurisdictional Considerations

During a dam failure event, many portions of Barrow County would potentially be impacted by flooding. However, the area's most prone to flooding have historically been those areas located within the 100-year floodplain and downstream from dams.

Hazard Summary

Dam failure poses a threat to Barrow County and its citizens, infrastructure, and critical facilities. A dam failure could prove catastrophic for areas downstream of the dam, particularly if the failure were to occur at any of the 3 Category I dams located in Barrow County. The Fort Yargo State Park Dam is of particular concern due to the size and potential impact that this dam could have if it breached. As a result, mitigation efforts for dam failure should be focused in this potentially affected area.

Technological Hazard: **Transportation Incident**

Hazard Description

There are many secondary hazards that could be associated with transportation incidents. Injuries or deaths can occur as a result of the impact of a transportation accident, by a hazardous materials release as a result of a transportation incident, or by other related transportations hazards. Transportation can occur via roadways, highways, interstates, railways, air or navigable waterways. Each transportation type poses their own unique hazard issues and consequences.

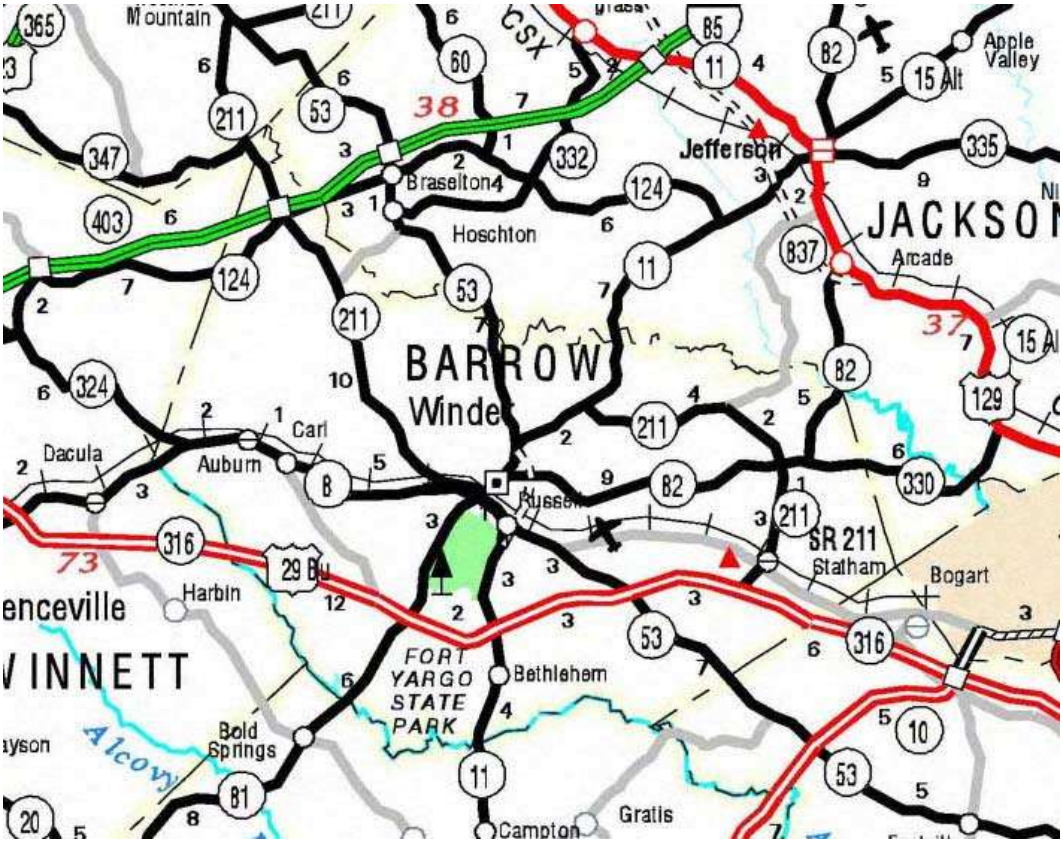
Roadway hazards are most likely to be caused by a motor vehicle accident involving one or more cars, trucks, vans, or transport vehicles. These incidents can have injuries as a result of the impact of the MVA or a hazardous materials release into the local environment, including waterways. Railway incidents pose many of the same dangers as motor vehicle accidents. However, the threat of a hazardous materials release is greatly increased when railway transportation incidents are considered.

Air accidents can include commercial airplanes, private airplanes, hot air balloons, helicopters, or other forms of air travel. Each of these incidents can cause a significant threat to human life as well as posing a hazardous material threat due to the cargo being transported or the fuel being used. Navigable waterway incidents can create formidable incidents for response organizations. Because of the waterway, technical expertise is needed to carry out rescue operations, especially in swift-moving waterways. Also, any incident in a waterway is likely to have environmental impacts.

Hazard Profile

Transportation incidents are of a significant concern in Barrow County. Passing through Barrow County are Interstate 85, US Highway 29, and Georgia Highways 8, 11, 53, 81, 82, 124, 211, 316, 324, and 330.

Technological Hazard: **Transportation Incident**



Assets Exposed to Hazard

All assets and critical facilities located along or near any transportation route could potentially be impacted by a transportation incident. Areas within Barrow County that are not located along or near a transportation route could still face residual impacts.

Estimated Potential Losses

Estimated potential losses cannot be anticipated with this event due to the vast number of differing scenarios regarding transportation incidents.

Land Use and Development Trends

Barrow County currently has no land use trends related to Transportation Incidents beyond an increase in overall population which, in turn, increases the likelihood and potential impact of a transportation incident. The primary areas of growth have been in and around the City of Winder and areas along the western portion of Barrow County near Gwinnett County.

Technological Hazard: **Transportation Incident**

Multi-Jurisdictional Considerations

Barrow County as well as all municipalities could potentially be impacted by a transportation incident. However, areas along Interstate 85 and the Georgia Highway 316/US Highway 29 corridor are the greatest at risk.

Hazard Summary

The Barrow County HMPC has determined that transportation incidents pose a high risk to their jurisdictions due to the unpredictable nature and likelihood of the incident. As a result, the Barrow County HMPC has developed mitigation strategies and actions with transportation incidents in mind.

Technological Hazard: **Terrorism**

Hazard Description

The Federal Bureau of Investigation (FBI) defines terrorism as violent acts or acts dangerous to human life that violate federal or state law, appear to be intended to intimidate or coerce a civilian population, affect the conduct of a government by mass destruction, assassination or kidnapping, and is calculated to influence or affect the conduct of a government by intimidation or retaliate against government conduct. Terrorism is usually referenced as being premeditated and politically motivated.

Terrorist acts are, by their very nature, designed and carried out with the intention of inflicting mass casualties and extensive property damage. When an act of terrorism is carried out in a jurisdiction, it will likely be necessary to implement multiple aspects of the emergency management system and summon additional resources from local, state, and federal partners.

Terrorism is generally divided into two types: domestic terrorism and international terrorism. Domestic terrorism is defined as terroristic acts focused on facilities and populations without foreign direction. International terrorism involves activities that are foreign-based and/or sponsored by organizations outside of the United States.

Terrorists often use threats to create fear among the public, to convince citizens that government is powerless to prevent terrorism and to get immediate publicity for their causes. Weapons of Mass Destruction (WMDs), including incendiary, explosive, chemical, biological, radiological and nuclear agents, have the capability to cause death or serious bodily injury to a significant number of people, thus posing the threat of a catastrophic incident. Terrorism can also include arson, agro-terrorism, armed attack, intentional hazardous materials release, water or food contamination, and attacks on infrastructure and electronic information systems.

Hazard Profile

Terrorism targets have historically been facilities that make a large economic or social impact on the targeted government or jurisdiction. In Barrow County, all critical facilities could be seen as potential targets. Terrorism includes a multitude of potential approaches, including agro-terrorism, which is terrorism targeted toward agriculture. Due to the high economic impact (over $19 million in annual agriculture-related sales) of agriculture in Barrow County, agro-terrorism could be of particular concern. Additionally, a terrorist contamination of the Still Branch Reservoir, which serves Pike and three other counties, is of particular concern.

Technological Hazard: **Terrorism**

Within Barrow County, there are many areas that could be viewed as potential targets for terrorism due to their economic impact on the area. This includes tourist-friendly areas, such as Chateau Elan near Braselton.

While active shooter situations are not always classified as terrorism, for this plan, the Barrow County HMPC has chosen to classify them as such. Active shooter situations can occur in any location, including businesses, schools, government buildings, and public spaces. Schools are seen as particularly vulnerable to these types of situations due to the high publicity of recent active shooter events. While active shooter events and other acts of terrorism occur worldwide, they have low probability for Barrow County but would have devastating impacts if they were to occur. To help mitigate some of these impacts, Barrow County has exercised an active shooter response in the past to better prepare for any such event.

Assets Exposed to the Hazard

Due to the unpredictable nature of terrorism, all public and private structures are threatened by the terrorism hazard. This includes all critical facilities.

Estimated Potential Losses

Losses due to terrorism are difficult to estimate due to the unpredictable nature of terrorism. The type of terrorist act carried out, location of the act, and the impact of the act would all affect the potential losses. Please see the critical facilities information for estimated potential losses for each critical facility.

Land Use and Development Trends

Barrow County currently has no land use trends related to Terrorism.

Multi-Jurisdictional Considerations

All of Barrow County, including all municipalities, are vulnerable to potential acts of terrorism. However, critical facilities and their surrounding areas are considered to be at the greatest risk.

Hazard Summary

Terrorism, while a low-probability hazard, would have devastating effects on Barrow County and all municipalities. These impacts would be immediate and long-lasting and could be potentially economically crippling to Barrow County and surrounding communities.

Technological Hazard: **Utility Failure**

Hazard Description

Utility infrastructures are particularly vulnerable to both natural and technological hazards. While a utility failure would most likely be a secondary hazard of one of the other hazards identified in this plan, a utility failure could be a solo incident itself.

A lack of connection with outside sources could lead to public panic, poor emergency response capabilities, and other domino hazards. These events pose a significant threat to many jurisdictions.

Hazard Profile

In case of any failure of a utility infrastructure, general difficulties would be exacerbated for both emergency responders and for the general public. The reliance on wireless communications, particularly for the public safety sector, increases the vulnerability of Barrow County's emergency response agencies to a utility failure.

Assets Exposed to Hazard

All assets and critical facilities within Barrow County could potentially be impacted by a utility failure.

Estimated Potential Losses

Estimated potential losses cannot be anticipated with this event due to the vast number of differing scenarios regarding utility failure.

Land Use and Development Trends

Barrow County currently has no land use trends related to utility failures beyond continued population growth.

Multi-Jurisdictional Considerations

Barrow County as well as all municipalities could potentially be impacted by a utility failure.

Hazard Summary

The Barrow County HMPC has determined that utility failures pose a high risk to their jurisdictions due to the unpredictable nature of the incident. As a result, the Barrow County HMPC has developed mitigation strategies and actions with utility failures in mind.

Technological Hazard: **Emergent Infectious Diseases**

Hazard Description

Microorganisms, such as bacteria, viruses, parasites, fungi, or prions, surround us within the environment. They can even be found within our own bodies. Most microorganisms are completely harmless, and many are actually beneficial. However, some of these organisms are pathogenic, meaning they cause or can cause disease. Infectious diseases are caused by these pathogenic organisms and are communicable – meaning they can be spread from person to person either directly or indirectly. Direct transmission of the disease occurs through actual physical contact with an infected person or their bodily fluids. Indirect transmission of a disease occurs when an infected person contaminates a surface by sneezing, coughing, etc., and a non-infected person comes into contact with that infected surface. Another means of indirect transmission includes vectors, such as mosquitos, flies, mites, ticks, fleas, rodents, or dogs, which may carry the pathogenic microorganism and transmit it to people via a bite. Infectious diseases can also impact animal populations, particularly livestock and other farm animals. Even though these diseases may not directly affect humans, the economic impact of these diseases can be just as harmful, if not more so, to the community.

Infectious diseases can occur as primary events or they may occur as a cascading result of another disaster, such as a tornado, flood, or winter weather. Infectious diseases can vary greatly in severity and magnitude. According to the World Health Organization, infectious diseases account for three of the ten leading causes of death worldwide – HIV/AIDS, lower respiratory infections, and diarrheal disease. These three events, combined with tuberculosis and malaria, account for 20% of deaths globally.

In Western countries, the impact of infectious diseases has diminished greatly over the last 75 years due to improved sanitation, personal hygiene, vaccinations, and the use of antibiotics. In the United States, only two infectious diseases – seasonal influenza and pneumonia – rank in the top ten leading causes of death. Annually, there are 1,500 deaths in the United States from seasonal influenza and another 52,000 from pneumonia. Children and older adults are the greatest at risk for both.

Emergent infectious diseases are those that are appearing in a population for the first time. Re-emergent infectious diseases are those that may have previously existed in a population, but levels had dropped to the point where it was no longer considered a public health problem until levels once again began increasing.

Technological Hazard: **Emergent Infectious Diseases**

During the last 25 years, emergent and re-emergent infectious diseases have been on the rise. The below table outlines some of the contributing factors to this rise:

Contributing Factors to Increasing Occurrence of Emergent Diseases
Agent-Related Factors
• Evolution of pathogenic infectious agents • Development of resistance to drugs • Resistance of disease carriers to pesticides
Host-Related Factors
• Human demographic changes (humans inhabiting new areas) • Human behavior (sexual practices and drug use) • Human susceptibility to infection
Environment-Related Factors
• Economic development and land use patterns • International travel and commerce • Deterioration of surveillance systems

Due to a lack of ready-made vaccines for these diseases and a lack of immunity in the population, emergent and re-emergent infectious diseases are much more likely to escalate to pandemic levels rapidly.

CDC-Identified Emergent and Re-Emergent Infectious Diseases	
Drug-resistant Infections	Mad Cow/Variant Creutzfeldt-Jakob Diseases
Campylobacteriosis	Chagas Disease
Cholera	Cryptococcosis
Cryptosporidiosis (Crypto)	Cyclosporiasis
Cysticercosis	Dengue Fever
Diphtheria	Ebola Hemorrhagic Fever
Group B Streptococcal Infection	Hantavirus Pulmonary Syndrome
Hepatitis C	Hendra Virus Infection
Histoplasmosis	HIV/AIDS
Influenza	Lassa Fever
Legionnaires' Disease and Pontiac Fever	Leptospirosis
Listeriosis	Lyme Disease
Malaria	Marburg Hemorrhagic Fever
Measles	Meningitis
Monkeypox	MRSA
Nipah Virus Infection	Norovirus Infection
Pertussis	Plague
Polio	Rabies
Rift Valley Fever	Rotavirus Infection
Salmonellosis	SARS
Shigellosis	Smallpox
Sleeping Sickness (Trypanosomiasis)	Tuberculosis
Tularemia	Valley Fever (Coccidioidomycosis)
VISA/VRSA	Staphylococcus Aureus
West Nile Virus Infection	Yellow Fever

Technological Hazard: **Emergent Infectious Diseases**

Hazard Profile

Emergent Infectious diseases are of significant concern to the Barrow County HMPC, particularly those that would have an impact on the human population or animal population of Barrow County. Barrow County would likely see significant economic impacts from an outbreak involving animal populations, such as an Avian Flu, due to the large economic base agriculture provides (over $19 million in annual sales). The lack of current vaccines and preparatory activities for these diseases has created a situation where the potential impact to Barrow County of a pandemic or epidemic could be catastrophic. The most recent pandemic scare in the Central Georgia area was the 2009-2010 H1N1 Swine Flu. There were 1286 cases of H1N1 in Georgia in 2009-2010 and 33 deaths. Most registered cases occurred with people between the ages of 5 and 29. This equates to a mortality rate of just over 2.5% - which is slightly lower than the 3% rate of the 1918-1919 Spanish Flu Pandemic.

Over the last 25 years, emergent infectious disease outbreaks have occurred in other parts of the country. These include:

- 1993 Cryptosporidium Outbreak (Milwaukee, Wisconsin – 403,000 people ill and 100 deaths)
- 2010 Whooping Cough Outbreak (California – 9,500 people ill and 10 infant deaths)
- 2014 Measles (Nationwide – 334 cases from January to May 2014 – most in 20 years)
- 2015 H5N2 Avian Flu Outbreak (Midwest – over 25 million chickens and turkeys destroyed as a precautionary measure at 83 locations)

Assets Exposed to the Hazard

Due to the unpredictable nature of emergent infectious diseases, all public and private structures are threatened by the hazard. This includes all critical facilities.

Estimated Potential Losses

Losses due to emergent infectious diseases are difficult to estimate due to the unpredictable nature of the hazard. The type of emergent infectious disease, location of the outbreak, and the impact of the outbreak would all affect the potential losses. Please see the critical facilities information for estimated potential losses for each critical facility.

Technological Hazard: **Emergent Infectious Diseases**

Land Use and Development Trends

Barrow County currently has no land use trends directly related to emergent infectious diseases.

Multi-Jurisdictional Considerations

All of Barrow County, including all municipalities, are vulnerable to emergent infectious diseases. However, livestock and other farm animals are considered to be the greatest at risk, along with areas with large, concentrated populations, such as schools.

Hazard Summary

An emergent infectious disease would have devastating effects on Barrow County and all municipalities. These impacts would be immediate and long-lasting and could be potentially economically crippling. Because of these considerations, the Barrow County HMPC has developed mitigation actions with emergent infectious diseases in mind.

CHAPTER FOUR
–
HAZARD MITIGATION STRATEGIES

Summary of Updates to Chapter Four

The following table provides a description of each section of this chapter, and a summary of the changes that have been made to the Barrow County Hazard Mitigation Plan 2015.

Chapter 4 Section	Updates
Goals and Objectives	• Updated goals to match the needs of Barrow County and all municipalities
Identification and Analysis of Mitigation Techniques	• Content Revised • Reviewed mitigation strategies identified in the 2015 plan and made updates • Identified mitigation strategies that were completed • Identified mitigation strategies to be removed
Multi-Jurisdictional Considerations	• Revised • Multi-Jurisdictional considerations listed for each identified hazard

Goals and Objectives

Requirement §201.6(c)(3)

Requirement §201.6(c)(3)(i)

It is important that State and local government, public-private partnerships, and the average citizen can see the results of these mitigation efforts, therefore, the goals and strategies need to be achievable. The mitigation goals and objectives form the basis for the development of specific mitigation actions. County and municipal officials should consider the listed goals before making community policies, public investment programs, economic development programs, or community development decisions for their communities. The goals of Barrow County have changed slightly in the last five years (since 2015) due to specific threat events, such as Hurricane Irma in 2017. Because of the recentness of the impacts of these hazards and the devastation that occurred, these types of events have taken a greater priority, particularly in the increased priority of mitigation strategies directly related to these events and the development of new mitigation strategies related to these hazards.

Each jurisdiction covered by the Barrow County Hazard Mitigation plan update – Barrow County and the Municipalities of Auburn, Bethlehem, Braselton, Carl, Statham, and Winder – has limited ability to fully implement the mitigation actions described in this plan. These jurisdictions are severely hampered by their small population and tax base when attempting to raise enough revenue to pursue many of these actions. All jurisdictions lack the needed financial strength and staffing to implement all the actions described in this plan. Many of the actions will be pursued through grant programs and by partnering with public and private organizations who can supplement the needed resources to accomplish the goals outlined in this plan. For actions where grant funding or partnerships are not available, Barrow County or municipality revenue streams may be supplemented through Special Purpose Local Option Sales Tax (SPLOST) funds, which are voted on by the electorate.

GOAL 1	Maximize the use of all resources by promoting intergovernmental coordination and partnerships in the public and private sectors
GOAL 2	Harden communities against the impacts of disasters through the development of new mitigation strategies and strict enforcement of current regulations that have proven effective
GOAL 3	Reduce and, where possible, eliminate repetitive damage, loss of life and property from disasters

GOAL 4 Bring greater awareness throughout the community about potential hazards and the need for community preparedness

These objectives state a more specific outcome that Barrow County strives to accomplish over the next five years. Action steps are the specific steps necessary to achieve these objectives. Objectives are not listed in order of importance.

OBJECTIVE 1	Reduce damage to property and loss of life from flooding
OBJECTIVE 2	Provide advanced severe weather warning
OBJECTIVE 3	Provide educational awareness to citizens regarding the dangers of natural hazards
OBJECTIVE 4	Implement initiatives for water conservation and wildfire protection
OBJECTIVE 5	Increase the ability of Barrow County, its municipalities, and its citizens to respond to natural and manmade hazards
OBJECTIVE 6	Maintain continuity of critical operations during and after hazard events
OBJECTIVE 7	Increase collaboration between local industry and emergency response agencies/departments
OBJECTIVE 8	Minimize the impacts on local citizens, industry, and infrastructure of a dam breach

Identification and Analysis of Mitigation Techniques

Requirement §201.6(c)(3)(iv)

Requirement §201.6(c)(3)(iii)

In updating Barrow County's mitigation strategy, a wide range of activities were considered in order to help achieve the mitigation goals and objectives. This includes the following activities as by the Emergency Management Accreditation Program (EMAP):

1) The use of applicable building construction standards;

2) Hazard avoidance through appropriate land-use practices;

3) Relocation, retrofitting, or removal of structures at risk;

4) Removal or elimination of the hazard;

5) Reduction or limitation of the amount or size of the hazard;

6) Segregation of the hazard from that which is to be protected;

7) Modification of the basic characteristics of the hazard;

8) Control of the rate of release of the hazard;

9) Provision of protective systems or equipment for both cyber and physical risks;

10) Establishment of hazard warning and communication procedures; and

11) Redundancy or duplication of essential personnel, critical systems, equipment, and information materials.

Part of the prioritization includes a general assessment according to the STAPLEE criteria, which stands for Social, Technical, Administrative, Political, Legal, Economic and Environmental. This process led to three designated priorities: High, Medium, and Low. Most items that require grant funding must undergo a full Benefit Cost Analysis to determine the action's actual cost effectiveness prior to funding. This process will be completed as part of the grant opportunity application process.

