



Albemarle Regional Hazard Mitigation Plan



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1 Introduction

Section 1 provides a general introduction to hazard mitigation and an introduction to the Albemarle Regional Hazard Mitigation Plan. This section contains the following subsections:

- ▶ 1.1 Background
- ▶ 1.2 Purpose and Authority
- ▶ 1.3 Scope
- ▶ 1.4 References
- ▶ 1.5 Plan Organization

1.1 BACKGROUND

This document comprises a Hazard Mitigation Plan for the Albemarle Region of North Carolina.

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

Hazards are a natural part of the environment that will inevitably continue to occur, but there is much we can do to minimize their impacts on our communities and prevent them from resulting in disasters. Every community faces different hazards, has different resources to draw upon in combating problems, and has different interests that influence the solutions to those problems. Because there are many ways to deal with hazards and many agencies that can help, there is no one solution for managing or mitigating their effects. Planning is one of the best ways to develop a customized program that will mitigate the impacts of hazards while accounting for the unique character of a community.

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

In an effort to reduce the nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) to invoke new and revitalized approaches to mitigation planning. Section 322 of DMA 2000 emphasizes the need for state and local government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for federal mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation (PDM) program, and the Flood Mitigation Assistance (FMA) Program, all of which are administered by the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security. Communities with an adopted and federally approved hazard mitigation plan thereby become pre-positioned and more apt to receive available mitigation funds before and after the next disaster strikes.

SECTION 1: INTRODUCTION

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

1.2 PURPOSE AND AUTHORITY

This plan was developed in a joint and cooperative manner by members of an Hazard Mitigation Planning Committee (HMPC) which included representatives of County, City, and Town departments, federal and state agencies, citizens, and other stakeholders. This plan will ensure all jurisdictions in the Albemarle Region remain eligible for federal disaster assistance including the FEMA HMGP, PDM, and the FMA programs.

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

This plan will be adopted by each participating jurisdiction in accordance with standard local procedures. Copies of adoption resolutions are provided in Section 9 Plan Adoption.

1.3 SCOPE

This document comprises a Regional Hazard Mitigation Plan for the Albemarle Region. The planning areas includes all incorporated municipalities and unincorporated areas in the region. All participating jurisdictions are listed in Table 1.1.

Table 1.1 – Participating Jurisdictions in the Albemarle Regional Hazard Mitigation Plan

Camden County	
Elizabeth City*	
Chowan County	
Edenton	
Gates County	
Gatesville	
Hertford County	
Ahoskie	Como
Harrellsville	Murfreesboro
Winton	Cofield
Pasquotank County	
Elizabeth City*	
Perquimans County	
Hertford	Winfall

* Elizabeth City is located mostly in Pasquotank County.

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

The Albemarle Region followed the planning process prescribed by FEMA, and this plan was developed under the guidance of an HMPC comprised of representatives of County, City, and Town departments; citizens; and other stakeholders. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the planning area, assessed the planning area’s vulnerability to these hazards,

SECTION 1: INTRODUCTION

and examined each participating jurisdiction's capabilities in place to mitigate them. The hazards profiled in this plan include:

- ▶ Dam & Levee Failure
- ▶ Drought
- ▶ Earthquake
- ▶ Erosion
- ▶ Extreme Heat
- ▶ Flood
- ▶ Hurricane & Tropical Storm
- ▶ Severe Weather (Thunderstorm Wind, Lightning, & Hail)
- ▶ Severe Winter Storm
- ▶ Tornado
- ▶ Wildfire
- ▶ Radiological Incident

1.4 REFERENCES

The following FEMA guides and reference documents were used to prepare this document:

- ▶ FEMA 386-1: Getting Started. September 2002.
- ▶ FEMA 386-2: Understanding Your Risks: Identifying Hazards and Estimating Losses. August 2001.
- ▶ FEMA 386-3: Developing the Mitigation Plan. April 2003.
- ▶ FEMA 386-4: Bringing the Plan to Life. August 2003.
- ▶ FEMA 386-5: Using Benefit-Cost Review in Mitigation Planning. May 2007.
- ▶ FEMA 386-6: Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning. May 2005.
- ▶ FEMA 386-7: Integrating Manmade Hazards into Mitigation Planning. September 2003.
- ▶ FEMA 386-8: Multijurisdictional Mitigation Planning. August 2006.
- ▶ FEMA 386-9: Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects. August 2008.
- ▶ FEMA. Local Mitigation Planning Handbook. March 2013.
- ▶ FEMA. Local Mitigation Plan Review Guide. October 1, 2011.
- ▶ FEMA National Fire Incident Reporting System 5.0: Complete Reference Guide. January, 2008.
- ▶ FEMA Hazard Mitigation Assistance Unified Guidance. June 1, 2010.
- ▶ FEMA. Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials. March 1, 2013.
- ▶ FEMA. Mitigation Ideas. A Resource for Reducing Risk to Natural Hazards. January 2013.