Strategy Priority	Priority Description	Strategies within this priority
LOW	Low priority strategies are those strategies that will have less direct impact on mitigating Barrow County's hazards, are in the early stages of strategy development, or score poorly on a preliminary cost-benefit analysis	**1.d; 1.q; 3.e; 4.a; 5.e; 5.g; 5.h; 5.p; 6.k; 6.l;**
MEDIUM	Medium priority strategies are those strategies that will have a direct impact on mitigation Barrow County's hazards but will not have as large of an anticipated impact as High Priority strategies or may be focused on hazards that are not as potentially impactful or prevalent for Barrow County. These strategies may be in the earlier stages of development or score mediocre on a preliminary cost-benefit analysis	**1.f; 1.o; 1.p; 2.a; 2.c; 3.a; 3.b; 3.c; 3.d; 3.f; 4.g; 4.h; 5.a; 5.f; 5.i; 5.l; 5.n; 5.o; 5.q; 6.a; 6.b; 6.c; 6.d; 6.e; 6.f; 6.i; 6.j; 6.o; 7.a; 7.b; 7.c; 8.a**
HIGH	High priority strategies are those strategies that would have a direct, large impact on mitigation Barrow County's hazards. These strategies are oftentimes well-established needs of Barrow County and/or all municipalities and have score high on a preliminary cost-benefit analysis	**1.a; 1.b; 1.c; 1.e; 1.g; 1.h; 1.i; 1.j; 1.k; 1.l; 1.m; 1.n; 2.b; 3.g; 4.b; 4.c; 4.d; 4.e; 4.f; 4.i; 5.b; 5.c; 5.d; 5.j; 5.k; 5.m; 6.g; 6.h; 6.m; 6.n; 6.p; 6.q; 6.r; 6.s; 7.d; 7.e; 7.f; 7.g; 7.h; 7.i; 7.j; 7.k; 7.l;**

The lead agency listed in the Mitigation Strategy charts will be responsible for the jurisdictional administration and implementation of the mitigation strategy prioritization. Prioritization was determined based on many factors. These include the likelihood of the event, the potential impact of the event, the current readiness posture of Barrow County for the event, the all-hazard impact of the mitigation strategy, and a cost-benefit analysis for the mitigation action. For example, mitigation actions that address high-likelihood, high-impact events with a low cost would rate higher than low-likelihood, high-impact events with a high cost.

All mitigation strategies considered by the Barrow County Hazard Mitigation Plan Update Committee can be classified under one of the following six (6) broad categories of mitigation techniques:

Prevention

Requirement §201.6(c)(3)(ii)

Preventative activities are intended to keep hazard problems from getting worse and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred, or capital improvements have not been substantial. Examples of preventative activities in this updated plan are listed in the following table:

Natural Hazards	Mitigation Strategies
Drought	4.b; 4.c; 4.d; 4.e; 4.f; 4.g; 6.m
Earthquake	6.m
Flood	1.a; 1.c; 1.d; 1.f; 1.g; 1.h; 1.i; 1.j; 1.k; 1.l; 1.m; 1.n; 1.p; 6.m
Thunderstorms	1.g; 1.h; 1.i; 1.j; 1.k; 1.l; 1.m; 1.n; 1.p; 6.m
Tornadoes	6.m
Tropical Cyclone	1.a; 1.c; 1.d; 1.f; 1.g; 1.h; 1.i; 1.j; 1.k; 1.l; 1.m; 1.n; 1.p; 6.m
Wildfire	4.f; 4.h; 6.m
Winter Storms	6.m
Technological Hazards	**Mitigation Strategies**
Dam Failure	
Hazardous Materials	7.d; 7.e; 7.f; 7.g
Terrorism	7.d; 7.e; 7.f; 7.g; 7.k
Transportation	
Utility Failure	7.d; 7.e; 7.f; 7.k
Emergent Infectious Diseases	7.g

Property Protection

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard or involve the removal of the structures from hazardous locations. Examples of property protection in this updated plan are listed in the following table:

Natural Hazards	Mitigation Strategies
Drought	
Earthquake	6.a; 6.b; 6.c; 6.d; 6.e; 6.f; 6.n; 6.r; 6.s
Flood	
Thunderstorms	6.a; 6.b; 6.c; 6.d; 6.e; 6.f
Tornadoes	6.a; 6.b; 6.c; 6.d; 6.e; 6.f; 6.n; 6.r; 6.s
Tropical Cyclone	6.a; 6.b; 6.c; 6.d; 6.e; 6.f; 6.n; 6.r; 6.s
Wildfire	
Winter Storms	6.a; 6.b; 6.c; 6.d; 6.e; 6.f; 6.n; 6.r; 6.s
Technological Hazards	**Mitigation Strategies**
Dam Failure	
Hazardous Materials	7.h
Terrorism	7.h; 7.j; 7.l
Transportation	
Utility Failure	
Emergent Infectious Diseases	7.h

Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas (ex: floodplains, wetlands, steep slopes, sand dunes) and their protective functions. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples of natural resource protection in this updated plan are listed in the following table:

Natural Hazards	Mitigation Strategies
Drought	
Earthquake	
Flood	
Thunderstorms	
Tornadoes	
Tropical Cyclone	
Wildfire	
Winter Storms	
Technological Hazards	**Mitigation Strategies**
Dam Failure	
Hazardous Materials	
Terrorism	
Transportation	
Utility Failure	
Emergent Infectious Diseases	

Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples of structural projects in this updated plan are listed in the following table:

Natural Hazards	Mitigation Strategies
Drought	
Earthquake	6.i
Flood	1.o; 1.q
Thunderstorms	1.o
Tornadoes	
Tropical Cyclone	1.o; 1.q; 6.i
Wildfire	
Winter Storms	6.i
Technological Hazards	**Mitigation Strategies**
Dam Failure	
Hazardous Materials	
Terrorism	
Transportation	
Utility Failure	
Emergent Infectious Diseases	

Emergency Services

Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples of emergency services in this updated plan are listed in the following table:

Natural Hazards	Mitigation Strategies
Drought	5.b; 5.c; 5.f; 5.l; 5.m; 5.n; 5.o; 6.g; 6.h; 6.p; 6.q
Earthquake	5.a; 5.b; 5.c; 5.d; 5.f; 5.g; 5.h; 5.i; 5.j; 5.k; 5.l; 5.m; 5.n; 5.o; 5.p; 5.q; 6.g; 6.h; 6.j; 6.k; 6.l; 6.o; 6.p; 6.q
Flood	1.e; 2.a; 2.c; 5.a; 5.b; 5.c; 5.d; 5.f; 5.g; 5.h; 5.i; 5.j; 5.l; 5.m; 5.n; 5.o; 6.g; 6.h; 6.j; 6.k; 6.l; 6.p; 6.q
Thunderstorms	1.e; 2.a; 2.c; 5.a; 5.b; 5.c; 5.d; 5.f; 5.g; 5.h; 5.i; 5.j; 5.l; 5.m; 5.n; 5.o; 6.g; 6.h; 6.j; 6.k; 6.l; 6.p; 6.q
Tornadoes	2.a; 2.b; 2.c; 5.a; 5.g; 5.c; 5.d; 5.f; 5.g; 5.h; 5.i; 5.j; 5.k; 5.l; 5.m; 5.n; 5.o; 6.g; 6.h; 6.j; 6.k; 6.l; 6.o; 6.p; 6.q
Tropical Cyclone	1.e; 2.a; 2.b; 2.c; 5.a; 5.g; 5.c; 5.d; 5.f; 5.g; 5.h; 5.i; 5.j; 5.k; 5.l; 5.m; 5.n; 5.o; 6.g; 6.h; 6.j; 6.k; 6.l; 6.o; 6.p; 6.q
Wildfire	4.a; 4.g; 5.b; 5.c; 5.d; 5.f; 5.h; 5.j; 5.l; 5.m; 5.n; 5.o; 5.p; 5.q; 6.g; 6.h; 6.p; 6.q
Winter Storms	2.a; 2.b; 2.c; 5.b; 5.c; 5.d; 5.f; 5.h; 5.l; 5.m; 5.n; 5.o; 6.g; 6.h; 6.j; 6.k; 6.l; 6.p; 6.q
Technological Hazards	**Mitigation Strategies**
Dam Failure	8.a
Hazardous Materials	7.a; 7.b; 7.c
Terrorism	7.a; 7.b; 7.c; 7.i; 8.a
Transportation	7.b; 7.c
Utility Failure	
Emergent Infectious Diseases	7.i

Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques that they can use to protect themselves and their property. Examples of public education and awareness strategies in this updated plan are listed in the following table:

Natural Hazards	Mitigation Strategies
Drought	3.c; 3.e; 5.e
Earthquake	3.b; 3.c; 3.e; 5.e
Flood	1.b; 3.a; 3.b; 3.c; 3.e; 3.f; 5.e
Thunderstorms	3.a; 3.b; 3.c; 3.d; 3.e; 3.f; 3.g; 5.e
Tornadoes	3.a; 3.b; 3.c; 3.d; 3.e; 3.f; 3.g; 5.e
Tropical Cyclone	1.b; 3.a; 3.b; 3.c; 3.d; 3.e; 3.f; 3.g; 5.e
Wildfire	3.c; 3.e; 5.e
Winter Storms	3.b; 3.c; 3.e; 3.f; 3.g; 5.e
Technological Hazards	**Mitigation Strategies**
Dam Failure	
Hazardous Materials	
Terrorism	
Transportation	
Utility Failure	
Emergent Infectious Diseases	

Overall

Mitigation Technique	Percentage
Prevention	31.3%
Property Protection	13.3%
Natural Resource Protection	0.0%
Structural Projects	3.6%
Emergency Services	41.0%
Public Education and Awareness	10.8%

The following Mitigation Charts meet:
Requirement §201.6(c)(3)(ii)
Requirement §201.6(d)(3)

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
OBJECTIVE 1: Reduce damage to property from flooding																
1.a	Update floodplain mapping in GIS as new FEMA maps are released	Barrow County Planning and Zoning and GIS *Barrow County and all municipalities*	**X**				**X**				Local government budgets	Staff time	12 months	**In Place; Continue**	**High**	**NEW**
1.b	Promote NFIP to the public utilizing maps in the Planning and Zoning Office, including providing copies of FIRM maps for location	Barrow County Planning and Zoning and GIS *Barrow County and all municipalities*	**X**				**X**				Local government budgets	Staff time	12 months	**Promotion in Place**	**High**	**P-2 (mod)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
1.c	Adopt new FEMA flood maps as they become available	Barrow County Planning and Zoning *Barrow County and all municipalities*	**X**				**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
1.d	Obtain address attributes for the "road centerline" map layer to achieve the full benefits of GIS technology within the county and municipalities	Barrow County GIS *Barrow County and all municipalities*	**X**				**X**				Public and private grants, and/or local government budgets	$8,000	2 years	**Working on update process**	**Low**	**P-3**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
1.e	Continue to implement procedure by which response personnel would report to E-911 the existence of any road or bridge hazard, or areas that appear to be experiencing flooding	Barrow County 911 *Barrow County and all municipalities*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**In place; Continue**	**High**	**Braselton P-3 (mod)**
1.f	Research CRS Program requirements for Barrow County and municipalities	Barrow County EMA and Barrow County Planning and Zoning *Barrow County and all municipalities*	**X**				**X**				Local budgets	Staff time	36 months	**NEW**	**Medium**	**Modified from PP-1**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
1.g	Continue to participate in NFIP	Barrow County Board of Commissioners *Barrow County and all municipalities*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**In Place; Continue**	**High**	**Modified from PP-1**
1.h	Continue to participate in NFIP	Auburn City Council *City of Auburn*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
1.i	Continue to participate in NFIP	Winder City Council *City of Winder*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
1.j	Continue to participate in NFIP	Statham City Council *City of Statham*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
1.k	Continue to participate in NFIP	Bethlehem City Council *City of Bethlehem*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
1.l	Continue to participate in NFIP	Braselton Town Council *Town of Braselton*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
1.m	Obtain NFIP Compliance	Carl Town Council *Town of Carl*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
1.n	Continue annual inspection of culverts	Barrow County Public Works *Barrow County and all municipalities*	**X**		**X**		**X**				Local budgets	Staff time	12 months	**In place; Continue**	**High**	**Modified from SP-1**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
1.o	Replace culverts in Barrow County and all municipalities, as needed	Barrow County and municipal Public Works Departments *Barrow County and all municipalities*	**X**		**X**		**X**				Public and private grants and/or local budgets	$5 million	60 months	**NEW**	**Med**	**NEW**
1.p	Perform a stormwater study to determine best culvert sizes and types to meet the stormwater needs of Barrow County and all municipalities	Barrow County and municipal Public Works Departments *Barrow County and all municipalities*	**X**		**X**		**X**				Public and private grants and/or local budgets	$500,000	60 months	**NEW**	**Med**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
1.q	Build a flood wall near Spring House Senior Living Facility	Spring House Senior Living Facility *Barrow County and City of Statham*	**X**				**X**				Public and private grants and/or local budgets	$250,000	60 months	**NEW**	**Low**	**NEW**
OBJECTIVE 2: Provide advanced severe weather warning																
2.a	Purchase NOAA Weather radios for elderly and low-income persons and offer them to the community	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**				Public and private grants and/or local budgets	$20,000	36 months	**NEW**	**Med**	**NEW**
2.b	Renew Storm Ready designation every three years	Barrow County EMA and National Weather Service *Barrow county and all municipalities*		**X**	**X**	**X**	**X**				Local and Federal budgets	Staff time	36 months	**NEW**	**High**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
2.c	Explore funding options to obtain more NOAA weather radios to place in locations where there are generally larger concentrations of people	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**				Public and private grants and/or local budgets	$2,500	18 months	**NEW**	**Med**	**NEW**
OBJECTIVE 3: Provide educational awareness to citizens regarding the dangers of natural hazards																
3.a	Encourage the public to examine their homeowner's insurance policies to ensure they cover wind and flood damage	Barrow County EMA *Barrow County and all municipalities*	**X**		**X**	**X**	**X**				Public Budgets	Staff time	12 months	**NEW**	**Med**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
3.b	Encourage the public to pursue renter's insurance if it applies to them	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**			**X**	Public Budgets	Staff time	12 months	**NEW**	**Med**	**NEW**
3.c	Revise public awareness documents and trainings to more adequately meet the needs of the community	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Public and private grants and/or local budgets	$10,000	36 months	**NEW**	**Med**	**Modified from ES-3**
3.d	Continue to hold StormSpotter classes every two years	Barrow County EMA and National Weather Service *Barrow County and all municipalities*			**X**	**X**					Local and Federal budgets	Staff time	24 months	**NEW**	**Med**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
3.e	Establish a "Hazard Identification, Preparedness, and Mitigation" section in the local libraries to increase local awareness of hazards	Barrow County libraries with support from Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Public and private grants and/or local budgets	$25,000	60 months	**None, due to lack of funding**	**Low**	**PEA-1**
3.f	Education the public about utilizing NOAA Weather Radios	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**				Local budgets	Staff time	24 months	**NEW**	**Med**	**NEW**
3.g	Encourage sign up for Everbridge Mass Notification System	Barrow County EMA *Barrow County and all municipalities*		**X**	**X**	**X**	**X**				Public and private budgets	$10,000	24 months	**NEW**	**High**	**NEW**
OBJECTIVE 4: Implement initiatives for water conservation and wildfire protection																

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
4.a	Utilize Air Curtain for prescribed burns and GFC Wildfire support operations	Barrow County and municipal fire departments *Barrow County and all municipalities*							**X**		Public and private grants and/or local budgets	$50,000	60 months	**NEW**	**Low**	**NEW**
4.b	Maintain drought contingency plan	Barrow County and municipal water departments *Barrow County and all municipalities*						**X**			Local budgets	$5,000	12 months	**In Place; Continue**	**High**	**P-6 (a)**
4.c	Preplan for drought conditions when designing water systems	Barrow County and municipal water departments *Barrow County and all municipalities*						**X**			Public and private grants and/or local budgets	$2,500	12 months (Continuous)	**In Place; Continue**	**High**	**P-6(b)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
4.d	Encourage water customers to conserve as much water as possible	Barrow County and municipal water departments *Barrow County and all municipalities*						**X**			Public budgets	Staff time	12 months	**In Place; Continue**	**High**	**P-6 (c)**
4.e	Review Barrow County's existing outdoor watering ban regulations	Barrow County Code Enforcement *Barrow County and all municipalities*						**X**			Public Budgets	Staff time	12 months	**In Place; Review to be completed**	**High**	**P-6 (d)**
4.f	Increase inspection rate on water tanks, water lines, and water mains for small leaks and repair, as needed	Barrow County and municipal water departments *Barrow County and all municipalities*						**X**	**X**		Public Budgets	Staff time for inspections	12 months	**Inspections in place**	**High**	**P-6 (e)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
4.g	Explore additional water source opportunities	Barrow County and municipal water departments *Barrow County and all municipalities*						**X**			Public and private grants and/or local budgets	$50 million	5+ years	**None, due to budgetary constraints**	**Med**	**P-6 (f)**
4.h	Coordinate a community "clean-up" day and encourage individual landowners to create a fire safe environment through vegetation maintenance and removal	Barrow County and municipal Fire Departments; Rivers Alive Program; GFC *Barrow County and all municipalities*							**X**		Local and Private funds	Staff time	36 months	**Clean-up Days are held twice a year; coordinated by Rivers Alive Program**	**Med**	**Braselton P-4b**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
4.g	Update the Barrow County Community Wildfire Protection Plan	Georgia Forestry *Barrow County and all municipalities*							**X**		State and Local Budgets	Staff time	18 months	**NEW**	**High**	**NEW**
OBJECTIVE 5: Increase the ability of Barrow County, its municipalities, and its citizens to respond to natural and manmade hazards																
5.a	Open discussion with American Red Cross regarding shelter operations and expectations/ abilities of ARC shelters	Barrow County EMA *Barrow County and all municipalities*	**X**			**X**	**X**			**X**	Public and Private Budgets	Staff time	24 months	**NEW**	**Med**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.b	Update Local Emergency Operations Plan Every four years	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Public budgets	Staff time	48 months	**Complete with Annexes added; Continue**	**High**	**P-5 (mod)**
5.c	Identify key facilities for potential EOCs and provide emergency maps and logistical supplies	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Public and private grants and/or local budgets	$200,000	60 months	**Some facilities reviewed**	**High**	**P-7 (c)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.d	Create local emergency action plan in accordance with NIMS Standards	Barrow County EMA and local response agencies *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**		**X**	**X**	Local budgets	Staff time	36 months	**NEW**	**High**	**NEW**
5.e	Offer the public and private sector and commercial businesses assistance in developing safety plans specific to their areas for natural hazards	Barrow County EMA and local response agencies *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Public and private grants and/or local budgets	$25,000	60 months	**Police Dept. assist with manmade hazards, but not natural**	**Low**	**Braselton P-2 (mod)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.f	Keep critical facility information updated in GMIS database	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	24 months	**Updated for 2019 Hazard Mitigation Plan**	**Med**	**P-9**
5.g	Update American Red Cross sheltering survey database for Barrow County	American Red Cross *Barrow County and all municipalities*	**X**			**X**	**X**			**X**	Private Budgets	Staff time	24 months	**NEW**	**Low**	**NEW**
5.h	Increase CERT Team Coordination with ARES and American Red Cross	Barrow County CERT, ARES, and ARC *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**		**X**	**X**	Public and private funds	Staff time	24 months	**NEW**	**Low**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.i	Form partnership with local organizations/ churches/ houses of worship to identify sites for evacuation and post-impact sheltering	Barrow County EMA and local organizations *Barrow County and all municipalities*	**X**			**X**	**X**			**X**	Public and private funds	Staff time	24 months	**NEW**	**Med**	**Combo and modified ES-4, ES-5, and ES-6**
5.j	Explore funding opportunities to purchase mobile electronic signage	Barrow County EMA and local response agencies *Barrow County and all municipalities*	**X**			**X**	**X**		**X**	**X**	Public and private grants and/or local budgets	$20,000	36 months	**NEW**	**High**	**ES-8 (mod)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.k	Purchase chippers for county and municipal public works agencies	Barrow County and municipal public works agencies *Barrow County and all municipalities*			**X**	**X**	**X**			**X**	Public and private grants and/or local budgets	$250,000	48 months	**None, due to budgetary constraints**	**High**	**ES-10**
5.l	Hold EOC/ESF Training through GEMA for Barrow County and municipal agencies so they understand their disaster roles	Barrow County EMA, GEMA, and local agencies *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	State and Local budgets	Staff time	24 months	**NEW**	**Med**	**NEW**
5.m	Continue the implementation of EMA coalition with county and municipal leaders	Barrow County EMA and county and municipal leaders *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	12 months	**In Place; Continue**	**High**	**PEA-1 (a)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.n	Host pre-disaster training for county and municipal Finance and Records Mgmt. personnel	Barrow County EMA, Barrow County and municipal finance departments *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local and State budgets	Staff time	36 months	**NEW**	**Med**	**NEW**
5.o	Host pre-disaster course for administrative personnel	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	36 months	**NEW**	**Med**	**NEW**
5.p	Purchase foam truck for Airport fire response capabilities	Barrow County and Winder Fire Departments *Barrow County and all municipalities*							**X**	**X**	Public and private grants and/or local budgets	$300,000	60 months	**NEW**	**Low**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
5.q	Purchase foam creation and application device for airport fire response capabilities	Barrow County and Winder Fire Departments *Barrow County and all municipalities*							**X**	**X**	Public and private grants and/or local budgets	$75,000	60 months	**NEW**	**Med**	**NEW**
OBJECTIVE 6: Maintain continuity of critical operations during and after hazard events																
6.a	Identify facilities that have generators and those that need generators	Essential facility operators; Barrow County EMA *Barrow County and all municipalities*		**X**	**X**	**X**	**X**			**X**	Local and Private budgets	Staff time	24 months	**In progress**	**Med**	**P-7 (b)**
6.b	Purchase a generator for the Town of Bethlehem	Bethlehem town council *Town of Bethlehem*		**X**	**X**	**X**	**X**			**X**	Public and private grants and/or local budgets	$75,000	36 months	**NEW**	**Med**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
6.c	Purchase a generator for DFCS/Public Health	DFCS/Public Health *Barrow County and all municipalities*		**X**	**X**	**X**	**X**			**X**	Public and private grants and/or local budget	$50,000	36 months	**NEW**	**Med**	**NEW**
6.d	Purchase generator for Carl City Hall	Carl City Council *City of Carl*		**X**	**X**	**X**	**X**			**X**	Public and private grants and/or local budget	$50,000	36 months	**NEW**	**Med**	**NEW**
6.e	Purchase a generator for the Highway 53 Treatment Plant	Barrow County Water Department *Barrow County and all municipalities*		**X**	**X**	**X**	**X**			**X**	Public and private grants and/or local budget	$250,000	36 months	**NEW**	**Med**	**NEW**
6.f	Purchase a generator for Barrow County Fire Department Stations 1, 2, 3, 4, and 5	DFCS/Public Health *Barrow County and all municipalities*		**X**	**X**	**X**	**X**			**X**	Public and private grants and/or local budget	$50,000 each station	36 months	**NEW**	**Med**	**NEW**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
6.g	Update City of Auburn COOPs, as needed	City of Auburn Administration *City of Auburn*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	60 months	**COOP completed**	**High**	**P-9 (mod)**
6.h	Create a COOP for Barrow County	Barrow County EMA and all Barrow County agencies *Barrow County*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Public and private grants and/or local budgets	$20,000	48 months	**NEW**	**High**	**NEW**
6.i	Explore a roundabout for the Highway 11 and Highway 53 intersection	*City of Winder Planning Department and Georgia DOT* City of Winder		**X**			**X**			**X**	Public and private grants and/or state and local budgets	$5 million	48 months	**Funding in place from DOT; Project on hold**	**Med**	**P-6**
6.j	Update electronic backup records, as needed for Barrow County	Barrow County Board of Commissioners *Barrow Country*	**X**	**X**		**X**	**X**			**X**	Public and private grants and/or local budgets	$50,000	60 months	**NEW**	**Med**	**Modified from SP-2**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
6.k	Have the Historical Society take video and pictures of county buildings to record in case of damage	Barrow County Historical Society and Barrow County Administration *Barrow County*	**X**	**X**		**X**	**X**			**X**	Public and private grants and/or local budgets	$7,500	36 months	**NEW**	**Low**	**New**
6.l	Have the Historical Society take video and pictures of City of Auburn buildings to record in case of damage	Barrow County Historical Society and City of Auburn Administration *City of Auburn*	**X**	**X**		**X**	**X**			**X**	Public and private grants and/or local budgets	$5,000	36 months	**NEW**	**Low**	**New**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
6.m	Update Barrow County Emergency Management ordinances to reflect the activation and declaration of local states of emergency	Barrow County EMA and Board of Commissioners *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	24 months	**Ordinances in place; need updating**	**High**	**ES-6 (mod)**
6.n	Investigate funding options to provide back-up power generators at critical facilities – particularly those housing vulnerable populations, such as nursing homes, personal care homes, and hospitals	Barrow County EMA and Critical Facility Operators *Barrow County and all municipalities*		**X**		**X**	**X**			**X**	Public and private grants and/or local budgets	$200,000	60 months	**Funding opportunities explored**	**High**	**Braselton ES-6**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
6.o	Create Pre-Disaster Debris Contracts	Barrow County Purchasing *Barrow County and all municipalities*			**X**	**X**	**X**			**X**	Local budgets	Staff time	24 months	**NEW**	**Med**	**NEW**
6.p	Encourage all county and municipal agencies to participate in each other's emergency initiatives to show united front	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	12 months	**NEW**	**High**	**NEW**
6.q	Identify internal and external stakeholders and educate them about emergency management plans and operations	Barrow County EMA *Barrow County and all municipalities*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	Local budgets	Staff time	24 months	**In place; Ongoing**	**High**	**PEA-3 (b)**

Strategy #	Mitigation Action	Lead and Supporting Agency, Department, Organization *Jurisdiction*	Flood	Winter Weather	Thunderstorm	Tornado	Tropical Cyclone	Drought	Wildfire	Earthquake	Funding Source	Estimated Cost	Completion Timeframe	Progress/ Status	Priority	Previous Strategy Number
6.r	Add a generator at the Barrow County Sheriff's Office	Barrow County Sheriff's Office *Barrow County and all municipalities*		**X**		**X**	**X**			**X**	Public and private grants and/or local budgets	$100,000	48 months	**NEW**	**High**	**NEW**
6.s	Add a generator to the 8th Street pump station in Statham	Statham Water Department *City of Statham*		**X**		**X**	**X**			**X**	Public and private grants and/or local budgets	$25,000	48 months	**NEW**	**High**	**NEW**

Strategy #	Mitigation Action	Lead and *Supporting* Agency, Department, Organization	Dam Failure	Hazardous Materials	Terrorism	Transportation	Utility Failure	Emergent Inf. Disease	Funding Source	Estimated Cost	Completion Timeframe	Progress / Status	Priority	Previous Strategy Number
OBJECTIVE 7: Increase collaboration between local industry and emergency response agencies/departments														
7.a	Develop a report of needed equipment, apparatus, training, and manpower to respond to hazardous materials events and purchase, as needed	Barrow County and municipal fire departments *Barrow County and all municipalities*		**X**	**X**				Public and private grants and/or local budgets	$100,000	60 months	**Current capability assessment complete**	**Med**	P-7 (b)
7.b	Establish a railroad accident emergency response plan	Barrow County EMA *Barrow County and all municipalities*		**X**	**X**	**X**			Public and private grants and/or local budgets	$10,000	48 months	**None, due to budgetary constraints**	**Med**	P-8

Strategy #	Mitigation Action	Lead and *Supporting* Agency, Department, Organization	Dam Failure	Hazardous Materials	Terrorism	Transportation	Utility Failure	Emergent Inf. Disease	Funding Source	Estimated Cost	Completion Timeframe	Progress / Status	Priority	Previous Strategy Number
7.c	Work with CSX to determine rail cargo hazards that pass-through Barrow County	Barrow County EMA *Barrow County and all municipalities*		**X**	**X**	**X**			Local and private funds	Staff time	24 months	**NEW**	**Med**	**NEW**
7.d	Establish water system safety and security analysis for City of Auburn	City of Auburn Water Department *City of Auburn*		**X**	**X**		**X**		Public and private grants and/or local budgets	$10,000	36 months	**NEW**	**High**	Modified from PP-4
7.e	Establish water system safety and security analysis for Barrow County	Barrow County Water Department *Barrow County*		**X**	**X**		**X**		Public and private grants and/or local budgets	$10,000	36 months	**NEW**	**High**	Modified from PP-4

Strategy #	Mitigation Action	Lead and *Supporting* Agency, Department, Organization	Dam Failure	Hazardous Materials	Terrorism	Transportation	Utility Failure	Emergent Inf. Disease	Funding Source	Estimated Cost	Completion Timeframe	Progress / Status	Priority	Previous Strategy Number
7.f	Establish water system safety and security analysis for City of Statham	City of Statham Water Department *City of Statham*		**X**	**X**		**X**		Public and private grants and/or local budgets	$10,000	36 months	**Complete for Water Plant, Broad Street Springs**	**High**	Statham PP-4
7.g	Perform Security assessment at NE Georgia Medical Center – Barrow and increase security as recommended	Northeast Georgia Medical Center – Barrow *Barrow County and all municipalities*		**X**	**X**			**X**	Public and private grants and/or local or private budgets	$10,000	24 months	**NEW**	**High**	NEW
7.h	Create and/or implement an electronic locking system that allows the hospital to be locked down	Northeast Georgia Medical Center – Barrow *Barrow County and all municipalities*		**X**	**X**			**X**	Public and private grants and/or private budgets	$100,000	48 months	**NEW**	**High**	NEW

Strategy #	Mitigation Action	Lead and *Supporting* Agency, Department, Organization	Dam Failure	Hazardous Materials	Terrorism	Transportation	Utility Failure	Emergent Inf. Disease	Funding Source	Estimated Cost	Completion Timeframe	Progress / Status	Priority	Previous Strategy Number
	quickly and efficiently													
7.i	Train on interoperability with hospital security personnel	Barrow County law enforcement agencies *Barrow County and all municipalities*			**X**			**X**	Local and private budgets	Staff time	24 months	**NEW**	**High**	NEW
7.j	Enhance the security of all government facilities	Barrow County and municipal administration *Barrow County and all municipalities*			**X**				Public and private grants and/or local budgets	$5 million	60+ months	**Courthouse security in place; CIP approved in 2018; keycard in access in some places; Tag/Tax Comm**	**High**	ES-7

Strategy #	Mitigation Action	Lead and *Supporting* Agency, Department, Organization	Dam Failure	Hazardous Materials	Terrorism	Transportation	Utility Failure	Emergent Inf. Disease	Funding Source	Estimated Cost	Completion Timeframe	Progress / Status	Priority	Previous Strategy Number
												office has ballistic glass		
7.k	Perform security site assessments for all government facilities	Barrow County SWAT *Barrow County and all municipalities*			**X**		**X**		Local budgets	Staff time	24 months	**In Place; Continue**	**High**	NEW
7.l	Enhance the security and exterior access at the 911 Center	Barrow County 911 *Barrow County and all municipalities*			**X**				Public and private grants and/or local budgets	$15,000	36 months	**NEW**	**High**	NEW
OBJECTIVE 8: Minimize the impacts on local citizens, industry, and infrastructure of a dam breach														

Strategy #	Mitigation Action	Lead and *Supporting* Agency, Department, Organization	Dam Failure	Hazardous Materials	Terrorism	Transportation	Utility Failure	Emergent Inf. Disease	Funding Source	Estimated Cost	Completion Timeframe	Progress / Status	Priority	Previous Strategy Number
8.a	Develop Emergency Action Plans for all categorized Dams in Barrow County	Barrow County EMA; Georgia Safe Dams; Dam Owners/ Operators *Barrow County and all municipalities*	**X**		**X**				Public funds	$15,000	48 months	**Done for Fort Yargo and City Pond**	**Med**	P-4

Completed Strategies

Previous Strategy #	Strategy Description	Status
P-7 (Auburn)	Although the majority of this Critical Facilities database is complete, some information is not available at this time. Therefore, the completion of this database has been added as an additional mitigation action in this Plan.	COMPLETE
P-1 (Braselton)	Include in communications planning and interface procedure whereby local media and public safety and public service personnel can be alerted and air the alert of impending tornado	COMPLETE
P-3 (Braselton)	Incorporate into communications planning a procedure by which response personnel would report to E-911 the existence of any road or bridge hazard, or areas that appear to be experiencing flooding	COMPLETE
PP-4	Make application to participate in FEMA's NFIP Community Rating System in order to enhance flood plain management practices and thereby reducing exposure to flooding and reducing individual insurance rates	COMPLETE
PP-1	Take the steps necessary to make the Town of Bethlehem an active participant in the NFIP	COMPLETE
SP-1	A plan to ensure these bridges and culverts are sound and properly maintained may be helpful to prevent any potential roadway failures. Some structure components require inspection of log jams, pushing on piles, bracing, seal joints, spalls, corrosion, bolts, pile and beam rehabilitation, scour, undermining, grout voids, deck joints, painting and sealing bents, encasing piles, riprap, dowel, wingwall rehab, and large diameter CMPs.	COMPLETE
SP-2	Construct a records storage facility to hold physical and electronic records of all county departments	COMPLETE
ES-4	Establish the National Weather Service "Storm ready Program" within Barrow County and to include each municipality	COMPLETE

ES-2 (Braselton)	Explore funding options to support a reverse E-911 or similar warning system	COMPLETE
ES-3 (Braselton)	Facilitate storm spotter training for public safety personnel and the public in cooperation with the National Weather Service	COMPLETE
PEA-3	Enhanced Emergency Management Operations and Awareness	COMPLETE
PEA-1 (Braselton)	Develop partnership between local responders, public safety personnel, communications, and the local media to allow for the airing of PSA's and pertinent warning information regarding hazards associated with severe thunderstorms and tornadoes	COMPLETE
PEA-2 (Braselton)	Make available personnel to publicly speak to groups about the hazards of severe thunderstorms, tornadoes, and winter storms	COMPLETE
PEA-4 (Braselton)	Develop partnership between local and state response agencies and organizations, public service agencies and organizations, and the local media whereby PSA's and pertinent information regarding the hazards associated with winter storms may be aired to the public as well as information about preventative and protective measures that the individual can take	COMPLETE

Deleted Strategies

Previous Strategy #	Strategy Description	Reason
PP-2	Create local regulations to require fire buffer zones for new developments	*Not a tenable option at this time*
PP-3	If one or more of the previously flood damaged structures suffer repetitive flood damage, and if cost effective and technically feasible, make application to FEMA for an acquisition or relocation project	*No repetitive structures have been identified*
PP-4	The "Worksheet 3A" is a valuable tool in determining potential losses. These documents provide specific information relating to the number and value of structures within the defined hazard area, as well as the estimated number of people associated with those structures. Much of this information has been estimated, therefore, prior to any future updates to this plan, these worksheets should be revisited and updated as necessary	*Required part of GEMA process – no longer needed as a strategy*
PP-1 (Braselton)	Promote prescribed burning, where applicable, to create at least 30 feet of "defensible space" surrounding structures and property	*Handled by Georgia Forestry Commission*
ES-3	In the event of severe weather damage and isolation due to severe weather or other disasters, citizens can play a vital role in providing relief assistance to our communities. Efforts are being made to increase the public awareness and training of citizens, in doing so, our community would be more adequately prepared for self-sufficiency until external assistance could be received.	*Revised to more adequately meet the needs of the community*

ES-2 (Statham)	The city needs shelters to be designed and equipped properly for emergency situations. In addition, the city must establish a first response team and assign responsibilities to specific departments and individuals	*Rolled into other sheltering mitigation strategies*
ES-5	Fire wise program	*Currently being met by other means*
ES-7 (Braselton)	Provide wildland fire suppression training for new fire personnel	*Braselton does not have its own fire department*
ES-9 (Braselton)	Research funding availability to increase the number of radio units available for use by volunteer field responders during disasters	*Barrow County does not utilize volunteer field responders*
ES-11 (Braselton)	Acquisition of an Air Curtain Destroyers	*Braselton does not have a fire department*
ES-12 (Braselton)	Acquisition of grapple buckets for loaders to be used to assist in the clearing of large debris	*Contracted out for this service*
ES-13 (Braselton)	Acquisition of a site suitable to be developed as a remote stockpile location for road sanding and salting supplies	*Acquisition of a site no longer needed*
PEA-2	Develop an overall public education program to educate the community in areas of risk reduction, emergency preparedness, and personal safety	*Covered by other mitigation strategies*

Multi-Jurisdictional Considerations

Thunderstorms

Thunderstorm events have occurred across all areas of Barrow County. Crop damage from thunderstorm events would likely have the greatest impact in the rural areas of Barrow County. However, property damage numbers would be highest in more heavily populated areas due to greater population density. Thunderstorms have the potential to impact all areas of Barrow County.

Winter Storms

All portions of Barrow County could potentially be impacted by a winter storm, including freezing rain, sleet, and snow. Therefore, all mitigation actions identified regarding winter storms should be pursued on a countywide basis and including all municipalities.

Flooding

During a large-scale flood event, many portions of Barrow County would potentially be impacted by flooding. However, the area's most prone to flooding have historically been those areas located within the 100-year floodplain – particularly those areas along the Apalachee and Mulberry Rivers and their tributaries and distributaries. All of Barrow County, including all municipalities, could potentially be impacted.

Tornado

All portions of Barrow County could potentially be impacted by a tornado due to the indiscriminate nature of tornadic events. Therefore, all mitigation actions identified regarding tornadoes should be pursued on a countywide basis and included all municipalities.

Drought

All portions of Barrow County could potentially be impacted by a drought, but agricultural areas of the county are potentially more at risk. Therefore, all mitigation actions identified regarding drought should be pursued on a countywide basis and include all municipalities.

Wildfire

All portions of Barrow County, including all municipalities, could potentially be impacted by a wildfire due to the large amount of Wildland-Urban Interface, but the less developed areas of the county are more vulnerable. Therefore, all mitigation actions identified regarding wildfires should be pursued on a countywide basis and include all municipalities.

Earthquakes

All of Barrow County, including all municipalities, potentially could be threatened by earthquakes. As such, all earthquake mitigation actions should be pursued on a countywide basis and include all municipalities.

Tropical Cyclone

All of Barrow County, including all municipalities, could potentially be threatened by tropical cyclones. As such, all tropical cyclone mitigation actions should be pursued on a countywide basis and include all municipalities.

Hazardous Materials Incidents

All of Barrow County, including all municipalities, are vulnerable to both fixed facility and transportation-related hazardous materials releases. However, areas along the Georgia Highway 316/US Highway 29 corridor, which traverses southern areas of unincorporated Barrow County, are at the greatest risk.

Dam Failure

During a dam failure event, many portions of Barrow County would potentially be impacted by flooding. However, the area's most prone to flooding have historically been those areas located within the 100-year floodplain. Additionally, areas downstream from one of the three Category I dams are at greatest risk from a dam failure.

Transportation Incidents

Barrow County as well as all municipalities could potentially be impacted by a transportation incident. However, areas along Interstate 85 and the Georgia Highway 316/US Highway 29 corridor are the greatest at risk.

Terrorism

All of Barrow County, including all municipalities, are vulnerable to potential acts of terrorism. However, critical facilities and their surrounding areas are considered to be at the greatest risk.

Utility Failure

Barrow County as well as all municipalities could potentially be impacted by a utility failure.

Emergent Infectious Diseases

All of Barrow County, including all municipalities, are vulnerable to emergent infectious diseases. However, livestock and other farm animals are considered to be the greatest at risk, along with areas with large, concentrated populations, such as schools.

CHAPTER FIVE
–
MAINTENANCE AND IMPLEMENTATION

Summary of Updates for Chapter Five

The following table provides a description of each section of this chapter, and a summary of the changes that have been made to the Barrow County Hazard Mitigation Plan 2015.

Chapter 5 Section	Updates
Maintenance	• Content Revised
Plan Distribution	• Content Revised
Implementation	• Content Revised
Evaluation	• Content Revised
Peer Review	• Content Revised
Plan Update	• Content Revised
Conclusion	• Content Revised

Maintenance

Requirement §201.6(c)(4)(iii)

In order to adhere to best practices, state and federal guidelines, and lessons learned, the Barrow County Hazard Mitigation Plan Update Committee has developed a method to ensure the regular review and update of the Plan occurs. Plan maintenance protocols identified during the 2015 Barrow County Hazard Mitigation Plan was followed, to the best abilities of Barrow County. This most importantly included an increased attempt for public participation and inclusion in the planning process. The Barrow County Hazard Mitigation Plan Update Committee will reconvene annually in February to monitor and evaluate the progress of the mitigation strategies in the Plan. Barrow County's Emergency Management Director, Penny Clack, will be responsible for implementing this meeting. The Committee will discuss the following questions annually:

- Do the goals address current and expected hazards and conditions?
- Are the goals and objectives still relevant to the County?
- Has the nature or magnitude of risks changed?
- Does the risk assessment portion of the Plan need to be updated or modified?
- Are the goals and objectives meeting changes in state and federal policy?
- Are the current resources appropriate for implementing the Plan?
- Are there local implementation problems, such as technical, political, legal, or coordination issues with other agencies?
- Did the jurisdictions, agencies, and other partners participate in the plan implementation process as proposed?

The responsible parties for various mitigation strategies will provide a report during this annual meeting regarding the following:
- How well did the implementation processes work?
- Were any difficulties encountered during implementation?
- How successful was the coordination of efforts?
- Are there any suggestions for revision of any strategies?

Barrow County's Emergency Management Director will send the minutes from this annual meeting to Barrow County Commissioners and City and Town Councils for review.

If there are any updates or modifications to the Barrow County Hazard Mitigation Plan, the Emergency Management Director will forward the changes to the Georgia Emergency Management Agency's Hazard Mitigation Officer. All annual reviews of the Barrow County Hazard Mitigation Plan will be open to the public. These meetings will be advertised both in the local newspapers, but also on signage in the publicly used facility hosting the meeting.

Maintenance Log

Revision Date	Revised Section	Reason for Revision	Revised By
2019	**Five Year Hazard Mitigation Plan Update**	**FEMA Requirement**	**Barrow County Hazard Mitigation Planning Committee with assistance from Lux Mitigation and Planning**

Plan Distribution

This Plan will be distributed, but not limited, to the following departments and organizations within Barrow County:

Barrow County Board of Commissioners
Barrow County Emergency Services
Barrow County Emergency Management Agency
Barrow County Sheriff's Office
Barrow County Public Works Department
Barrow County Planning and Community Development
Barrow County Board of Education
City of Winder
City of Auburn
City of Bethlehem
City of Statham
Town of Braselton
Town of Carl

A printed copy of the approved Plan will be available for viewing at the Barrow County Board of Commissioners located at 30 North Broad Street, Winder, Georgia 30680. A printed copy of the approved Plan will also be available for viewing at the Winder Public Library located at 189 Bellview Street, Winder, GA 30680. The existence and location of these copies will be publicized in the County's local newspaper, the Barrow Journal.

All comments, questions, concerns, and opinions about the Plan will be directed to Director Penny Clack of the Barrow County Emergency Management Agency for follow-up.

Implementation

Requirement §201.6(c)(4)(ii)

Each jurisdiction participating in the Barrow County Hazard Mitigation Plan is responsible for implementing specific mitigation actions as prescribed in this plan. In the Mitigation Strategies section, every proposed strategy is assigned to a specific local department or agency in order to assign responsibility and accountability and increase the likelihood of subsequent implementation.

In addition to the designation of a local lead department or agency, some strategies have secondary or assisting department or agencies listed as well. This allows for a sharing of responsibility and coordination of effort for some of the identified strategies that cross lines of departmental responsibility. The completion date has been assigned in order to assess whether identified mitigation strategies are being implemented in a timely fashion.

Barrow County and all municipalities will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified and targeted for the proposed actions listed in the mitigation strategies. It will be the responsibility of each participating jurisdiction to determine additional implementation procedures beyond those listed within the Barrow County Hazard Mitigation Plan.

This plan, as a joint effort between Barrow County and the municipalities of Winder, Statham, Auburn, Carl, Bethlehem, and Braselton, will serve as a comprehensive mitigation plan. The mitigation strategies, hazard identification, and other information identified in this plan will be integrated into all comprehensive Barrow County plans, as well as all municipality plans in the future. Incorporation of these strategies will occur, as necessary, throughout this planning cycle covered by this Hazard Mitigation Plan Update. Aspects of this plan will be integrated into the Barrow County Comprehensive Plan during the next planning cycle.

Identified hazards and mitigation strategies of the 2015 Barrow County Hazard Mitigation plan were integrated into the Local Emergency Operations Plan, multiple County and City SOPs and SOGs, and future planning and zoning plans. Barrow County will integrate mitigation strategies identified in this plan into the Barrow County Comprehensive Plan, Community Wildfire Protection Plan, Continuity of Operations Plan and other future plans. Strategies identified in the previous plan were applied to grant applications, building and zoning requirements, and development planning considerations for Barrow County and all municipalities. Many of these strategies will be applied using previously identified

policies and ordinances, including the NFIP compliance ordinances and water-use ordinances, which have now been applied countywide. All jurisdictions have the authority to adopt locally binding ordinances and policies to enhance the mitigation strategies in their jurisdiction.

The Legal and Regulatory Capability survey documents authorities available to the jurisdiction and/or enabling legislation at the state level affecting planning and land management tools that support local hazard mitigation planning efforts. The identified planning and land management tools are typically used by states and local jurisdictions to implement hazard mitigation activities.