Additional sources used in the development of this plan, including data compiled for the Hazard Identification and Risk Assessment, are listed in Appendix D.

1.5 PLAN ORGANIZATION

The Albemarle Regional Hazard Mitigation Plan is organized into the following sections:

- ▶ Section 2: Planning Process
- ▶ Section 3: Planning Area Profile
- ▶ Section 4: Hazard Identification & Risk Assessment
- ▶ Section 5: Capability Assessment
- ▶ Section 6: Mitigation Strategy
- ▶ Section 7: Mitigation Action Plans
- ▶ Section 8: Plan Implementation and Maintenance
- ▶ Section 9: Plan Adoption
- ▶ Appendix A: Local Plan Review Tool
- ▶ Appendix B: Planning Process Documentation
- ▶ Appendix C: Mitigation Alternatives
- ▶ Appendix D: References

2 Planning Process

Requirement §201.6(b): An open public involvement process is essential to the development of an effective plan. To develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- 1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- 2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
- 3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): The plan shall include the following:

- 1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

This section provides a review of the planning process followed for the development of the Albemarle Regional Hazard Mitigation Plan. It consists of the following sub-sections:

- ▶ 2.1 Purpose and Vision
- ▶ 2.2 What’s Changed in the Plan
- ▶ 2.3 Preparing the Plan
- ▶ 2.4 Hazard Mitigation Planning Committee
- ▶ 2.5 Meetings and Workshops
- ▶ 2.6 Involving the Public
- ▶ 2.7 Outreach Efforts
- ▶ 2.8 Involving the Stakeholders
- ▶ 2.9 Documentation of Plan Progress

2.1 PURPOSE AND VISION

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

The purpose of the Albemarle Regional Hazard Mitigation Plan is to identify, assess, and mitigate hazard risk to better protect the people and property within the Region from the effects of natural and human-caused hazards. This plan documents progress on existing hazard mitigation planning efforts, updates the previous plan to reflect current conditions in the Region including relevant hazards and vulnerabilities, increases public education and awareness about the plan and planning process, maintains grant eligibility for participating jurisdictions, maintains compliance with state and federal requirements for local hazard mitigation plans, and identifies and outlines strategies the Region’s participating jurisdictions will use to decrease vulnerability and increase resiliency.

The Albemarle Region Hazard Mitigation Planning Committee (HMPC) met to discuss their vision for the Region in terms of hazard mitigation planning. The committee was asked to consider what the successful implementation of the plan would achieve, what outcomes the plan would generate, and what the Region will look like in five years as a way to brainstorm a vision statement for the plan. The HMPC developed and discussed a list of ideas that were consolidated into the following vision statement and a set of key principles that they agreed should define and guide the planning process and the Region’s approach to hazard mitigation.

SECTION 2: PLANNING PROCESS

Through a coordinated regional planning effort, create and implement an effective hazard mitigation plan that will identify and reduce risk to natural hazards in order to protect the health, safety, quality of life, environment, and economy of all participating jurisdictions throughout the Albemarle Region.

2.2 WHAT'S CHANGED IN THE PLAN

This plan is an update to the 2015 Regional Hazard Mitigation Plan, which included participation from all jurisdictions involved in this plan update: Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties. Dare and Currituck Counties were also involved in the 2015 plan but are now participating as their own Region for this plan update cycle. The previous plan was approved by FEMA on June 11, 2015.

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

- ▶ Consider changes in vulnerability due to action implementation;
- ▶ Document success stories where mitigation efforts have proven effective;
- ▶ Document areas where mitigation actions were not effective;
- ▶ Document any new hazards that may arise or were previously overlooked;
- ▶ Incorporate new data or studies on hazards and risks;
- ▶ Incorporate new capabilities or changes in capabilities;
- ▶ Incorporate growth and development-related changes to inventories; and
- ▶ Incorporate new action recommendations or changes in action prioritization.