Regulatory Tools/Plans	Regulatory Type: Ordinance, Resolution, Codes, Plans, Etc.	Local Authority	State Prohibited	Higher Authority
Building Codes	County/Municipal Code	Yes	No	No
Capital Improvements Plan		Yes	No	No
Comprehensive Plan	Barrow County Comprehensive Plan	Yes	No	No
Economic Development Plan	Barrow County Comprehensive Plan	Yes	No	Yes
Emergency Management Accreditation Program		No	No	Yes
Emergency Response Plan	Barrow County Local Emergency Operations Plan (LEOP)	Yes	No	Yes
Flood Management Plan		Yes	No	No
Historic Preservation	Barrow County Codes, Chapter 89, Article IX, Division 6, Section 89-1071	Yes	No	No
National Flood Insurance Program Participation	Barrow County Codes, Chapter 89, Article XI, Division 3, Section 89-1258	Yes	No	Yes

Continuity of Government/ Operations Plan		No	No	No
Post-Disaster Ordinance	Barrow County Codes Chapter 30, Article III	Yes	No	No
Zoning Ordinances	County and Municipal Codes	Yes	No	No

Opportunities to integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone Hazard Mitigation Plan is deemed by the Barrow County Hazard Mitigation Planning Committee to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

The City of Winder provides the following administrative and technical capabilities: Administrative, Water, Gas, Wastewater, Fire Department, Police Services, Planning Department, and Code Enforcement

Evaluation

Requirement §201.6(c)(4)(i)

Periodic revisions and updates of the Barrow County Hazard Mitigation Plan may be required to ensure that the goals of this plan are kept current with federal, state, and local regulations. These revisions should also consider any potential changes in the hazard vulnerability and mitigation priorities of Barrow County.

The Barrow County Hazard Mitigation Plan Update Committee will meet annually to review the Barrow County Hazard Mitigation Plan. During this annual review, mitigation strategies will be reviewed to evaluate the progress that has occurred for each identified mitigation strategy. The Barrow County Hazard Mitigation Plan Update Committee will also meet following any disaster event to review the identified mitigation strategies for that hazard and determine if timelines should be adjusted or additional mitigation strategies should be identified and added to the plan. These steps will ensure that the Barrow County Hazard Mitigation Plan is continuously updated to allow for changes in hazard vulnerabilities and identified mitigation strategies.

The Barrow County Hazard Mitigation Plan Update Committee will complete all evaluations of the Barrow County Hazard Mitigation Plan.

Peer Review

State Requirement Element F1

In order to maintain standards of quality, improve performance, and provide credibility to the Barrow County Hazard Mitigation Plan Update, representatives of local emergency management agencies bordering Barrow County conducted a peer review of the Plan. The peer review of this Plan constitutes a form of self-regulation, accountability, and new insights offered by qualified professionals in neighboring communities, which face many of the same natural and man-made hazards.

Barrow County Hazard Mitigation Plan Update was peer reviewed by:

Tommy Kessler — Date
Director
Jackson County Emergency Management Agency

CJ Worden — Date
Director
Oconee County Emergency Management Agency

Greg Swanson — Date
Director
Gwinnett County Emergency Management Agency

Casey Ramsey — Date
Director
Hall County Emergency Management Agency

Plan Update

Requirement §201.6(c)(4)(i)

The Federal Disaster Mitigation Act of 2000 requires that the Hazard Mitigation Plan be updated at least once every five years. The Barrow County Emergency Management Agency is the department responsible with ensuring this requirement is met. The Barrow County Hazard Mitigation Plan Update Committee will be involved in this future process and will aid the Barrow County Emergency Management Agency in ensuring that all jurisdictions provide input into the planning process. The public will be invited to participate in the planning process through public hearings to be held whenever major updates to this plan are needed and during annual review meetings. This plan will expire in the fourth quarter of 2022; therefore, the approval and adoption of the next plan update must be completed before that time.

In the first quarter of 2023, Barrow County plans to begin the Hazard Mitigation Plan Update process for the fourth time. This planning process will include bi-monthly meetings to accomplish the identified goals of the Barrow County Hazard Mitigation Plan Update. This process will be headed up by the Barrow County Emergency Management Agency. The Barrow County Hazard Mitigation Planning Committee will follow a similar process as was undertaken during this planning cycle to complete all FEMA and GEMA requirements for the Hazard Mitigation Plan Update. This process will be completed by the third quarter of 2024 to meet all identified planning deadlines.

Conclusion

As a result of the hazard mitigation planning process, Barrow County, and all municipalities therein, as well as additional participating organizations have obtained a great deal of information and knowledge regarding Barrow County's disaster history, natural and technological hazards, vulnerabilities, and potential strategies to lessen the impacts of the identified hazards.

One consistent theme identified by the Barrow County Hazard Mitigation Planning Committee was the inability to consistently identify geographic locations that were more vulnerable to most hazards due to the widespread potential effects and random impact areas each hazard could have. This was exceedingly true for most natural hazards. Recognizing this challenge, the Barrow County Hazard Mitigation Plan Update Committee determined it was best to identify many mitigation goals, objectives, and strategies that were both general and specific in nature. These strategies allow the Barrow County Hazard Mitigation Plan Update Committee to adopt strategies that will have the greatest positive effect on the greatest amount of the population.

The Barrow County Hazard Mitigation Planning Committee adopted strategies in all six of the major mitigation categories: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Education and Awareness. Prevention and Emergency Services comprised the greatest number (over 72%) of the mitigation strategies identified by Barrow County.

Appendix A – Barrow County Dams Information

Barrow County Category I Dams

Name	Latitude	Longitude	Height (feet)	Storage (acres)
Barber Creek Watershed Structure # 25	33.947820	-83.598230	29.00	580.00
Fort Yargo Lake State Park Dam	33.962100	-83.724600	49.00	7460.00
Marbury Creek Watershed Structure # 22	33.944750	-83.722790	26.00	735.00
Winder Reservoir Dam	34.011620	-83.741060	21.00	250.00

Barrow County Category II Dams

Name	Latitude	Longitude	Height (feet)	Storage (acres)
Barber Creek Watershed Structure # 6	33.953030	-83.617040	27.00	520.00
Barber Creek Watershed Structure # 9	33.944730	-83.612430	30.00	585.00
Elder Lake Dam	33.997222	-83.816667	21.00	184.00
Harrison Lake Dam	33.914444	-83.737500	20.00	135.00
John Cruce Lake Dam	34.076389	-83.804167	26.00	207.00
Lester Lake Dam	34.040556	-83.660278	28.00	59.00
Liou Pond Dam	34.018611	-83.833611	30.00	106.00
Marbury Creek Watershed Structure # 3	33.968611	-83.761667	31.00	920.00
Rives Lake Dam	34.024444	-83.562500	25.00	112.00
Rutledge Lake Dam	33.958889	-83.812778	25.00	93.00
White Lake Dam	34.041111	-83.673056	38.00	206.00
Winder Water Reservoir # 2	34.041111	-82.726389	47.00	295.00

Appendix B – Barrow County Hazard Mitigation Plan Committee Sign-In Sheets

Barrow County Hazard Mitigation Plan Update
Committee Meeting #1

Sign-In Sheet

(42)

Thursday, January 24, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Captain Glen Cain	[illegible]	gcain@barrowga.org	B.C.E.S.
Mike Nations	[illegible]	mnations@harrisonpoultry.com	HPI
Todd Dewberry	[illegible]	tdewberry@harrisonpoultry.com	HPI
Paul Brown / DPS	[illegible]	paul.brown5@redcross.org	American Red Cross
Kevin Hill EM Specialist Gwinnett County	[illegible]	Kevin.Hill@GwinnettCounty.com	Gwinnett County
Giles Roberts EM Specialist	Giles Roberts	Giles.Roberts@GwinnettCounty.com	Gwinnett Co.
Bryan Bullock	[illegible]	bbullock@jacksoncountygov.com	Jackson Co. EMA
Heath Williams	[illegible]	hwilliams@barrowga.org	BCES
Karen Hayes	Karen Hayes	Khayes@barrowga.org	Finance
John Skinner	[illegible]	John.Skinner@barrow.k12.ga.us	BCSS
Alan Shuman	[illegible]	[illegible]	[illegible]

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #1

Sign-In Sheet

Thursday, January 24, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Tammy S Brown	Tammy S. Brown	tsbrown@barrowga.org	Probate Judge
Caroline Evans-Magistrate Judge	Caroline Evans	cevans@barrowga.org	Magistrate Court
Tracey Byrd - Clerk	TByrd	tmbyrd@barrowga.org	Magistrate Court
Matt Whitley	[illegible]	matt.whitley@[illegible]	Winder Fire
Jim Fullington	[illegible]	jim.fullington@[illegible]	Winder PD
Luis Sanchez	[illegible]		BARLOW BUILDING GROUNDS
Cindy Price	[illegible]	cindy.price@dph.ga.gov	Barrow Co. Health
Jennifer Scott	[illegible]	jscott@braselton.net	Braselton
Matt Treeter	[illegible]	mtreeter@barrowga.org	Barrow County
Alex Mitcheson	[illegible]	[illegible]	Auburn
Iris Akridge	[illegible]	pwdirector@cityofauburnga.org	Auburn

Barrow County Hazard Mitigation Plan Update
Committee Meeting #1

Sign-In Sheet

Thursday, January 24, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Breanna Rogers Haz Mit Planner	[signature]	breanna.rogers@gema.ga.gov	GEMA/HS
Sam Powell / Director of Public Works	[signature]	SamPowell@CityofStatham	City of Statham
Luis Suarez / Building Gen	[signature]		
Mark Gieszler	[signature]	mark.gieszler@nghs.com	NGMC Barrow
Autron Hayes / Public Works Director	[signature]	ahayes@barrowga.org	Barrow County
Mark Whiddon Wastewater	[signature]	mwhiddon@barrowga.org	Barrow County
Julia Autry	[signature]	Julia.Autry@dnr.ga.gov	GA DNR
Roger Wilhelm	[signature]	Roger.wilhelm@cityofwinder	WINDER
Chris Owens	[signature]	chris.owens@cfa-franchise.com	Chick-fil-A
John Westbury Asst Admin	[signature]	john.westbury@winderhealthcare.com	WHC
Richard Carignan	[signature]	rcarignan@barrowga.org	Barrow Fire/EMA

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #1

Sign-In Sheet

Thursday, January 24, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Scott Dakin Dep. Director		sdakin@barrowga.org	Barrow County EMA
Ken Austin PO	Ken Austin	Ken@winderhealthcare	Barrow County
Kathy Bridges	Kathy Bridges	townofbeth@16windstream.net	Bethlehem
MIKE RENSHAW		mrenshaw@barrowga.org	BC.
CHRIS COOPER		CHRIS.COOPER@CITYOFWINDER.COM	WINDER POLICE
Scott Bratcher		Scott.brat@yahoo.com	BC Road Dept Bridges
CHRIS HODGE		CHODGE@CITYOFAUBURN-GA.ORG.	AUBURN POLICE DEPT.
BETH BURGESS		beth.burgess@accgov.com	ATHENS-CLARKE COUNTY EMERGENCY MANAGEMENT
Denise H. Lark		denise.lark@dhs.ga.gov	Region 5 DFCS
Penny Clack	Penny Clack	pclack@barrowga.org	Barrow County EMA

Barrow County Hazard Mitigation Plan Update
Committee Meeting #2

Sign-In Sheet (21)

Thursday, February 28, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Penny Clack/EMA Director	[signature]	pclack@barrowga.org	Barrow County
Tyrees P. Jones/Fire Inspector	[signature]	tjones@barrowga.org	"
Paul Brown/Disaster Program Specialist	[signature]	[illegible]	American Red Cross
Karen Hayes/Finance			
Sam Powell/Public Works	[signature]	[illegible]	City of Statham
Matt Trecker/Stormwater Manager	[signature]	mtrecker@barrowga.org	Barrow County
D Brown Carl Mayor	[signature]	[illegible]	Town of Carl
Luis Juarez	[signature]	ljuarez@barrowga.org	Barrow County
Jennifer Scott	[signature]	jscott@braselton.net	Braselton
Sandy Weinel	[signature]	sweinel@braselton.net	Braselton
Denise Hlark	[signature]	[illegible]	Reg.5 DFCS

1

Barrow County Hazard Mitigation Plan Update
Committee Meeting #2

Sign-In Sheet

Thursday, February 28, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Richard Carignan	[illegible]	rcarignan@barrowga.org	Barrow Co.
Kevin M Hill	[illegible]	Kevin.Hill@Gwinnettcounty.com	Gwinnett County EMA
Todd Dewberry	[illegible]	[illegible]	Harrison Poultry Inc.
Kathy Bridges Bethlehem Town Clerk	Kathy Bridges	townofbeth01@windstream.net	Bethlehem
Matt Whiting	[illegible]	[illegible]	Winder Fire
Julia Autry, Park MGR	Julia Autry	Julia.Autry1@dnr.ga.gov	DNR Fort Yargo
MIKE RENSHAW COUNTY MGR	[illegible]	mrenshaw@barrowga.org	BARROW COUNTY
MARK WHIDDON	Mark Whiddon	mwhiddon@barrowga.org	Barrow County
ALAN SHUMAN	[illegible]	[illegible]	BARROW County
Cindy Price	CPrice	cindy.price@dph.ga.gov	Barrow Co. Health

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #3

Sign-In Sheet (19)

Thursday, March 28, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Penny Clack / EMA Director	P. Clack	pclack@barrowga.org	Barrow Co.
Glen A Cain / Fire Marshal	G Cain	gcain@barrowga.org	Barrow Co.
Kevin M Hill / EM Specialist	Kevin M Hill	Kevin.Hill@GwinnettCounty.com	Gwinnett County EMA
TYREES P. JONES / FIRE INSPECTOR	Tyrees Jones	tjones@barrowga.org	BCES
Richard Carignan	Richard Carignan	rcarignan@barrowga.org	BCES
Lauren Shirley	L Shirley	lshirley@barrowga.org	BCES
Jennifer Scott	Jen Scott	jscott@brasstown.net	Braselton
Kathy Bridges	Kathy Bridges	townofbeth012Gwindstream.net	Bethlehem
Scott Dakin	Scott Dakin	sdakin@barrowga.org	BCES
Roger Wilhelm	[illegible]	Roger.Wilhelm@cityofwinder.com	WINDER
Cindy Price	Cprice	cindy.price@dph.ga.gov	BarrowCo. Health

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #3

Sign-In Sheet

Thursday, March 28, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Deputy Chief Heath Williams	[illegible]	hwilliams@barrowga.org	BCES
Denise Lark	[illegible]	Denise.Lark@dhs.ga.gov	Region 5 DFCS
Todd Dewberry	[illegible]	tdewberry@harrisonpoultry.com	Harrison Poultry
Nick [illegible]	[illegible]	[illegible]	Winder Police Dept.
Mark Whiddon	mark Whiddon	mwhiddon@barrowga.org	Barrow County
Luis Suarez	[illegible]	csuarez@barrowga.org	Barrow County
Julia Autry	Julia Autry	Julia.Autry1@dnr.ga.gov	Fort Yargo State Park
David Brock	[illegible]	BDINC94@WINDSTREAM.NET	Town of Carl

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #4

Sign-In Sheet

(20)

Thursday, April 25, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Todd Dewberry / PSM Coordinator	[illegible]	tdewberry@harrisonpoultry.com	Harrison Poultry
Matt Treeter / Stormwater Manager	[illegible]	mtreeter@barrowga.org	Barrow County
Luis Suarez / Building + Grounds	[illegible]	LSuarez@barrow.ga.org	
Jim Fullington / Chief	[illegible]	jim.fullington@cityofwinder.com	Winder Police
Mark Whiddon, Mgr.	Mark Whiddon	mwhiddon@barrowga.org	Barrow County Waterworks
Autron Hayes, Public Works Director	[illegible]	ahayes@barrowga.org	Barrow County
Alex Mitchem	[illegible]	AMITCHEM@CITYOFAUBURN-GA.ORG	Auburn
Iris Aldridge	Iris Aldridge	pwdirector@cityofauburnga.org	Auburn
Dan Schultz	[illegible]	dschultz@barrowga.org	Barrow

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #4

Sign-In Sheet

Thursday, April 25, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Penny Clark	P. Clark	pclark@barrowga.org	Barrow County EMA
Mike Nations	[illegible]	mnations@harrisonpoultry.com	HPI
Paul Brown	[illegible]	Paul.Brown5@redcross.org	American Red Cross
Scott Dakin	[illegible]	sdakin@barrowga.org	Barrow County EMA
Jennifer Scott	[illegible]	jscott@braselton.net	Braselton
Mike Renshaw	[illegible]	mrenshaw@barrowga.org	Barrow County
Kathy Bridges	Kathy Bridges	townofbeth.e7@windstream.net	Bethlehem
Sam Powell	S. Powell	SamPowell@cityofstatham	City of Statham
Kevin M Hill	[illegible]	Kevin.hill@gwinnettcounty.com	Gwinnett EM
Denise H. Lark	Denise H. Lark	Denise.Lark@dhs.ga.gov	Region5 DFCS
Alan Shuman	[illegible]		

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Barrow County Hazard Mitigation Plan Update
Committee Meeting #5

Sign-In Sheet (16)

Thursday, May 16, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
ALAN SHUMAN		ashuman@barrowga.org	BCES
Mallory Danner		mallory.denner@nghs.com	NGMC-Barrow
Penny Clack		pclack@barrowga.org	BCES
Scott Dakin		sdakin@barrowga.org	BCES
Michael MacKendrick		mmackendrick@barrowga.org	BCES
Allison Choudhury		along@barrowga.org	BCES
MIKE RENSHAW		mrenshaw@barrowga.org	B.C. ADMIN
Sam Powell		SamPowell@cityofstatham.com	CITY OF STATHAM
Paul Brown		[illegible]	RCS Class
Luis Suarez		LSuarez@barrowga.org	BARROW COUNTY

Barrow County Hazard Mitigation Plan Update
Committee Meeting #5

Sign-In Sheet

Thursday, May 16, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Todd Dewberry / BSM Construction		tdewberry@harrisonpoultry.com	Harrison Poultry
Kathy Bridges Town Clerk Bethlehem	Kathy Bridges	townofbeth016@windstream.net	Bethlehem
Iris Aldridge	Iris Aldridge	pwdirector@cityofauburnga.org	City of Auburn
JUD SMITH / BCSO		jsmith@barrowsheriff.com	BCSO
Karen Hayes / Karen Hayes	Karen Hayes	Khayes@barrowga.org	
Denise H. Lark	Denise H. Lark	denise.lark@dfcs.ga.gov	Region 5 DFCS

Barrow County Hazard Mitigation Plan Update
Committee Meeting #6

Sign-In Sheet

Thursday, June 27, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
Penny Clack	P Clack	pclack@barrowga.org	BCES
Kevin M Hill	Kevin M Hill	Kevin.Hill@gwinnettcounty.com	Gwinnett County Emergency Management
Paul Brown	Paul Brown	Paul.Brown5@dhr.state.ga.us	American Red Cross
Kathy Bridges	Kathy Bridges	townofbethel@windstream.net	Town of Bethlehem
Jennifer Scott	Jennifer Scott	jscott@braselton.net	Braselton
Sam Powell	Sam Powell	sampowell@cityofstatham.com	City of Statham
Karen Hayes	Karen Hayes	Khayes@barrowga.org	BOC Finance
Luis Suarez	Luis Suarez	LSuarez@barrow.ga.us	Barrow County
Scott Datin	Scott Datin	sdatin@barrowga.org	BCES
Denise Lark	Denise Lark	Denise.Lark@dhs.ga.gov	Region 5 DFCS
Tim E. Aldridge	Tim E. Aldridge	pwdirector@cityofauburn-ga.org	City of Auburn

Barrow County Hazard Mitigation Plan Update
Committee Meeting #6

Sign-In Sheet

Thursday, June 27, 2019

Name/Title	Signature	E-mail Address	Agency/Organization
CHRIS HOOGE		C-HOOGE@CITYOFAUBURN-GA.ORG	AUBURN POLICE DEPT
Autron Hayes		Ahayes@barrowga.org	Barrow County
Todd Dewberry		tdewberry@harrisonpoultry.com	Harrison Poultry

Appendix C – Barrow County Critical Facilities

Critical Facility	Jurisdiction
124 Water Storage Tank	Barrow County
53/316 Water Storage Tank	Barrow County
Alternative Education Program	Bethlehem town
Apalachee High School	Barrow County
Auburn City Hall	Auburn city
Auburn Elementary	Auburn city
Auburn Police	Auburn city
Auburn Station	Barrow County
Autry Road Pumping Station	Barrow County
Barber Creek Pump Station	Barrow County
Barber Creek Wastewater Treatment Plant	Barrow County
Barrow Arts & Sciences Academy	Barrow County
Barrow Christian Academy	Barrow County
Barrow County 911 Center (PSAP)	Barrow County
Barrow County Airport	Winder city
Barrow County Animal Control	Barrow County
Barrow County Detention Ctr.	Winder city
Barrow County Emergency Services Headquarters	Barrow County
Barrow County Fire Station # 1	Statham city
Barrow County Fire Station # 3	Bethlehem town
Barrow County Fire Station # 4	Auburn city
Barrow County Fire Station # 5	Winder city
Barrow County Fire Station # 6	Winder city
Barrow County Fire Station # 7	Winder city
Barrow County Health Department	Barrow County
Barrow County Historic Courthouse	Winder city
Barrow County Judicial Courthouse	Winder city
Barrow County Leisure Services	Winder city
Barrow County Sheriff's Office	Barrow County
Barrow County Schools Professional Development Center (PDC)	Winder city
Barrow County Roads & Bridges	Winder city
Barrow County Senior Center	Barrow County
Barrow County Buildings and Grounds	Barrow County
Northeast Georgia Medical Center - Barrow	Winder city
Barrow Crossing Pump Station	Barrow County
Barrow Manufacturing Tank	Winder city

Bear Creek Middle School	Statham city
Bethlehem Christian Academy	Barrow County
Bethlehem City Hall	Bethlehem town
Bethlehem Elementary School	Barrow County
Bramlett Elementary School	Barrow County
Carl City Hall	Carl town
Carl Hwy 324 - Ground Storage Tank	Barrow County
Carl Tank	Winder city
Cedar Creek Wastewater Treatment Plan	Winder city
Center for Innovative Teaching	Winder city
Chateau Lift Station	Braselton town
Chateau Main Life Station	Braselton town
County Line Elementary School	Barrow County
CVS Pumping Station	Barrow County
Embassy Walk Lift Station	Winder city
Exchange Blvd Pump Station	Barrow County
Fort Yargo State Park	Barrow County
Four Seasons Assisted Living	Winder city
Frank House Dump Station	Winder city
Georgia Club Pump Station	Barrow County
Glenwood Lift Station	Winder city
Haymon Morris Middle School	Barrow County
Highway 53 Water Treatment Plan	Winder city
Holsenbeck Elementary School	Barrow County
Home Depot Pump Station	Barrow County
Highway 29 Tank	Winder city
Highway 53 Pump Station	Barrow County
Jaco Natural Gas Regulator Station	Winder city
Kennedy Elementary School	Barrow County
Kerala Gardens Pump Station	Barrow County
Lake Drive Lift Station	Winder city
Lanier Technology College	Winder city
Layers Landing Pumping Station	Barrow County
Magnolia Estates	Winder city
Manville Tank	Winder city
Marburg Wastewater Treatment Plant	Winder city
Midland Tank	Winder city
Mulberry Grove Assisted	Statham city
Oakgrove Landfill	Barrow County

Pea Hill Tank	Winder city
Publix Lift Station	Braselton town
Riverwalk Lift Station	Braselton town
Rockwell Church 500 mg tank	Winder city
Rockwell Church Pump Station	Winder city
Russell Middle School	Winder city
Sims Academy of Innovation and Technology	Barrow County
Sims Academy Pump Station	Barrow County
Statham City Hall	Statham city
Statham Police	Statham city
Tanners Bridge Wastewater Treatment Plant	Barrow County
Telephone Switchbox (contains 911 Trunk lines)	Barrow County
Turtle Creek Lift Station	Winder city
Wells 1-3	Braselton town
Westside Middle School	Barrow County
Whistleville Christian Academy	Barrow County
Winder Barrow High School	Winder city
Winder City Hall	Winder city
Winder Customer Service Center	Winder city
Winder Elementary School	Winder city
Winder Fire Station # 1	Winder city
Winder Fire Station #2	Winder city
Winder Fire Station #2	Winder city
Winder Healthcare	Winder city
Winder Police	Winder city
Winder Utility Complex	Winder city
Yargo Elementary School	Barrow County

Appendix D - Natural Hazard Data Tables

Thunderstorms

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	1	9.181M	0.00K
BARROW CO.	BARROW CO.	GA	09/02/1970	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	09/30/1973	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	03/21/1974	04:15	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	07/10/1975	16:10	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/23/1977	14:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/16/1980	19:40	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	11/12/1982	16:35	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	07/25/1983	13:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	05/02/1984	17:50	CST	Hail	1.00 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	05/02/1984	17:50	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	11/10/1984	18:05	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	04/05/1985	19:50	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K

BARROW CO.	BARROW CO.	GA	06/07/1985	16:00	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	03/13/1986	07:55	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	05/07/1986	15:00	CST	Hail	1.75 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	05/07/1986	15:15	CST	Hail	1.75 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/09/1986	16:28	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	04/23/1988	14:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/18/1988	15:55	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	04/04/1989	14:15	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/05/1989	13:40	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	02/10/1990	05:33	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	02/10/1990	05:50	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	02/16/1990	06:50	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	04/10/1990	17:30	CST	Hail	0.75 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/22/1990	11:20	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	07/08/1990	16:20	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K

BARROW CO.	BARROW CO.	GA	08/22/1990	18:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	04/27/1991	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	04/29/1991	14:23	CST	Hail	0.75 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	07/04/1991	11:15	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	08/06/1991	19:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	03/19/1992	11:54	CST	Hail	0.88 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	03/19/1992	12:10	CST	Hail	1.00 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/26/1992	12:30	PST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	07/05/1992	16:40	PST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Athens	BARROW CO.	GA	05/19/1993	07:50	EST	Hail	1.75 in.	0	0	0.00K	0.00K
Winder	BARROW CO.	GA	04/19/1995	14:17	EST	Thunderstorm Wind	0 kts.	0	0	0.25K	0.00K
Winder	BARROW CO.	GA	04/19/1995	14:20	EST	Hail	1.75 in.	0	0	0.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/11/1995	20:50	EST	Thunderstorm Wind	0 kts.	0	0	1.00K	0.00K
Statham	BARROW CO.	GA	07/21/1995	17:17	EST	Thunderstorm Wind	0 kts.	0	0	0.50K	0.00K
Winder	BARROW CO.	GA	09/01/1995	15:30	EST	Thunderstorm Wind	0 kts.	0	0	0.50K	0.00K

Jefferson	BARROW CO.	GA	09/01/1995	15:45	EST	Hail	1.75 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	03/15/1996	15:10	EST	Thunderstorm Wind		0	0	10.00K	0.00K
WINDER	BARROW CO.	GA	03/15/1996	15:10	EST	Hail	1.00 in.	0	0	2.00K	0.00K
AUBURN	BARROW CO.	GA	03/19/1996	00:30	EST	Hail	0.75 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/06/1996	15:40	EST	Hail	0.75 in.	0	0	0.00K	0.00K
BETHLEHEM	BARROW CO.	GA	02/21/1997	14:50	EST	Thunderstorm Wind		0	0	2.00K	0.00K
BETHLEHEM	BARROW CO.	GA	03/05/1997	19:25	EST	Thunderstorm Wind		0	0	3.00K	0.00K
STATHAM	BARROW CO.	GA	04/22/1997	14:05	EST	Hail	0.80 in.	0	0	0.00K	0.00K
BETHLEHEM	BARROW CO.	GA	04/28/1997	16:30	EST	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	09/10/1997	18:34	EST	Hail	0.88 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	11/30/1997	18:30	EST	Thunderstorm Wind		0	0	5.00K	0.00K
AUBURN	BARROW CO.	GA	02/17/1998	08:50	EST	Hail	0.75 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	04/08/1998	19:42	EST	Hail	0.90 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	04/08/1998	22:10	EST	Thunderstorm Wind		0	0	1.00K	0.00K
WINDER	BARROW CO.	GA	04/09/1998	01:25	EST	Thunderstorm Wind		0	0	1.00K	0.00K

WINDER	BARROW CO.	GA	04/22/1998	15:50	EST	Hail	0.75 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/07/1998	09:50	EST	Hail	0.88 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/07/1998	18:06	EST	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/07/1998	18:10	EST	Thunderstorm Wind		0	0	150.00K	0.00K
WINDER	BARROW CO.	GA	05/07/1998	20:23	EST	Hail	1.75 in.	0	0	5.00K	0.00K
AUBURN	BARROW CO.	GA	05/07/1998	23:32	EST	Hail	1.75 in.	0	0	2.00K	0.00K
AUBURN	BARROW CO.	GA	05/06/1999	08:27	EST	Hail	0.75 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	05/13/1999	15:15	EST	Hail	1.50 in.	0	0	0.00K	0.00K
BETHLEHEM	BARROW CO.	GA	06/29/1999	16:15	EST	Thunderstorm Wind		0	0	1.00K	0.00K
WINDER	BARROW CO.	GA	09/21/1999	14:15	EST	Hail	1.00 in.	0	0	0.00K	0.00K
STATHAM	BARROW CO.	GA	09/21/1999	14:40	EST	Thunderstorm Wind		0	0	2.50K	0.00K
WINDER	BARROW CO.	GA	04/03/2000	03:15	EST	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
AUBURN	BARROW CO.	GA	05/25/2000	17:15	EST	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/25/2000	17:25	EST	Thunderstorm Wind		0	0	10.00K	0.00K
WINDER	BARROW CO.	GA	06/25/2000	13:25	EST	Hail	0.75 in.	0	0	0.00K	0.00K

CARL	BARROW CO.	GA	07/23/2000	15:15	EST	Lightning		0	0	50.00K	0.00K
WINDER	BARROW CO.	GA	08/04/2000	15:30	EST	Hail	0.75 in.	0	0	0.00K	0.00K
COUNTYWIDE	BARROW CO.	GA	02/16/2001	19:00	EST	Thunderstorm Wind		0	0	5.00K	0.00K
WINDER	BARROW CO.	GA	05/19/2001	12:37	EST	Thunderstorm Wind		0	0	1.00K	0.00K
WINDER	BARROW CO.	GA	06/22/2001	14:15	EST	Thunderstorm Wind		0	0	1.50K	0.00K
BETHLEHEM	BARROW CO.	GA	07/03/2001	15:00	EST	Lightning		0	0	35.00K	0.00K
WINDER	BARROW CO.	GA	05/10/2002	17:20	EST	Hail	1.00 in.	0	0	3.00K	0.00K
WINDER	BARROW CO.	GA	05/13/2002	15:20	EST	Thunderstorm Wind		0	0	0.50K	0.00K
AUBURN	BARROW CO.	GA	08/18/2002	16:15	EST	Hail	1.00 in.	0	0	3.00K	0.00K
WINDER	BARROW CO.	GA	08/18/2002	16:25	EST	Thunderstorm Wind		0	0	2.00K	0.00K
WINDER	BARROW CO.	GA	11/11/2002	03:45	EST	Lightning		0	0	15.00K	0.00K
BETHLEHEM	BARROW CO.	GA	02/22/2003	08:00	EST	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
BETHLEHEM	BARROW CO.	GA	03/19/2003	23:45	EST	Hail	0.88 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	06/13/2003	17:00	EST	Lightning		0	0	150.00K	0.00K
WINDER	BARROW CO.	GA	07/02/2003	17:00	EST	Thunderstorm Wind	39 kts. EG	0	0	15.00K	0.00K
WINDER	BARROW CO.	GA	07/22/2003	13:10	EST	Thunderstorm Wind	50 kts. EG	0	0	0.50K	0.00K

WINDER	BARROW CO.	GA	08/28/2003	17:08	EST	Lightning		0	0	175.00K	0.00K
AUBURN	BARROW CO.	GA	08/28/2003	17:15	EST	Thunderstorm Wind	56 kts. EG	0	0	45.00K	0.00K
WINDER	BARROW CO.	GA	07/04/2004	19:20	EST	Lightning		0	0	250.00K	0.00K
COUNTYWIDE	BARROW CO.	GA	07/14/2004	17:30	EST	Thunderstorm Wind	52 kts. EG	0	0	10.00K	0.00K
BETHLEHEM	BARROW CO.	GA	02/21/2005	13:47	EST	Hail	1.00 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	02/21/2005	18:55	EST	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
THOMPSONS MILL	BARROW CO.	GA	02/21/2005	18:55	EST	Hail	2.00 in.	0	0	1.000M	0.00K
AUBURN	BARROW CO.	GA	02/21/2005	19:00	EST	Lightning		0	0	2.00K	0.00K
WINDER	BARROW CO.	GA	04/07/2005	17:30	EST	Thunderstorm Wind	50 kts. EG	0	0	100.00K	0.00K
BETHLEHEM	BARROW CO.	GA	04/07/2005	19:05	EST	Hail	1.00 in.	0	0	0.00K	0.00K
BETHLEHEM	BARROW CO.	GA	04/07/2005	19:05	EST	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	04/22/2005	13:02	EST	Hail	0.88 in.	0	0	0.00K	0.00K
COUNTYWIDE	BARROW CO.	GA	07/14/2005	16:00	EST	Thunderstorm Wind	35 kts. EG	0	0	2.00K	0.00K
BETHLEHEM	BARROW CO.	GA	08/05/2005	18:15	EST	Lightning		0	0	150.00K	0.00K
WINDER	BARROW CO.	GA	08/22/2005	19:15	EST	Lightning		0	0	5.00K	0.00K
WINDER	BARROW CO.	GA	12/04/2005	16:50	EST	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/04/2006	16:42	EST	Lightning		0	0	25.00K	0.00K

WINDER	BARROW CO.	GA	05/04/2006	16:44	EST	Hail	0.75 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/25/2006	17:47	EST	Thunderstorm Wind	35 kts. EG	0	0	0.25K	0.00K
WINDER	BARROW CO.	GA	05/26/2006	15:31	EST	Hail	0.75 in.	0	0	0.00K	0.00K
COUNTYWIDE	BARROW CO.	GA	06/22/2006	18:00	EST	Lightning		0	0	0.00K	0.00K
STATHAM	BARROW CO.	GA	06/22/2006	18:30	EST	Thunderstorm Wind	39 kts. EG	0	0	10.00K	0.00K
STATHAM	BARROW CO.	GA	01/05/2007	12:32	EST-5	Hail	0.88 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	06/12/2007	18:00	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
THOMPSONS MILL	BARROW CO.	GA	06/12/2007	18:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	7.00K	0.00K
WINDER	BARROW CO.	GA	08/05/2007	15:36	EST-5	Lightning		0	0	1.00K	0.00K
WINDER	BARROW CO.	GA	03/15/2008	15:39	EST-5	Hail	1.75 in.	0	0	400.00K	0.00K
WINDER	BARROW CO.	GA	04/04/2008	17:02	EST-5	Hail	0.75 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	05/24/2008	13:30	EST-5	Hail	0.88 in.	0	0	0.00K	0.00K
THOMPSONS MILL	BARROW CO.	GA	05/24/2008	14:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
AUBURN	BARROW CO.	GA	07/22/2008	18:00	EST-5	Hail	1.75 in.	0	0	800.00K	0.00K
AUBURN	BARROW CO.	GA	07/22/2008	18:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K

THOMPSONS MILL	BARROW CO.	GA	04/10/2009	19:00	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	04/10/2009	20:00	EST-5	Hail	1.75 in.	0	0	900.00K	0.00K
AUBURN	BARROW CO.	GA	04/23/2009	20:00	EST-5	Hail	1.75 in.	0	0	900.00K	0.00K
BETHLEHEM	BARROW CO.	GA	05/06/2009	14:51	EST-5	Lightning		0	0	200.00K	0.00K
WINDER ARPT	BARROW CO.	GA	08/11/2009	19:23	EST-5	Thunderstorm Wind	53 kts. MG	0	0	15.00K	0.00K
STATHAM	BARROW CO.	GA	08/11/2009	20:15	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BETHLEHEM	BARROW CO.	GA	06/25/2010	17:30	EST-5	Thunderstorm Wind	36 kts. EG	0	0	1.00K	0.00K
WINDER	BARROW CO.	GA	08/01/2010	14:29	EST-5	Thunderstorm Wind	39 kts. EG	0	0	1.50K	0.00K
AUBURN	BARROW CO.	GA	02/28/2011	17:36	EST-5	Thunderstorm Wind	48 kts. EG	0	0	3.00K	0.00K
WINDER	BARROW CO.	GA	03/26/2011	21:41	EST-5	Hail	0.75 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	04/04/2011	22:59	EST-5	Thunderstorm Wind	50 kts. MG	0	0	50.00K	0.00K
BETHLEHEM	BARROW CO.	GA	05/26/2011	18:04	EST-5	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
COUNTY LINE	BARROW CO.	GA	06/18/2011	17:25	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
BETHLEHEM	BARROW CO.	GA	06/22/2011	16:07	EST-5	Thunderstorm Wind	50 kts. EG	0	0	7.00K	0.00K
AUBURN	BARROW CO.	GA	06/26/2011	18:39	EST-5	Thunderstorm Wind	37 kts. EG	0	0	1.00K	0.00K

AUBURN	BARROW CO.	GA	06/26/2011	18:43	EST-5	Lightning		0	0	25.00K	0.00K
WINDER	BARROW CO.	GA	07/05/2011	17:10	EST-5	Thunderstorm Wind	50 kts. EG	0	0	4.00K	0.00K
WINDER	BARROW CO.	GA	08/20/2011	14:55	EST-5	Thunderstorm Wind	39 kts. EG	0	0	4.00K	0.00K
WINDER ARPT	BARROW CO.	GA	07/01/2012	21:29	EST-5	Thunderstorm Wind	60 kts. EG	0	0	150.00K	0.00K
WINDER	BARROW CO.	GA	07/17/2012	12:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
WINDER	BARROW CO.	GA	07/26/2012	22:15	EST-5	Lightning		0	0	3.000M	0.00K
WINDER	BARROW CO.	GA	01/30/2013	15:30	EST-5	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
WINDER	BARROW CO.	GA	04/11/2013	21:25	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.50K	0.00K
COUNTY LINE	BARROW CO.	GA	06/02/2013	15:35	EST-5	Thunderstorm Wind	46 kts. MG	0	0	0.50K	0.00K
THOMPSONS MILL	BARROW CO.	GA	06/13/2013	18:27	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.50K	0.00K
COUNTY LINE	BARROW CO.	GA	07/17/2013	18:11	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
STATHAM	BARROW CO.	GA	08/23/2013	22:00	EST-5	Thunderstorm Wind	55 kts. EG	0	1	200.00K	0.00K
COUNTY LINE	BARROW CO.	GA	01/11/2014	08:55	EST-5	Thunderstorm Wind	56 kts. MG	0	0	0.00K	0.00K
WINDER ARPT	BARROW CO.	GA	05/25/2014	17:15	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	09/01/2014	14:52	EST-5	Thunderstorm Wind	55 kts. EG	0	0	1.00K	0.00K

WINDER	BARROW CO.	GA	04/20/2015	14:16	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
STATHAM	BARROW CO.	GA	05/26/2015	16:49	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
MULBERRY	BARROW CO.	GA	08/06/2015	14:22	EST-5	Thunderstorm Wind	50 kts. EG	0	0	8.00K	0.00K
THOMPSONS MILL	BARROW CO.	GA	08/22/2015	22:55	EST-5	Thunderstorm Wind	55 kts. EG	0	0	15.00K	0.00K
ALGERNON	BARROW CO.	GA	07/21/2016	17:05	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
STATHAM	BARROW CO.	GA	03/21/2017	18:30	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	03/21/2017	19:11	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	04/05/2017	22:07	EST-5	Hail	1.50 in.	0	0	0.00K	0.00K
AUBURN	BARROW CO.	GA	07/23/2017	18:20	EST-5	Lightning		0	0	1.00K	0.00K
WINDER ARPT	BARROW CO.	GA	06/11/2018	13:00	EST-5	Thunderstorm Wind	55 kts. EG	0	0	150.00K	0.00K
AUBURN	BARROW CO.	GA	06/28/2018	09:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	15.00K	0.00K
WHISTLEVILLE	BARROW CO.	GA	07/21/2018	19:25	EST-5	Thunderstorm Wind	50 kts. EG	0	0	12.00K	0.00K
RUSSELL	BARROW CO.	GA	07/21/2018	19:30	EST-5	Hail	1.50 in.	0	0	0.00K	0.00K
WHISTLEVILLE	BARROW CO.	GA	07/22/2018	17:54	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
WHISTLEVILLE	BARROW CO.	GA	04/14/2019	11:41	EST-5	Thunderstorm Wind	45 kts. EG	0	0	1.00K	0.00K

Flooding

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	185.25K	0.00K
COUNTYWIDE	BARROW CO.	GA	07/25/2001	06:00	EST	Flood		0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	09/27/2002	00:30	EST	Flood		0	0	0.00K	0.00K
COUNTYWIDE	BARROW CO.	GA	03/20/2003	03:05	EST	Flash Flood		0	0	0.00K	0.00K
STATHAM	BARROW CO.	GA	03/20/2003	09:48	EST	Flash Flood		0	0	0.00K	0.00K
COUNTYWIDE	BARROW CO.	GA	07/01/2003	20:10	EST	Flash Flood		0	0	10.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	09/16/2004	19:30	EST	Flood		0	0	5.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	09/27/2004	13:00	EST	Flood		0	0	0.00K	0.00K
WINDER	BARROW CO.	GA	07/14/2005	16:21	EST	Flash Flood		0	0	50.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	08/07/2005	13:00	EST	Flood		0	0	0.25K	0.00K
THOMPSONS MILL	BARROW CO.	GA	09/21/2009	15:58	EST-5	Flood		0	0	100.00K	0.00K
WINDER ARPT	BARROW CO.	GA	05/31/2010	20:10	EST-5	Flash Flood		0	0	20.00K	0.00K
WINDER ARPT	BARROW CO.	GA	06/01/2010	00:00	EST-5	Flash Flood		0	0	0.00K	0.00K

Tornadoes

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	1	445.00K	0.00K
BARROW CO.	BARROW CO.	GA	06/07/1974	16:00	CST	Tornado	F1	0	0	25.00K	0.00K
BARROW CO.	BARROW CO.	GA	03/28/1984	14:25	CST	Tornado	F1	0	1	250.00K	0.00K
WINDER	BARROW CO.	GA	08/29/2005	22:05	EST	Tornado	F0	0	0	150.00K	0.00K
WINDER ARPT	BARROW CO.	GA	03/21/2017	20:03	EST-5	Tornado	EF0	0	0	20.00K	0.00K

Drought

Location	County/Zone	St.	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Totals:							0	0	0.00K	2.920M
BARROW (ZONE)	BARROW (ZONE)	GA	09/01/1997	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	05/01/1999	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	08/01/1999	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/01/2000	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	04/01/2000	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	05/01/2000	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	06/01/2000	00:00	Drought		0	0	0.00K	2.920M
BARROW (ZONE)	BARROW (ZONE)	GA	07/01/2000	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	10/01/2000	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	10/01/2001	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	11/01/2001	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/01/2001	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	04/01/2002	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	08/01/2002	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/01/2003	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	03/01/2004	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	05/01/2007	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	09/01/2007	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	10/01/2007	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	11/01/2007	00:00	Drought		0	0	0.00K	0.00K

BARROW (ZONE)	BARROW (ZONE)	GA	12/01/2007	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	09/01/2011	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	06/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	07/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	08/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	09/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	10/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	11/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/01/2016	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/01/2017	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/01/2017	00:00	Drought		0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	03/01/2017	00:00	Drought		0	0	0.00K	0.00K

Winter Storms

Location	County/Zone	St.	Date	Time	T.Z.	Type	Dth	Inj	PrD	CrD
Totals:							0	0	1.243M	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/18/1996	18:00	EST	Heavy Snow	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/23/1999	11:00	EST	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/22/2000	13:00	EST	Ice Storm	0	0	980.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/28/2000	19:00	EST	Ice Storm	0	0	32.79K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/13/2000	14:30	EST	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/17/2000	07:30	EST	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/19/2000	00:00	EST	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/21/2000	03:30	EST	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/02/2002	06:00	EST	Heavy Snow	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/04/2002	14:00	EST	Ice Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/25/2004	05:00	EST	Ice Storm	0	0	10.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/26/2004	00:00	EST	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/28/2005	20:00	EST	Winter Storm	0	0	150.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/15/2005	00:00	EST	Ice Storm	0	0	20.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/06/2006	04:00	EST	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/16/2008	20:30	EST-5	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	03/01/2009	12:00	EST-5	Heavy Snow	0	0	50.00K	0.00K

BARROW (ZONE)	BARROW (ZONE)	GA	01/07/2010	16:00	EST-5	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/12/2010	14:30	EST-5	Heavy Snow	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	03/02/2010	04:00	EST-5	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/15/2010	18:30	EST-5	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/25/2010	15:00	EST-5	Heavy Snow	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/09/2011	22:00	EST-5	Heavy Snow	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/09/2011	23:00	EST-5	Heavy Snow	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/25/2013	07:00	EST-5	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/28/2014	12:00	EST-5	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/11/2014	07:00	EST-5	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	02/16/2015	18:00	EST-5	Ice Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/22/2016	16:00	EST-5	Winter Weather	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	12/08/2017	21:00	EST-5	Winter Storm	0	0	0.00K	0.00K
BARROW (ZONE)	BARROW (ZONE)	GA	01/16/2018	20:00	EST-5	Winter Weather	0	0	0.00K	0.00K