Section 4.2 provides a comparison of the hazards addressed in the 2018 State of North Carolina HMP and the existing Albemarle Regional plan and provides the final decision made by the HMPC as to which hazards should be included in the updated 2020 Albemarle Regional Plan.

In addition to the specific changes in hazard analyses identified in Section 4.2, the following items were also addressed in this 2020 plan update:

- ▶ GIS was used, to the extent data allowed, to analyze the priority hazards as part of the vulnerability assessment.
- ▶ Assets at risk to identified hazards were identified by property type and values of properties based on North Carolina Emergency Management's IRISK Database.
- ▶ A discussion on climate change and its projected effect on specific hazards was included in each hazard profile in the risk assessment.
- ▶ The discussion on growth and development trends was enhanced utilizing 2017 American Community Survey data.
- ▶ Enhanced public outreach and agency coordination efforts were conducted throughout the plan update process in order to meet the more rigorous requirements of the 2017 CRS Coordinator's Manual, in addition to DMA requirements.

2.3 PREPARING THE PLAN

The planning process for preparing the Albemarle Regional Hazard Mitigation Plan was based on DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

- 1) Planning Process;

SECTION 2: PLANNING PROCESS

- 2) Risk Assessment;
- 3) Mitigation Strategy; and
- 4) Plan Maintenance.

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

Table 2.1 shows how the 10-step CRS planning process aligns with the four phases of hazard mitigation planning pursuant to the Disaster Mitigation Act of 2000.

Table 2.1 – Mitigation Planning and CRS 10-Step Process Reference Table

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

In addition to meeting DMA and CRS requirements, this plan also meets the recommended steps for developing a Community Wildfire Protection Plan (CWPP). Table 2.2 below outlines the recommended CWPP process and the CRS step and sections of this plan that meet each step.

Table 2.2 – Community Wildfire Protection Plan Process Reference

CWPP Process	CRS Step	Fulfilling Plan Section
Convene decision makers	Step 1	Section 2 – HMPC
Involve Federal agencies	Step 3	Section 2 – Involving Stakeholders
Engage interested parties (such as community representatives)	Step 1, 2, and 3	Section 2 – HMPC, Involving the Public, Involving Stakeholders
Establish a community base map		Section 4 – Wildfire
Develop a community risk assessment, including fuel hazards, risk of wildfire occurrence, homes, business and essential infrastructure at risk, other community values at risk, local preparedness, and firefighting capability	Step 4 and 5	Section 4 – Wildfire Section 6 – Capability
Establish community hazard reduction priorities and recommendations to reduce structural ignitability	Step 6, 7, and 8	Section 6 – Mitigation Strategy Section 7 – Mitigation Action Plans
Develop an action plan and assessment strategy	Step 8 and 10	Section 7 – Mitigation Action Plans Section 8 – Plan Maintenance
Finalize the CWPP	Step 9	Section 9 – Plan Adoption

SECTION 2: PLANNING PROCESS

The process followed for the preparation of this plan, as outlined in Table 2.1 above, is as follows:

2.3.1 Phase I – Planning Process

Planning Step 1: Organize to Prepare the Plan

With the Region’s commitment to participate in the DMA planning process, community officials worked to establish the framework and organization for development of the plan. An initial meeting was held with key community representatives to discuss the organizational aspects of the plan development process. The County Emergency Managers led each County’s effort to reorganize and coordinate for the plan update. Consultants from Wood Environment and Infrastructure Solutions, Inc. and Holland Consulting Planners assisted by leading the Region through the planning process and preparing the plan document.

Planning Step 2: Involve the Public

Public involvement in the development of the plan was sought using various methods, as detailed in Section 2.6.

Planning Step 3: Coordinate

The HMPC formed for development of the 2015 Plan was reconvened for this plan update. Where necessary, additional members were added to the HMPC. Each community also sought to incorporate stakeholder and public participation on the HMPC. More details on the HMPC are provided in Section 2.4. Stakeholder coordination was incorporated into the formation of the HMPC and was also sought through additional outreach methods. These efforts are detailed in Section 2.8.