Appendix E – Barrow County Worksheet 3As

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Barrow County
Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	59,517	59,517	100.000%	2,931,525,050	2,931,525,050	100.000%	75,099	75,099	100%
Commercial	3,072	3,072	100.000%	390,569,338	390,569,338	100.000%	0	0	#DIV/0!
Industrial	768	768	100.000%	240,669,198	240,669,198	100.000%	0	0	#DIV/0!
Agricultural	1,793	1,793	100.000%	73,435,638	73,435,638	100.000%	0	0	#DIV/0!
Religious / Non-profit	629	629	100.000%	109,349,688	109,349,688	100.000%	0	0	#DIV/0!
Government	828	828	100.000%	196,203,243	196,203,243	100.000%	0	0	#DIV/0!
Education	147	147	100.000%	126,221,065	126,221,065	100.000%	0	0	#DIV/0!
Utilities	22	22	100.000%	147,387,643	147,387,643	100.000%	0	0	#DIV/0!
Total	66,776	66,776	100.000%	4,215,360,863	4,215,360,863	100.000%	75,099	75,099	100%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		N
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community or State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	59,517	616	1.035%	2,931,525,050	31,973,807	1.091%	75,099	777	1%
Commercial	3,072	32	1.042%	390,869,338	1,622,976	0.415%	0	0	#DIV/0!
Industrial	768	22	2.865%	240,869,198	3,541,878	1.472%	0	0	#DIV/0!
Agricultural	1,793	2	0.112%	73,435,638	19,742	0.027%	0	0	#DIV/0!
Religious/ Non-profit	629	2	0.318%	109,349,688	19,665	0.018%	0	0	#DIV/0!
Government	828	1	0.121%	196,203,243	7,067	0.004%	0	0	#DIV/0!
Education	147	0	0.000%	126,221,065	0	0.000%	0	0	#DIV/0!
Utilities	22	0	0.000%	147,387,643	0	0.000%	0	0	#DIV/0!
Total	66,776	675	1.011%	4,215,360,863	37,185,135	0.882%	75,099	777	1%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	59,517	49,875	83.800%	2,931,525,050	2,456,605,875	83.800%	75,099	62,933	84%
Commercial	3,072	2,764	89.974%	390,569,338	351,410,693	89.974%	0	0	#DIV/0!
Industrial	768	651	84.766%	240,669,198	204,004,750	84.766%	0	0	#DIV/0!
Agricultural	1,793	1,243	69.325%	73,435,638	50,909,369	69.325%	0	0	#DIV/0!
Religious / Non-profit	629	543	86.328%	109,349,688	94,398,856	86.328%	0	0	#DIV/0!
Government	828	610	73.671%	196,203,243	144,545,867	73.671%	0	0	#DIV/0!
Education	147	125	85.034%	126,221,065	107,330,838	85.034%	0	0	#DIV/0!
Utilities	22	17	77.273%	147,387,643	113,890,451	77.273%	0	0	#DIV/0!
Total	66,776	55,828	83.605%	4,215,360,863	3,523,096,700	83.578%	75,099	62,933	84%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Auburn - Barrow County
Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	5,478	5,478	100.000%	207,500,373	207,500,373	100.000%	7,622	7,622	100%
Commercial	250	250	100.000%	26,316,823	26,316,823	100.000%	0	0	#DIV/0!
Industrial	26	26	100.000%	8,548,295	8,548,295	100.000%	0	0	#DIV/0!
Agricultural	8	8	100.000%	366,515	366,515	100.000%	0	0	#DIV/0!
Religious / Non-profit	37	37	100.000%	3,957,078	3,957,078	100.000%	0	0	#DIV/0!
Government	70	70	100.000%	5,657,595	5,657,595	100.000%	0	0	#DIV/0!
Education	19	19	100.000%	4,364,185	4,364,185	100.000%	0	0	#DIV/0!
Utilities	2	2	100.000%	6,117,085	6,117,085	100.000%	0	0	#DIV/0!
Total	5,890	5,890	100.000%	262,827,949	262,827,949	100.000%	7,622	7,622	100%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		b
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Auburn - Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community or State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	5,478	13	0.237%	207,500,373	367,435	0.177%	7,622	18	0%
Commercial	250	0	0.000%	26,316,823	0	0.000%	0	0	#DIV/0!
Industrial	26	0	0.000%	8,548,295	0	0.000%	0	0	#DIV/0!
Agricultural	8	0	0.000%	386,515	0	0.000%	0	0	#DIV/0!
Religious/ Non-profit	37	0	0.000%	3,957,078	0	0.000%	0	0	#DIV/0!
Government	70	0	0.000%	5,667,595	0	0.000%	0	0	#DIV/0!
Education	19	0	0.000%	4,364,185	0	0.000%	0	0	#DIV/0!
Utilities	2	0	0.000%	6,117,085	0	0.000%	0	0	#DIV/0!
Total	5,890	13	0.221%	262,827,949	367,435	0.140%	7,622	18	0%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Auburn - Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	5,478	5,212	95.144%	207,500,373	197,424,597	95.144%	7,622	7,252	95%
Commercial	250	231	92.400%	26,316,823	24,316,744	92.400%	0	0	#DIV/0!
Industrial	26	21	80.769%	8,548,295	6,904,392	80.769%	0	0	#DIV/0!
Agricultural	8	6	75.000%	366,515	274,886	75.000%	0	0	#DIV/0!
Religious / Non-profit	37	35	94.595%	3,957,078	3,743,182	94.595%	0	0	#DIV/0!
Government	70	64	91.429%	5,657,595	5,172,658	91.429%	0	0	#DIV/0!
Education	19	16	84.211%	4,364,185	3,675,103	84.211%	0	0	#DIV/0!
Utilities	2	2	100.000%	6,117,085	6,117,085	100.000%	0	0	#DIV/0!
Total	5,890	5,587	94.856%	262,827,949	247,628,648	94.217%	7,622	7,252	95%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Bethlehem - Barrow County
Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	600	600	100.000%	20,014,015	20,014,015	100.000%	696	696	100%
Commercial	48	48	100.000%	4,279,098	4,279,098	100.000%	0	0	#DIV/0!
Industrial	32	32	100.000%	4,497,100	4,497,100	100.000%	0	0	#DIV/0!
Agricultural	13	13	100.000%	265,868	265,868	100.000%	0	0	#DIV/0!
Religious / Non-profit	36	36	100.000%	19,488,418	19,488,418	100.000%	0	0	#DIV/0!
Government	42	42	100.000%	3,836,138	3,836,138	100.000%	0	0	#DIV/0!
Education	4	4	100.000%	1,776,395	1,776,395	100.000%	0	0	#DIV/0!
Utilities	1	1	100.000%	1,130,903	1,130,903	100.000%	0	0	#DIV/0!
Total	776	776	100.000%	55,287,935	55,287,935	100.000%	696	696	100%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		N
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Bethlehem - Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	600	0	0.000%	20,014,015	0	0.000%	696	0	0%
Commercial	48	0	0.000%	4,279,098	0	0.000%	0	0	#DIV/0!
Industrial	32	0	0.000%	4,497,100	0	0.000%	0	0	#DIV/0!
Agricultural	13	0	0.000%	255,888	0	0.000%	0	0	#DIV/0!
Religious/ Non-profit	36	0	0.000%	19,488,418	0	0.000%	0	0	#DIV/0!
Government	42	0	0.000%	3,836,138	0	0.000%	0	0	#DIV/0!
Education	4	0	0.000%	1,776,395	0	0.000%	0	0	#DIV/0!
Utilities	1	0	0.000%	1,130,903	0	0.000%	0	0	#DIV/0!
Total	776	0	0.000%	55,287,935	0	0.000%	696	0	0%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Bethlehem - Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	600	582	97.000%	20,014,015	19,413,595	97.000%	696	675	97%
Commercial	48	43	89.583%	4,279,098	3,833,359	89.583%	0	0	#DIV/0!
Industrial	32	28	87.500%	4,497,100	3,934,963	87.500%	0	0	#DIV/0!
Agricultural	13	12	92.308%	265,868	245,417	92.308%	0	0	#DIV/0!
Religious / Non-profit	36	34	94.444%	19,488,418	18,405,728	94.444%	0	0	#DIV/0!
Government	42	35	83.333%	3,836,138	3,196,782	83.333%	0	0	#DIV/0!
Education	4	4	100.000%	1,776,395	1,776,395	100.000%	0	0	#DIV/0!
Utilities	1	1	100.000%	1,130,903	1,130,903	100.000%	0	0	#DIV/0!
Total	776	739	95.232%	55,287,935	51,937,140	93.939%	696	675	97%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Braselton - Barrow County
Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	1,320	1,320	100.000%	162,207,415	162,207,415	100.000%	10,947	10,947	100%
Commercial	198	198	100.000%	59,421,945	59,421,945	100.000%	0	0	#DIV/0!
Industrial	32	32	100.000%	60,253,635	60,253,635	100.000%	0	0	#DIV/0!
Agricultural	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Religious / Non-profit	3	3	100.000%	2,305,478	2,305,478	100.000%	0	0	#DIV/0!
Government	8	8	100.000%	1,645,430	1,645,430	100.000%	0	0	#DIV/0!
Education	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Utilities	1	1	100.000%	6,009,990	6,009,990	100.000%	0	0	#DIV/0!
Total	1,562	1,562	100.000%	291,843,893	#DIV/0!	#DIV/0!	10,947	#DIV/0!	#DIV/0!

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		N
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Braselton - Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community or State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	1,320	30	2.273%	162,207,415	1,319,725	0.814%	10,947	249	2%
Commercial	198	6	3.030%	59,421,945	100,570	0.169%	0	0	#DIV/0!
Industrial	32	4	12.500%	60,253,835	12,248	0.020%	0	0	#DIV/0!
Agricultural	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Religious/ Non-profit	3	0	0.000%	2,305,478	0	0.000%	0	0	#DIV/0!
Government	8	0	0.000%	1,645,430	0	0.000%	0	0	#DIV/0!
Education	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Utilities	1	0	0.000%	6,009,990	0	0.000%	0	0	#DIV/0!
Total	1,562	40	2.561%	291,843,893	#DIV/0!	#DIV/0!	10,947	#DIV/0!	#DIV/0!

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Braselton - Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	1,320	1,289	97.652%	162,207,415	158,397,998	97.652%	10,947	10,690	98%
Commercial	198	175	88.384%	59,421,945	52,519,396	88.384%	0	0	#DIV/0!
Industrial	32	26	81.250%	60,253,635	48,956,078	81.250%	0	0	#DIV/0!
Agricultural	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Religious / Non-profit	3	3	100.000%	2,305,478	2,305,478	100.000%	0	0	#DIV/0!
Government	8	7	87.500%	1,645,430	1,439,751	87.500%	0	0	#DIV/0!
Education	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Utilities	1	1	100.000%	6,009,990	6,009,990	100.000%	0	0	#DIV/0!
Total	1,562	1,501	96.095%	291,843,893	#DIV/0!	#DIV/0!	10,947	#DIV/0!	#DIV/0!

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Carl - Barrow County
Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	216	216	100.000%	5,978,760	5,978,760	100.000%	225	225	100%
Commercial	60	60	100.000%	2,515,020	2,515,020	100.000%	0	0	#DIV/0!
Industrial	6	6	100.000%	367,363	367,363	100.000%	0	0	#DIV/0!
Agricultural	11	11	100.000%	324,478	324,478	100.000%	0	0	#DIV/0!
Religious / Non-profit	20	20	100.000%	3,202,313	3,202,313	100.000%	0	0	#DIV/0!
Government	8	8	100.000%	511,458	511,458	100.000%	0	0	#DIV/0!
Education	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Utilities	1	1	100.000%	1,326,388	1,326,388	100.000%	0	0	#DIV/0!
Total	322	322	100.000%	14,225,780	#DIV/0!	#DIV/0!	225	#DIV/0!	#DIV/0!

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		N
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Carl - Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community or State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	216	0	0.000%	5,978,760	0	0.000%	225	0	0%
Commercial	60	0	0.000%	2,515,020	0	0.000%	0	0	#DIV/0!
Industrial	6	0	0.000%	367,383	0	0.000%	0	0	#DIV/0!
Agricultural	11	0	0.000%	324,478	0	0.000%	0	0	#DIV/0!
Religious/ Non-profit	20	0	0.000%	3,202,313	0	0.000%	0	0	#DIV/0!
Government	8	0	0.000%	511,458	0	0.000%	0	0	#DIV/0!
Education	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Utilities	1	0	0.000%	1,326,388	0	0.000%	0	0	#DIV/0!
Total	322	0	0.000%	14,225,780	#DIV/0!	#DIV/0!	225	#DIV/0!	#DIV/0!

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Carl - Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	216	216	100.000%	5,978,760	5,978,760	100.000%	225	225	1.00%
Commercial	60	60	100.000%	2,515,020	2,515,020	100.000%	0	0	#DIV/0!
Industrial	6	6	100.000%	367,363	367,363	100.000%	0	0	#DIV/0!
Agricultural	11	11	100.000%	324,478	324,478	100.000%	0	0	#DIV/0!
Religious / Non-profit	20	20	100.000%	3,202,313	3,202,313	100.000%	0	0	#DIV/0!
Government	8	8	100.000%	511,458	511,458	100.000%	0	0	#DIV/0!
Education	0	0	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!
Utilities	1	1	100.000%	1,326,388	1,326,388	100.000%	0	0	#DIV/0!
Total	322	322	100.000%	14,225,780	#DIV/0!	#DIV/0!	225	#DIV/0!	#DIV/0!

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**

Jurisdiction: Statham - Barrow County

Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	1,989	1,989	100.000%	67,538,988	67,538,988	100.000%	2,694	2,694	100%
Commercial	168	168	100.000%	18,895,830	18,895,830	100.000%	0	0	#DIV/0!
Industrial	38	38	100.000%	10,884,020	10,884,020	100.000%	0	0	#DIV/0!
Agricultural	7	7	100.000%	132,258	132,258	100.000%	0	0	#DIV/0!
Religious / Non-profit	28	28	100.000%	2,427,135	2,427,135	100.000%	0	0	#DIV/0!
Government	82	82	100.000%	13,702,650	13,702,650	100.000%	0	0	#DIV/0!
Education	14	14	100.000%	17,216,955	17,216,955	100.000%	0	0	#DIV/0!
Utilities	5	5	100.000%	5,715,353	5,715,353	100.000%	0	0	#DIV/0!
Total	2,331	2,331	100.000%	136,513,189	136,513,189	100.000%	2,694	2,694	100%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		N
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Statham - Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community or State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	1,989	3	0.151%	67,538,988	132,683	0.196%	2,694	4	0%
Commercial	168	0	0.000%	18,895,830	0	0.000%	0	0	#DIV/0!
Industrial	38	0	0.000%	10,884,020	0	0.000%	0	0	#DIV/0!
Agricultural	7	0	0.000%	132,258	0	0.000%	0	0	#DIV/0!
Religious/ Non profit	28	0	0.000%	2,427,135	0	0.000%	0	0	#DIV/0!
Government	82	0	0.000%	13,702,650	0	0.000%	0	0	#DIV/0!
Education	14	0	0.000%	17,216,955	0	0.000%	0	0	#DIV/0!
Utilities	5	0	0.000%	5,715,353	0	0.000%	0	0	#DIV/0!
Total	2,331	3	0.129%	136,513,189	132,683	0.097%	2,694	4	0%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Statham - Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	1,989	1,564	78.632%	67,538,988	53,107,580	78.632%	2,694	2,118	79%
Commercial	168	143	85.119%	18,895,830	16,083,951	85.119%	0	0	#DIV/0!
Industrial	38	23	60.526%	10,884,020	6,587,696	60.526%	0	0	#DIV/0!
Agricultural	7	5	71.429%	132,258	94,470	71.429%	0	0	#DIV/0!
Religious / Non-profit	28	24	85.714%	2,427,135	2,080,401	85.714%	0	0	#DIV/0!
Government	82	64	78.049%	13,702,650	10,694,751	78.049%	0	0	#DIV/0!
Education	14	12	85.714%	17,216,955	14,757,390	85.714%	0	0	#DIV/0!
Utilities	5	4	80.000%	5,715,353	4,572,282	80.000%	0	0	#DIV/0!
Total	2,331	1,839	78.893%	136,513,189	107,978,522	79.098%	2,694	2,118	79%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Winder - Barrow County
Hazard: Non-Spatially Defined Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	11,979	11,979	100.000%	547,787,523	547,787,523	100.000%	16,244	16,244	100%
Commercial	1,487	1,487	100.000%	171,500,720	171,500,720	100.000%	0	0	#DIV/0!
Industrial	21	21	100.000%	1,201,668	1,201,668	100.000%	0	0	#DIV/0!
Agricultural	32	32	100.000%	1,716,653	1,716,653	100.000%	0	0	#DIV/0!
Religious / Non-profit	170	170	100.000%	35,518,768	35,518,768	100.000%	0	0	#DIV/0!
Government	413	413	100.000%	121,342,145	121,342,145	100.000%	0	0	#DIV/0!
Education	56	56	100.000%	44,315,853	44,315,853	100.000%	0	0	#DIV/0!
Utilities	2	2	100.000%	14,975,838	14,975,838	100.000%	0	0	#DIV/0!
Total	14,160	14,160	100.000%	938,359,168	938,359,168	100.000%	16,244	16,244	100%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?		N
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?		N
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?		N
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?		N
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?		N
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Winder - Barrow County
Hazard: Flood Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	11,979	33	0.275%	547,787,523	1,545,686	0.282%	16,244	45	0%
Commercial	1,487	0	0.000%	171,500,720	0	0.000%	0	0	#DIV/0!
Industrial	21	0	0.000%	1,201,668	0	0.000%	0	0	#DIV/0!
Agricultural	32	0	0.000%	1,716,853	0	0.000%	0	0	#DIV/0!
Religious/ Non-profit	170	0	0.000%	35,518,768	0	0.000%	0	0	#DIV/0!
Government	413	0	0.000%	121,342,145	0	0.000%	0	0	#DIV/0!
Education	58	0	0.000%	44,315,853	0	0.000%	0	0	#DIV/0!
Utilities	2	0	0.000%	14,975,838	0	0.000%	0	0	#DIV/0!
Total	14,160	33	0.233%	938,359,168	1,545,686	0.165%	16,244	45	0%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

GEMA Worksheet #3a **Inventory of Assets**
Jurisdiction: Winder - Barrow County
Hazard: Wildfire Hazard

Task A. Determine the proportion of buildings, the value of buildings, and the population in your community or state that are located in hazard areas.

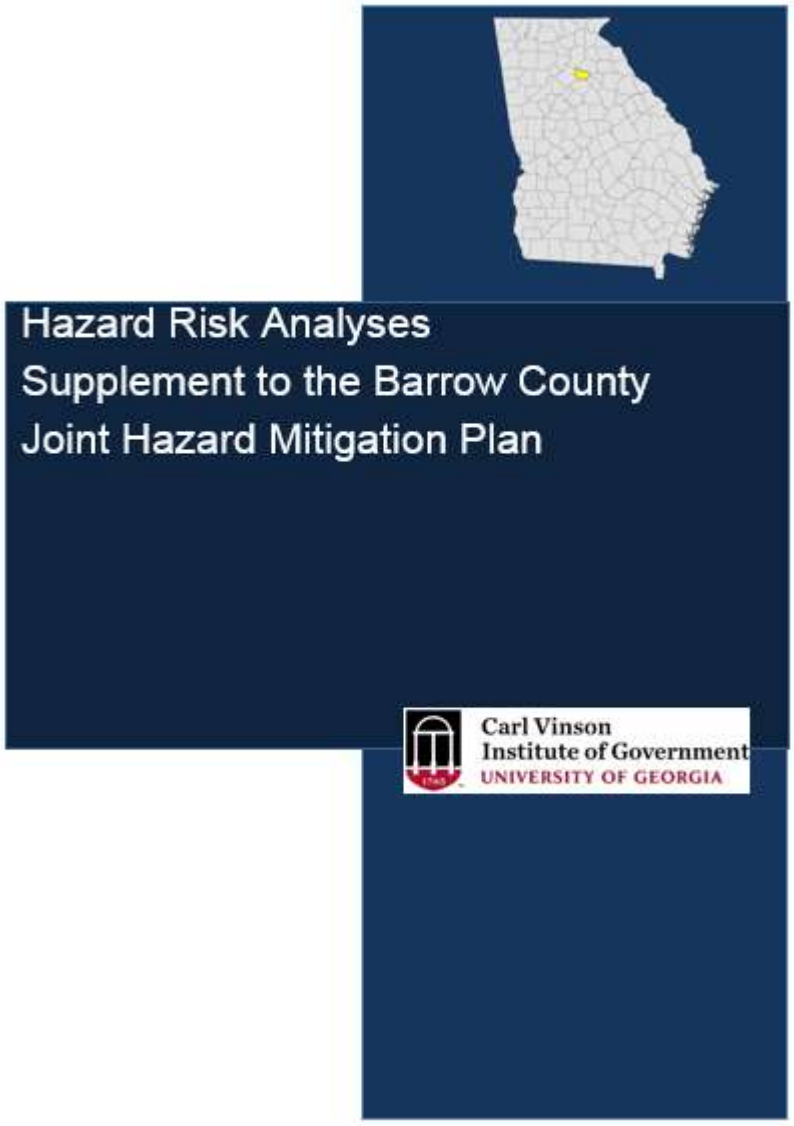
	Number of Structures			Value of Structures			Number of People		
Type of Structure (Occupancy Class)	# in Community of State	# in Hazard Area	% in Hazard Area	$ in Community or State	$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	11,979	8,372	69.889%	547,787,523	382,843,071	69.889%	16,244	11,353	70%
Commercial	1,487	451	30.330%	171,500,720	52,015,350	30.330%	0	0	#DIV/0!
Industrial	21	8	38.095%	1,201,668	457,778	38.095%	0	0	#DIV/0!
Agricultural	32	27	84.375%	1,716,653	1,448,426	84.375%	0	0	#DIV/0!
Religious / Non-profit	170	96	56.471%	35,518,768	20,057,657	56.471%	0	0	#DIV/0!
Government	413	213	51.574%	121,342,145	62,580,816	51.574%	0	0	#DIV/0!
Education	56	32	57.143%	44,315,853	25,323,345	57.143%	0	0	#DIV/0!
Utilities	2	2	100.000%	14,975,838	14,975,838	100.000%	0	0	#DIV/0!
Total	14,160	9,201	64.979%	938,359,168	559,702,280	59.647%	16,244	11,353	70%

Task B. Determine whether (and where) you want to collect additional inventory data.

	Y	N
1. Do you know where the greatest damages may occur in your area?	Y	
2. Do you know whether your critical facilities will be operational after a hazard event?		N
3. Is there enough data to determine which assets are subject to the greatest potential damages?	Y	
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	Y	
5. Is there enough data to determine whether certain areas of historic, environmental, political, or cultural significance are vulnerable to potential hazards?	Y	
6. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	Y	
7. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?		N

Appendix F – Documentation of Peer Review

Appendix G – 2019 Barrow County HAZUS Report



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Introduction

The Federal Disaster Mitigation Act of 2000 (DMA2K) requires state, local, and tribal governments to develop and maintain a mitigation plan to be eligible for certain federal disaster assistance and hazard mitigation funding programs.

Mitigation seeks to reduce a hazard's impacts, which may include loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation must be based on a sound risk assessment that quantifies the potential losses of a disaster by assessing the vulnerability of buildings, infrastructure, and people.

In recognition of the importance of planning in mitigation activities, FEMA Hazus-MH, a powerful disaster risk assessment tool based on geographic information systems (GIS). This tool enables communities of all sizes to predict estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses.

In 2019, the Georgia Department of Emergency Management partnered with the Carl Vinson Institute of Government at the University of Georgia to develop a detailed risk assessment focused on defining hurricane, riverine flood, and tornado risks in Barrow County, Georgia. This assessment identifies the characteristics and potential consequences of the disaster, how much of the community could be affected by the disaster, and the impact on community assets.

Risk Assessment Process Overview

Hazus-MH Version 2.2 SP1 was used to perform the analyses for Barrow County. The Hazus-MH application includes default data for every county in the US. This Hazus-MH data was derived from a variety of national sources and in some cases the data are also several years old. Whenever possible, using local provided data is preferred. Barrow County provided building inventory information from the county's property tax assessment system. This section describes the changes made to the default Hazus-MH inventory and the modeling parameters used for each scenario.

County Inventory Changes

The default Hazus-MH site-specific point inventory was updated using data compiled from the Georgia Emergency Management Agency (GEMA). The default Hazus-MH aggregate inventory (General Building Stock) was also updated prior to running the scenarios. Reported losses reflect the updated data sets.

General Building Stock Updates

General Building Stock (GBS) is an inventory category that consists of aggregated data (grouped by census geography — tract or block). Hazus-MH generates a combination of site-specific and aggregated loss estimates based on the given analysis and user input.

The GBS records for Barrow County were replaced with data derived from parcel and property assessment data obtained from Barrow County. The county provided property assessment data was current as of April 2019 and the parcel data current as of April 2019. Records without improvements were deleted. The parcel boundaries were converted to parcel points located in the centroids of each parcel boundary; then, each parcel point was linked to an assessor record based upon matching parcel numbers. The parcel assessor match-rate for Barrow County is 98.5%. The generated building inventory represents the approximate locations (within a parcel) of structures. The building inventory was aggregated by census block. Both the tract and block tables were updated. Table 1 shows the results of the changes to the GBS tables by occupancy class.

Table 1: GBS Building Exposure Updates by Occupancy Class*

General Occupancy	Default Hazus-MH Count	Updated Count	Default Hazus-MH Exposure	Updated Exposure
Agricultural	67	26	$26,598,000	$960,000
Commercial	945	1,171	$518,687,000	$334,597,000
Education	24	62	$35,388,000	$182,052,000
Government	29	100	$31,424,000	$59,219,000
Industrial	405	606	$217,110,000	$338,835,000
Religious	86	204	$59,636,000	$55,715,000
Residential	25,408	27,610	$5,361,851,000	$4,239,450,000
Total	26,964	29,779	$6,250,694,000	$5,210,828,000

*The exposure values represent the total number and replacement cost for all Barrow County Buildings

For Barrow County, the updated GBS was used to calculate hurricane wind losses. The flood losses and tornado losses were calculated from building inventory modeled in Hazus-MH as User-Defined Facility

(UDF)[1], or site-specific points. Figure 1 shows the distribution of buildings as points based on the county provided data.

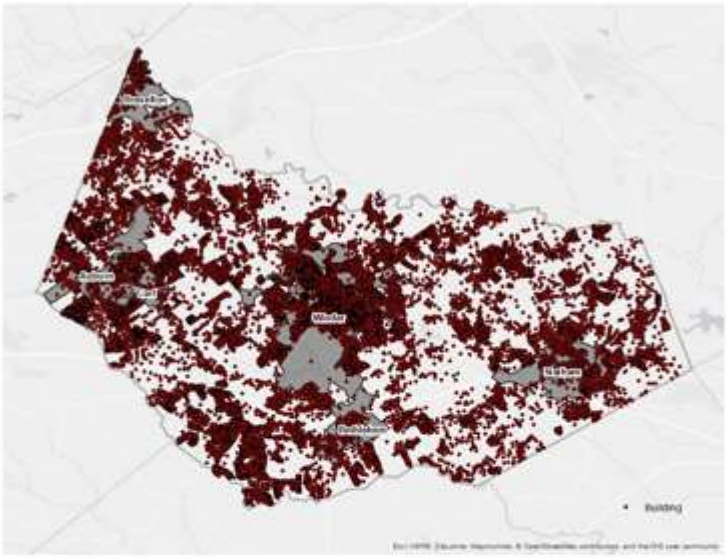

Figure 1: Barrow County Overview

Essential Facility Updates

The default Hazus-MH essential facility data was updated to reflect improved information available in the Georgia Mitigation Information System (GMIS) as of August 2019. For these risk analyses, only GMIS data for buildings that Hazus-MH classified as Essential Facilities was integrated into Hazus-MH because the application provides specialized reports for these five facilities. Essential Facility inventory was updated for the analysis conducted for this report. The following table summarizes the counts and exposures, where available, by Essential Facility classification of the updated data.

Essential facilities include:

- Care facilities
- EOCs
- Fire stations
- Police stations
- Schools

[1] The UDF inventory category in Hazus-MH allows the user to enter site-specific data in place of GBS data.

Table 2: Updated Essential Facilities

Classification	Updated Count	Updated Exposure
Auburn		
EOC	0	$0
Care	0	$0
Fire	1	$277,000
Police	1	$385,000
School	1	$3,124,000
Total	3	$3,786,000
Bethlehem		
EOC	0	$0
Care	0	$0
Fire	1	$221,000
Police	0	$0
School	1	$248,000
Total	2	$469,000
Braselton		
EOC	0	$0
Care	0	$0
Fire	0	$0
Police	0	$0
School	0	$0
Total	0	$0
Carl		
EOC	0	$0
Care	0	$0
Fire	0	$0
Police	0	$0
School	0	$0
Total	0	$0

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Classification	Updated Count	Updated Exposure
	Statham	
EOC	0	$0
Care	1	$930,000
Fire	1	$281,000
Police	1	$224,000
School	2	$14,783,000
Total	5	$16,218,000
	Winder	
EOC	1	$3,680,000
Care	4	$10,845,000
Fire	2	$878,000
Police	2	$16,270,000
School	3	$22,725,000
Total	12	$54,398,000
	Unincorporated Areas of Barrow County	
EOC	0	$0
Care	0	$0
Fire	3	$1,459,000
Police	0	$0
School	11	$39,489,000
Total	14	$40,948,000

Assumptions and Exceptions

Hazus-MH loss estimates may be impacted by certain assumptions and process variances made in this risk assessment.

- The Barrow County analysis used Hazus-MH Version 2.2 SP1, which was released by FEMA in May 2015.
- County provided parcel and property assessment data may not fully reflect all buildings in the county. For example, some counties do not report not-for-profit buildings such as government buildings, schools and churches in their property assessment data. This data was used to update the General Building Stock as well as the User Defined Facilities applied in this risk assessment.
- Georgia statute requires that the Assessor's Office assign a code to all of the buildings on a parcel based on the buildings primary use. If there is a residential or a commercial structure on a parcel and there are also agricultural buildings on the same parcel Hazus-MH looks at the residential and commercial "primary" structures first and then combines the value of all

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secondary structures on that parcel with the value of the primary structure. The values and building counts are still accurate but secondary structures are accounted for under the same classification as the primary structure. Because of this workflow, the only time that a parcel would show a value for an agricultural building is when there are no residential or commercial structures on the parcel thus making the agricultural building the primary structure. This is the reason that agricultural building counts and total values seem low or are nonexistent.

- GBS updates from assessor data will skew loss calculations. The following attributes were defaulted or calculated:
  - Foundation Type was set from Occupancy Class
  - First Floor Height was set from Foundation Type
  - Content Cost was calculated from Replacement Cost
- It is assumed that the buildings are located at the centroid of the parcel.
- The essential facilities extracted from the GMIS were only used in the portion of the analysis designated as essential facility damage. They were not used in the update of the General Building Stock or the User Defined Facility inventory.

The hazard models included in this risk assessment included:

- Hurricane assessment which was comprised of a wind only damage assessment.
- Flood assessment based on the 1% annual chance event that includes riverine assessments.
- Tornado assessment based on GIS modeling.

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Hurricane Risk Assessment

Hazard Definition

The National Hurricane Center describes a hurricane as a tropical cyclone in which the maximum sustained wind is, at minimum, 74 miles per hour (mph)[2]. The term hurricane is used for Northern Hemisphere tropical cyclones east of the International Dateline to the Greenwich Meridian. The term typhoon is used for Pacific tropical cyclones north of the Equator west of the International Dateline. Hurricanes in the Atlantic Ocean, Gulf of Mexico, and Caribbean form between June and November with the peak of hurricane season occurring in the middle of September. Hurricane intensities are measured using the Saffir-Simpson Hurricane Wind Scale (Table 3). This scale is a 1 to 5 categorization based on the hurricane's intensity at the indicated time.

Hurricanes bring a complex set of impacts. The winds from a hurricane produce a rise in the water level at landfall called storm surge. Storm surges produce coastal flooding effects that can be as damaging as the hurricane's winds. Hurricanes bring very intense inland riverine flooding. Hurricanes can also produce tornadoes that can add to the wind damages inland. In this risk assessment, only hurricane winds, and coastal storm surge are considered.

Table 3: Saffir-Simpson Hurricane Wind Scale

Category	Wind Speed (mph)	Damage
1	74 - 95	Very dangerous winds will produce some damage
2	96 - 110	Extremely dangerous winds will cause extensive damage
3	111 - 130	Devastating damage will occur
4	131 -155	Catastrophic damage will occur
5	> 155	Catastrophic damage will occur

The National Oceanic and Atmospheric Administration's National Hurricane Center created the HURDAT database, which contains all of the tracks of tropical systems since the mid-1800s. This database was used to document the number of tropical systems that have affected Barrow County by creating a 20-mile buffer around the county to include storms that didn't make direct landfall in Barrow County but impacted the county. Note that the storms listed contain the peak sustained winds, maximum pressure and maximum attained storm strength for the entire storm duration. Since 1859, Barrow County has had 13 tropical systems within 20 miles of its county borders (Table 4).

Table 4: Tropical Systems affecting Barrow County[3]

YEAR	DATE RANGE	NAME	MAX WIND(Knots)	MAX PRESSURE	MAX CAT
1859	September 15-18	UNNAMED	70	0	TO

[2] National Hurricane Center (2011). "Glossary of NHC Terms." National Oceanic and Atmospheric Administration. http://www.nhc.noaa.gov/aboutgloss.shtml#h. Retrieved 2012-23-02.

[3] Atlantic Oceanic and Meteorological Laboratory (2012). "Data Center." National Oceanic and Atmospheric Administration. http://www.aoml.noaa.gov/hrd/data_sub/re_anal.html. Retrieved 7-20-2015.

YEAR	DATE RANGE	NAME	MAX WIND(Knots)	MAX PRESSURE	MAX CAT
1896	July 04-12	UNNAMED	85	0	H1
1900	September 11-15	UNNAMED	45	0	TD
1901	September 21 - October 02	UNNAMED	45	0	TD
1902	October 03-13	UNNAMED	90	970	H1
1903	September 09-16	UNNAMED	80	988	H1
1907	September 18-23	UNNAMED	40	0	TD
1911	August 23-31	UNNAMED	85	972	H1
1912	June 07-17	UNNAMED	60	0	TD
1959	October 06-09	IRENE	40	1003	TD
1994	August 14-19	BERYL	50	1013	TD
1995	August 22-28	JERRY	35	1010	TD
1997	July 16-27	DANNY	70	1013	TD

Category Definitions:

TS – Tropical storm

TD – Tropical depression

H1 – Category 1 (same format for H2, H3, and H4)

E – Extra-tropical cyclone

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Figure 2: Continental United States Hurricane Strikes: 1950 to 2017[4]

Probabilistic Hurricane Scenario

The following probabilistic wind damage risk assessment modeled a Tropical Storm with maximum winds of 66 mph.

Wind Damage Assessment

Separate analyses were performed to determine wind and hurricane storm surge related flood losses. This section describes the wind-based losses to Barrow County. Wind losses were determined from probabilistic models run for the Tropical Storm which equates to the 1% chance storm event. Figure 3 shows wind speeds for the modeled Tropical Storm.

[4] Source: NOAA National Centers for Environmental Information

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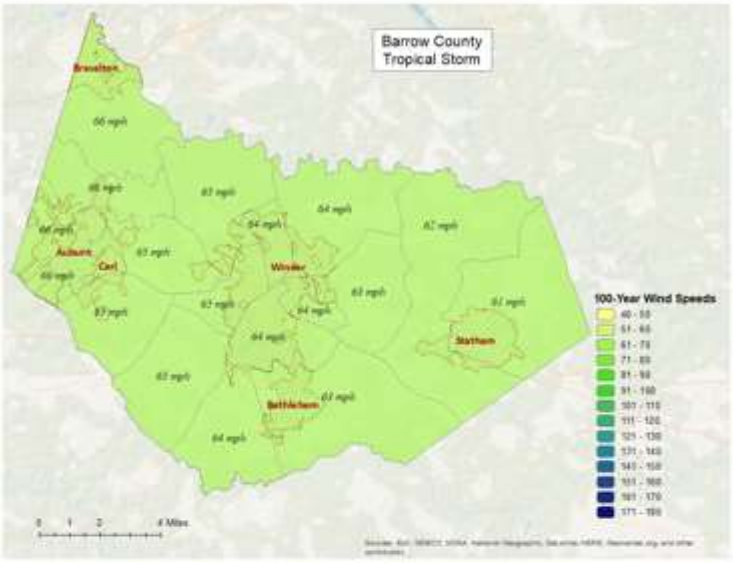

Figure 3: Wind Speeds by Storm Category

Wind-Related Building Damages

Buildings in Barrow County are vulnerable to storm events, and the cost to rebuild may have significant consequences to the community. The following table shows a summary of the results of wind-related building damage in Barrow County for the Tropical Storm (100 Year Event). The loss ratio expresses building losses as a percentage of total building replacement cost in the county. Figure 4 illustrates the building loss ratios of the modeled Tropical Storm.

Table 5: Hurricane Wind Building Damage

Classification	Number of Buildings Damaged	Total Building Damage	Total Economic Loss[5]	Loss Ratio
Tropical Storm	47	$2,370,310	$2,966,370	0.05%

[5] Includes property damage (infrastructure, contents, and inventory) as well as business interruption losses.

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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.

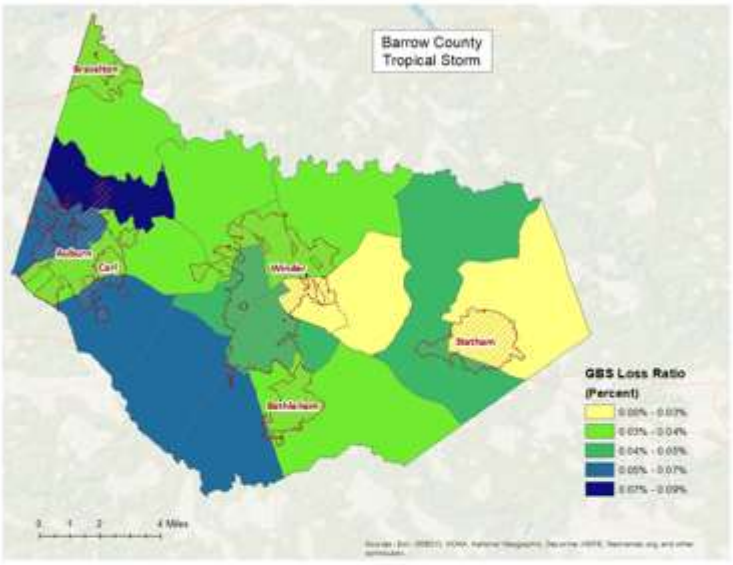

Figure 4: Hurricane Wind Building Loss Ratios

Essential Facility Losses

Essential facilities are also vulnerable to storm events, and the potential loss of functionality may have significant consequences to the community. Hazus-MH identified the essential facilities that may be moderately or severely damaged by winds. The results are compiled in Table 6.

There are 36 essential facilities in Barrow County.

Classification	Number
EOCs	1
Fire Stations	8
Care Facilities	5
Police Stations	4
Schools	18

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Table 6: Wind-Damaged Essential Facility Losses

Classification	Facilities At Least Moderately Damaged > 50%	Facilities Completely Damaged > 50%	Facilities with Expected Loss of Use (< 1 day)
Tropical Storm	0	0	36

Shelter Requirements

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. Since the 1% chance storm event for Barrow County is a Tropical Storm, the resulting damage is not enough to displace Households or require temporary shelters as shown in the results listed in Table 7.

Table 7: Displaced Households and People

Classification	# of Displaced Households	# of People Needing Short-Term Shelter
Tropical Storm	0	0

Debris Generated from Hurricane Wind

Hazus-MH estimates the amount of debris that will be generated by high velocity hurricane winds and quantifies it into three broad categories to determine the material handling equipment needed:

- Reinforced Concrete and Steel Debris
- Brick and Wood and Other Building Debris
- Tree Debris

Different material handling equipment is required for each category of debris. The estimates of debris for this scenario are listed in Table 8. The amount of hurricane wind related tree debris that is estimated to require pick up at the public's expense is listed in the eligible tree debris column.

Table 8: Wind-Related Debris Weight (Tons)

Classification	Brick, Wood, and Other	Reinforced Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
Tropical Storm	141	0	999	4,172	5,312

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Figure 5 shows the distribution of all wind related debris resulting from a Tropical Storm. Each dot represents 20 tons of debris within the census tract in which it is located. The dots are randomly distributed within each census tract and therefore do not represent the specific location of debris sites.

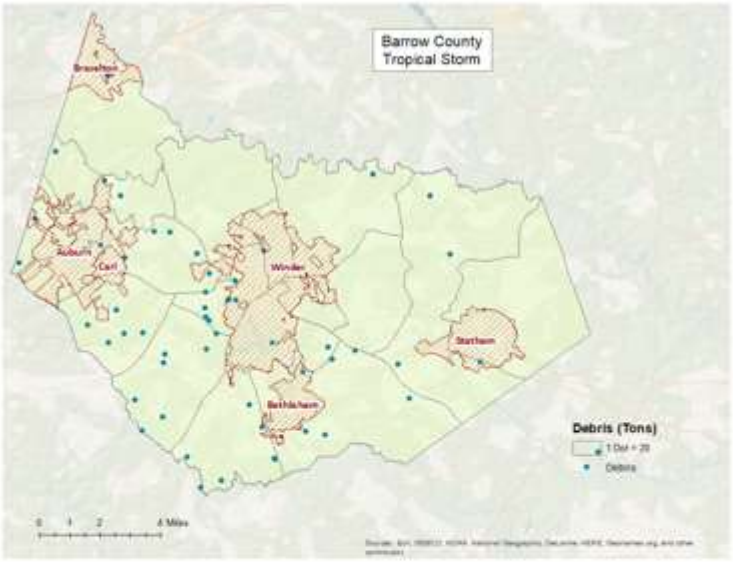

Figure 5: Wind-Related Debris Weight (Tons)

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Flood Risk Assessment

Hazard Definition

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods can be classified as one of three types: upstream floods, downstream floods, or coastal floods.

Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe in the local areas in which they occur. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at any time of the year in Georgia, but they are most common in the spring and summer months.

Downstream floods, also called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and time of the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage.

Coastal floods occurring on the Atlantic and Gulf coasts may be related to hurricanes or other combined offshore, nearshore, and shoreline processes. The effects of these complex interrelationships vary significantly across coastal settings, leading to challenges in the determination of the base (1-percent-annual-chance) flood for hazard mapping purposes. Land area covered by floodwaters of the base flood is identified as a Special Flood Hazard Area (SFHA). The Barrow County flood risk assessment analyzed at risk structures in the SFHA.

The SFHA is the area where the National Flood Insurance Program's (NFIP) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The owner of a structure in a high-risk area must carry flood insurance, if the owner carries a mortgage from a federally regulated or insured lender or servicer.

The following probabilistic risk assessment involves an analysis of a 1% annual chance riverine flood event (100-Year Flood) and a 1% annual chance coastal flood.

Riverine 1% Flood Scenario

Riverine losses were determined from the 1% flood boundaries downloaded from the FEMA Flood Map Service Center in August 2019. The flood boundaries were overlaid with the USGS 10 meter DEM using

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the Hazus-MH Enhanced Quick Look tool to generate riverine depth grids. The riverine flood depth grid was then imported into Hazus-MH to calculate the riverine flood loss estimates. Figure 6 illustrates the riverine inundation boundary associated with the 1% annual chance.

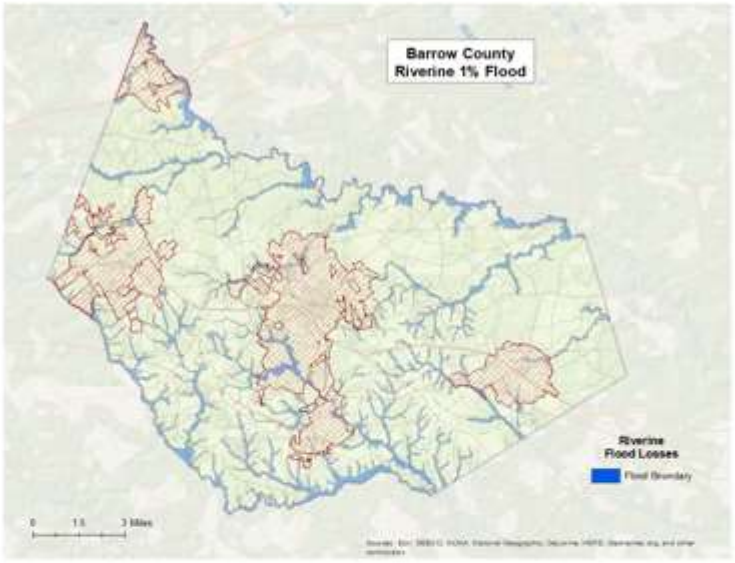

Figure 6: Riverine 1% Flood Inundation

Riverine 1% Flood Building Damages

Buildings in Barrow County are vulnerable to flooding from events equivalent to the 1% riverine flood. The economic and social impacts from a flood of this magnitude can be significant. Table 9 provides a summary of the potential flood-related building damage in Barrow County by jurisdiction that might be experienced from the 1% flood. Figure 7 maps the potential loss ratios of total building exposure to losses sustained to buildings from the 1% flood by 2010 census block and Figure 8 illustrates the relationship of building locations to the 1% flood inundation boundary.

Table 9: Barrow County Riverine 1% Building Losses

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
Auburn					
Residential	2,290	13	$308,281,235	$367,435	0.12%
Braselton					
Residential	637	30	$273,247,896	$1,319,725	0.48%
Commercial	56	6	$32,850,722	$100,570	0.31%
Industrial	25	4	$20,760,677	$12,246	0.06%
Statham					
Residential	960	3	$115,087,898	$132,683	0.12%
Unincorporated					
Government	18	1	$4,283,620	$7,067	0.16%
Commercial	346	26	$72,500,376	$1,522,406	2.10%
Religious	111	2	$20,776,406	$19,665	0.09%
Agricultural	15	2	$199,570	$19,742	9.89%
Industrial	342	18	$142,828,830	$3,529,632	2.47%
Residential	17,750	537	$2,661,729,433	$28,608,278	1.07%
Winder					
Residential	5,641	33	$839,085,111	$1,545,686	0.18%

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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
County Total					
	28,191	**675**	**$4,491,631,774**	**$37,185,135**	

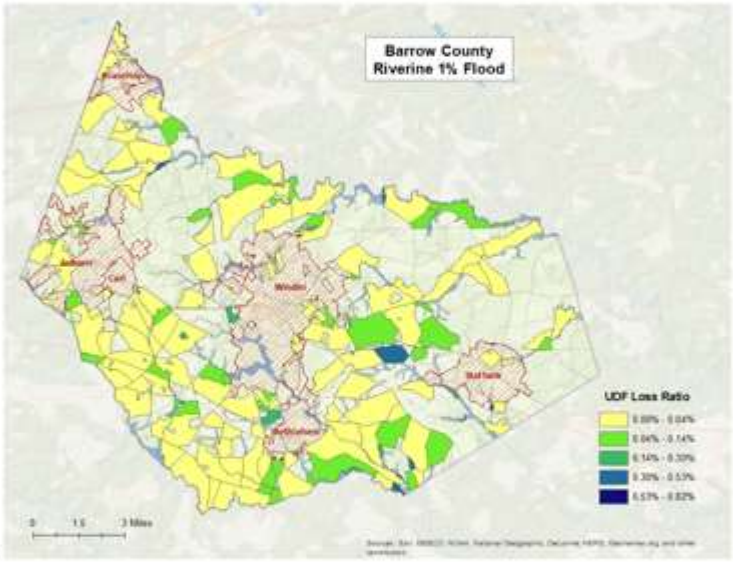

Figure 7: Barrow County Potential Loss Ratios of Total Building Exposure to Losses Sustained to Buildings from the 1% Riverine Flood by 2010 Census Block

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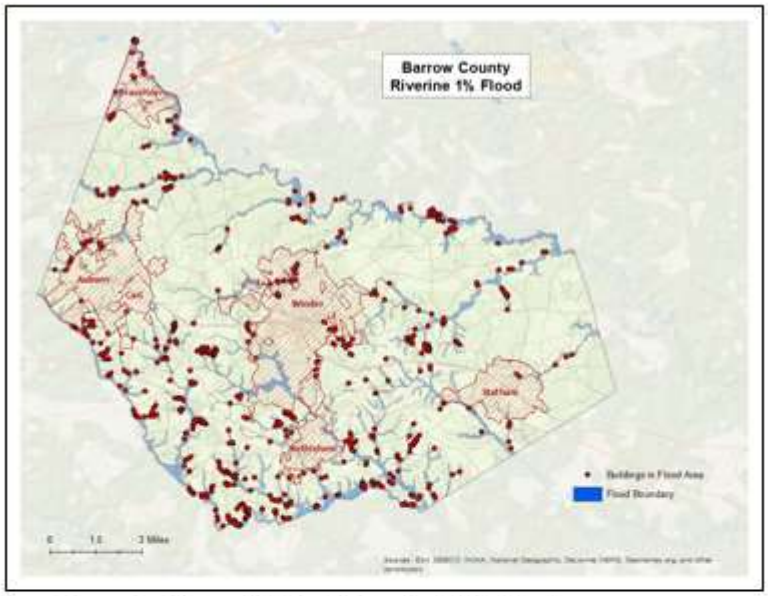

Figure 8: Barrow County Damaged Buildings in Riverine Floodplain (1% Flood)

Riverine 1% Flood Essential Facility Losses

An essential facility 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 no essential facility that were subject to damage in the Barrow County riverine 1% probability floodplain.

Riverine 1% Flood Shelter Requirements

Hazus-MH estimates that the number of households that are expected to be displaced from their homes due to riverine flooding and the associated potential evacuation. The model estimates 1,659 households might be displaced due to the flood. Displacement includes households evacuated within or very near to the inundated area. Displaced households represent 4,977 individuals, of which 3,355 may require short term publicly provided shelter. The results are mapped in Figure 9.

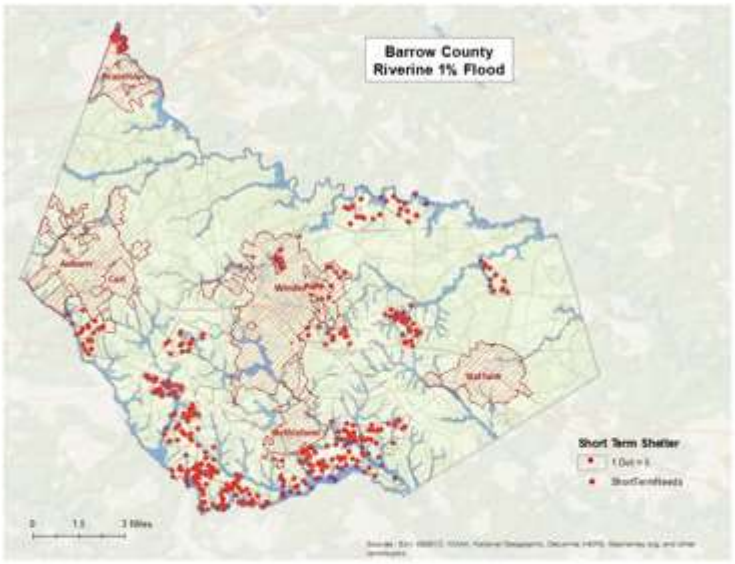

Figure 9: Riverine 1% Estimated Flood Shelter Requirements

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Riverine 1% Flood Debris

Hazus-MH estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories:

- Finishes (dry wall, insulation, etc.)
- Structural (wood, brick, etc.)
- Foundations (concrete slab, concrete block, rebar, etc.)

Different types of material handling equipment will be required for each category. Debris definitions applied in Hazus-MH are unique to the Hazus-MH model and so do not necessarily conform to other definitions that may be employed in other models or guidelines.

The analysis estimates that an approximate total of 29,650 tons of debris might be generated: 1) Finishes- 8,181 tons; 2) Structural – 10,521 tons; and 3) Foundations- 10,948 tons. The results are mapped in Figure 10.

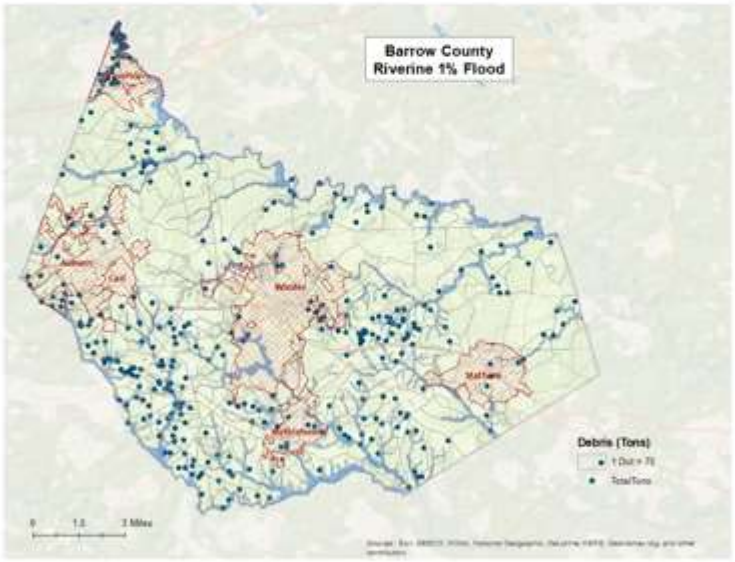

Figure 10: Riverine 1% Flood Debris Weight (Tons)

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Tornado Risk Assessment

Hazard Definition

Tornadoes pose a great risk to the state of Georgia and its citizens. Tornadoes can occur at any time during the day or night. They can also happen during any month of the year. The unpredictability of tornadoes makes them one of Georgia's most dangerous hazards. Their extreme winds are violently destructive when they touch down in the region's developed and populated areas. Current estimates place the maximum velocity at about 300 miles per hour, but higher and lower values can occur. A wind velocity of 200 miles per hour will result in a wind pressure of 102.4 pounds per square foot of surface area—a load that exceeds the tolerance limits of most buildings. Considering these factors, it is easy to understand why tornadoes can be so devastating for the communities they hit.

Tornadoes are defined as violently-rotating columns of air extending from thunderstorms and cyclonic events. Funnel clouds are rotating columns of air not in contact with the ground; however, the violently-rotating column of air can reach the ground very quickly and become a tornado. If the funnel cloud picks up and blows debris, it has reached the ground and is a tornado.

Tornadoes are classified according to the Fujita tornado intensity scale. Originally introduced in 1971, the scale was modified in 2006 to better define the damage and estimated wind scale. The Enhanced Fujita Scale ranges from low intensity EF0 with effective wind speeds of 65 to 85 miles per hour, to EF5 tornadoes with effective wind speeds of over 200 miles per hour. The Enhanced Fujita intensity scale is included in Table 10.

Table 10: Enhanced Fujita Tornado Rating

Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
EF0 Gale	65-85 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, sign boards damaged, shallow-rooted trees blown over.
EF1 Moderate	86-110 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
EF2 Significant	111-135 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted.
EF3 Severe	136-165 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
EF4 Devastating	166-200 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
EF5 Incredible	> 200 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Source: http://www.srh.noaa.gov

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Hypothetical Tornado Scenario

For this report, an EF3 tornado was modeled to illustrate the potential impacts of tornadoes of this magnitude in the county. The analysis used a hypothetical path based upon an EF3 tornado event running along the predominant direction of historical tornados (southeast to northwest). The tornado path was placed to travel through Crawford. The selected widths were modeled after a re-creation of the Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these categories. Table 11 depicts tornado path widths and expected damage.

Table 11: Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
EF-5	2,400	100%
EF-4	1,800	100%
EF-3	1,200	80%
EF-2	600	50%
EF-1	300	10%
EF-0	300	0%

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path, with decreasing amounts of damage away from the center. After the hypothetical path is digitized on a map, the process is modeled in GIS by adding buffers (damage zones) around the tornado path. Figure 11 describes the zone analysis.

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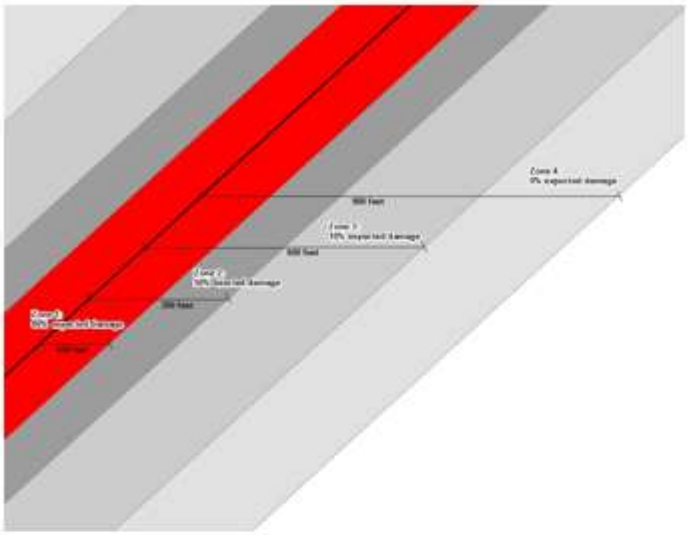

Figure 11: EF Scale Tornado Zones

An EF3 tornado has four damage zones, depicted in Table 12. Major damage is estimated within 150 feet of the tornado path. The outer buffer is 900 feet from the tornado path, within which buildings will not experience any damage. The selected hypothetical tornado path is depicted in Figure 12 and the damage curve buffer zones are shown in Figure 13.

Table 12: EF3 Tornado Zones and Damage Curves

Zone	Buffer (feet)	Damage Curve
1	0-150	80%
2	150-300	50%
3	300-600	10%
4	600-900	0%

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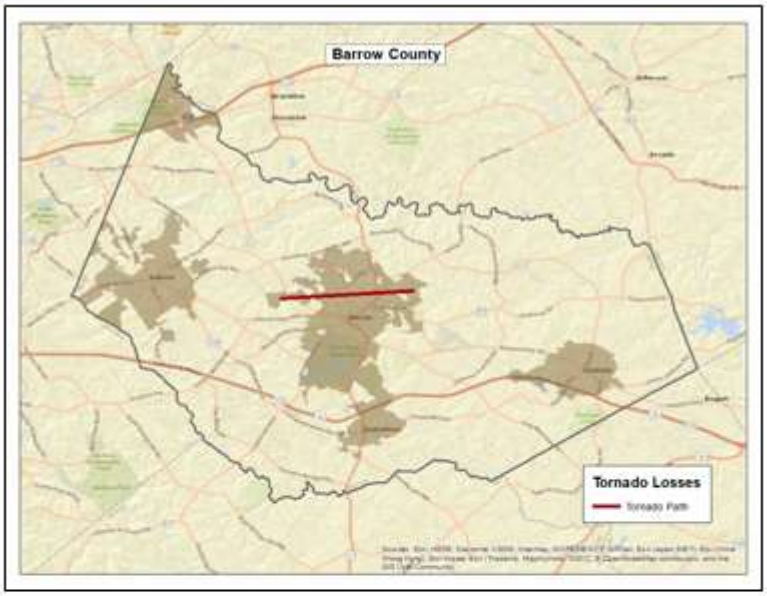

Figure 12: Hypothetical EF3 Tornado Path in Barrow County

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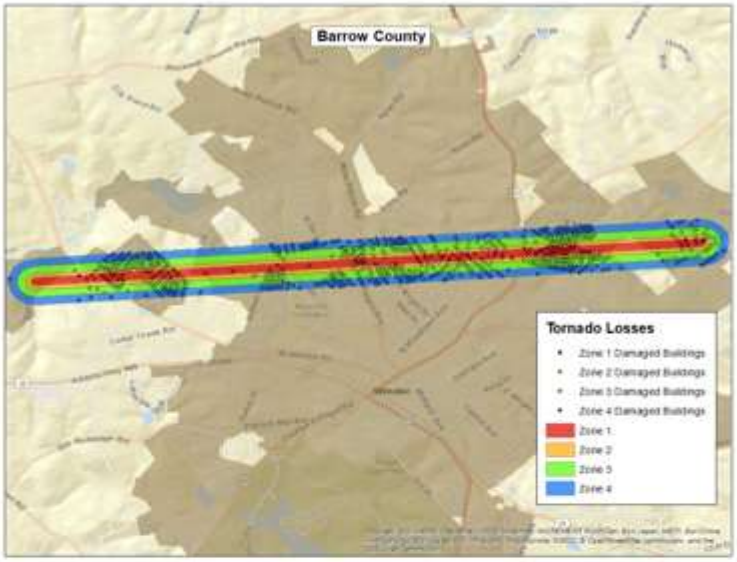

Figure 13: Modeled EF3 Tornado Damage Buffers in Barrow County

EF3 Tornado Building Damages

The analysis estimated that approximately 834 buildings could be damaged, with estimated building losses of $81 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels provided by Barrow County that were joined with Assessor records showing estimated property replacement costs. The Assessor records often do not distinguish parcels by occupancy class if the parcels are not taxable and thus the number of buildings and replacement costs may be underestimated. The results of the analysis are depicted in Table 13.

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Table 13: Estimated Building Losses by Occupancy Type

Occupancy	Buildings Damaged	Building Losses
Residential	767	$26,764,054
Commercial	35	$2,472,675
Industrial	3	$93,393
Religious	16	$202,003
Government	3	$0
Education	10	$51,774,047
Total	834	$81,306,173

EF3 Tornado Essential Facility Damage

There were four essential facility located in the tornado path – three schools, and one medical care facility. Table 14 outlines the specific facility and the amount of damage under the scenario.

Table 14: Estimated Essential Facilities Damaged

Facility	Amount of Damage
Winder-Barrow High School	Major Damage
Russell Middle School	Minor Damage
Winder Elementary School	Minor Damage
Barrow Regional Medical Center	Minor Damage

According to the Georgia Department of Education, Winder-Barrow High School's enrollment was approximately 1,997 students, Russell Middle School's enrollment was approximately 982 students, and Winder Elementary School's enrollment was approximately 710 students as of March 2019. Depending on the time of day, a tornado strike as depicted in this scenario could result in significant injury and loss of life. In addition, arrangements would have to be made for the continued education of the students in another location.

There is one medical care facility impacted by the path of the tornado. According to the Georgia Department of Public Health OASIS website, Barrow Regional Medical Center has 56 beds. The medical requirements of those patients already in the system, combined with injuries suffered during the storm event, could potentially overtax the medical infrastructure of the county.

The location of the damaged Essential Facility is mapped in Figure 14.

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Figure 14: Modeled Essential Facility Damage in Barrow County

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Exceptions Report

Hazus Version 2.2 SP1 was used to perform the loss estimates for Barrow County, Georgia. Changes made to the default Hazus-MH inventory and the modeling parameters used to setup the hazard scenarios are described within this document.

Reported losses reflect the updated data sets. Steps, algorithms and assumptions used during the data update process are documented in the project workflow named PDM_GA_Workflow.doc.

Statewide Inventory Changes

The default Hazus-MH Essential Facility inventory was updated for the entire state prior to running the hazard scenarios for Barrow County.

Updates to the Critical Facility data used in GMIS were provided by Barrow County in August 2019. These updates were applied by The Carl Vinson Institute of Government at the University of Georgia. Table 15 summarizes the difference between the original Hazus-MH default data and the updated data for Barrow County.

Table 15: Essential Facility Updates

Site Class	Feature Class	Default Replacement Cost	Default Count	Updated Replacement Cost	Updated Count
EF	Care	$11,775,000	5	$11,775,000	5
EF	EOC	$880,000	1	$3,680,000	1
EF	Fire	$3,116,000	8	$3,116,000	8
EF	Police	$8,528,000	5	$16,879,000	4
EF	School	$72,407,000	18	$80,369,000	18

County Inventory Changes

The GBS records for Barrow County were replaced with data derived from parcel and property assessment data obtained from Barrow County. The county provided property assessment data was current as of April 2019 and the parcel data current as of April 2019.

General Building Stock Updates

The parcel boundaries and assessor records were obtained from Barrow County. Records without improvements were deleted. The parcel boundaries were converted to parcel points located in the centroids of each parcel boundary. Each parcel point was linked to an assessor record based upon matching parcel numbers. The generated Building Inventory represents the approximate locations (within a parcel) of building exposure. The Building Inventory was aggregated by Census Block and imported into

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Hazus-MH using the Hazus-MH Comprehensive Data Management System (CDMS). Both the 2010 Census Tract and Census Block tables were updated.

The match between parcel records and assessor records was based upon a common Parcel ID. For this type of project, unless the hit rate is better than 85%, the records are not used to update the default aggregate inventory in Hazus-MH. The Parcel-Assessor hit rate for Barrow County was 98.5%.

Adjustments were made to records when primary fields did not have a value. In these cases, default values were applied to the fields. Table 16 outlines the adjustments made to Barrow County records.

Table 16: Building Inventory Default Adjustment Rates

Type of Adjustment	Building Count	Percentage
Area Unknown	185	1%
Construction Unknown	1,061	4%
Condition Unknown	147	0%
Foundation Unknown	1,069	4%
Year Built Unknown	41	0%
Total Buildings	29,779	2%

Approximately 2% of the CAMA values were either missing (<Null> or '0'), did not match CAMA domains or were unusable ('Unknown', 'Other', 'Pending'). These were replaced with 'best available' values. Missing YearBuilt values were populated from average values per Census Block. Missing Condition, Construction and Foundation values were populated with the highest-frequency CAMA values per Occupancy Class. Missing Area values were populated with the average CAMA values per Occupancy Class.

The resulting Building Inventory was used to populate the Hazus-MH General Building Stock and User Defined Facility tables. The updated General Building Stock was used to calculate flood and tornado losses. Changes to the building counts and exposure that were modeled in Barrow County are sorted by General Occupancy in Table 1 at the beginning of this report. If replacements cost or building value were not present for a given record in the Assessor data, replacement costs were calculated from the Building Area (sqft) multiplied by the Hazus-MH RS Means ($/sqft) values for each Occupancy Class.

Differences between the default and updated data are due to various factors. The Assessor records often do not distinguish parcels by occupancy class when the parcels are not taxable; therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

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User Defined Facilities

Building Inventory was used to create Hazus-MH User Defined Facility (UDF) inventory for flood modeling. Hazus-MH flood loss estimates are based upon the UDF point data. Buildings within the flood boundary were imported into Hazus-MH as User Defined Facilities and modeled as points.

Table 17: User Defined Facility Exposure

Class	Hazus-MH Feature	Counts	Exposure
BI	Building Exposure	29,779	$5,210,962,676
Riverine UDF	Structures Inside 1% Annual Chance Riverine Flood Area	729	$135,059,924

Assumptions

- Flood analysis was performed on Building Inventory. Building Inventory within the flood boundary was imported as User Defined Facilities. The point locations are parcel centroid accuracy.
- The analysis is restricted to the county boundary. Events that occur near the county boundary do not contain loss estimates from adjacent counties.
- The following attributes were defaulted or calculated:
  - First Floor Height was set from Foundation Type
  - Content Cost was calculated from Building Cost

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Appendix H – Documentation of Plan Adoption