Coordination with Other Community Planning Efforts and Hazard Mitigation Activities

In addition to stakeholder involvement, coordination with other community planning efforts was also seen as paramount to the success of this plan. Mitigation planning involves identifying existing policies, tools, and actions that will reduce a community’s risk and vulnerability to hazards. The Albemarle Region participating jurisdictions use a variety of planning mechanisms, such as Comprehensive Plans, subdivision regulations, building codes, and ordinances to guide growth and development. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. As detailed in Table 2.3, the development of this plan incorporated information from existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

These and other documents were reviewed and considered, as appropriate, during the collection of data to support the planning process and plan development, including the hazard identification, vulnerability assessment, and capability assessment. Data from these sources was incorporated into the risk assessment and hazard vulnerability sections of the plan as appropriate. The data was also used in determining the capability of each jurisdiction to implement certain mitigation strategies. The Capability Assessment can be found in Section 5.

Table 2.3 – Summary of Existing Studies and Plans Reviewed

Resource Referenced	Use in this Plan
Local Comprehensive Plans	Where available, each community’s comprehensive plan was referenced to develop the Planning Area Profile in Section 3, with future land use maps and descriptions incorporated into community annexes. Local land use and comprehensive plans were also used to develop Mitigation Action Plans in Section 7 and were referenced in the Capability Assessment in Section 5.

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Resource Referenced	Use in this Plan
Local Ordinances (Flood Damage Prevention Ordinances, Subdivision Ordinances, Zoning Ordinances, etc.)	Local ordinances were referenced in the Capability Assessment in Section 5 and where applicable for updates or enforcement in Mitigation Action Plans in Section 7.
Flood Insurance Study (FIS) Reports for Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties and Incorporated Areas	FIS reports were referenced in the preparation of the flood hazard profile in Section 4.
Albemarle Regional Hazard Mitigation Plan, 2015	The previous plan was referenced in compiling the Hazard Identification and Risk Assessment in Section 4 and in reporting on implementation status and developing the Mitigation Action Plans in Section 2 and Section 7, respectively.

2.3.2 Phase II – Risk Assessment

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

The HMPC completed a comprehensive effort to identify, document, and profile all hazards that have, or could have, an impact on the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. A draft of the risk and vulnerability assessment was made available on the plan website for the HMPC, stakeholders, and the public to review and comment.

The HMPC also conducted a capability assessment to review and document the planning area’s current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process and the results are included in Section 4 Risk Assessment.

2.3.3 Phase III – Mitigation Strategy

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

Wood facilitated brainstorming and discussion sessions with the HMPC that described the purpose and process of developing a vision for the planning process and setting planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Section 6 Mitigation.

Planning Step 8: Draft an Action Plan

A complete first draft of the plan was prepared based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7. This draft was shared for HMPC, stakeholder, and public review and comment via the plan website. HMPC, public, and stakeholder comments were integrated into the final draft for the NCEM and FEMA Region IV to review and approve, contingent upon final adoption by the County and its participating jurisdictions.

2.3.4 Phase IV – Plan Maintenance

Planning Step 9: Adopt the Plan

To secure buy-in and officially implement the plan, the plan will be reviewed and adopted by all participating jurisdictions. Resolutions will be provided in Section 9.

Planning Step 10: Implement, Evaluate and Revise the Plan

SECTION 2: PLANNING PROCESS

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. Up to this point in the planning process, the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Section 8 Plan Maintenance provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The Section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

2.4 HAZARD MITIGATION PLANNING COMMITTEE

As with the previous plan, this Hazard Mitigation Plan was developed under the guidance of an HMPC. The Committee's representatives included representatives of County and Jurisdiction departments, federal and state agencies, citizens and other stakeholders.

To reconvene the planning committee, a letter was sent via email to all County Emergency Managers asking for their assistance to convene the County, City, and Town HMPC contacts from the previous planning effort. Each community was asked to designate a primary and secondary contact for the HMPC. Communities were also asked to identify local stakeholder representatives to participate on the HMPC alongside the County, City, and Town officials in order to improve the integration of stakeholder input into the plan. Table 2.4 details the HMPC members and the agencies and jurisdictions they represented.

The formal HMPC meetings followed the 10 CRS Planning Steps. Agendas, minutes, and sign-in sheets for the HMPC meetings are included in Appendix B. The meeting dates and topics discussed are summarized in Section 2.5 Meetings and Workshops. All HMPC meetings were open to the public.

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

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

For the Albemarle Region HMPC, "participation" meant the following:

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

Detailed summaries of HMPC meetings are provided under Meetings and Workshops, including meeting dates, locations, and topics discussed. During the planning process, the HMPC members communicated

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through face-to-face meetings, email, and telephone conversations. This continued communication ensured that coordination was ongoing throughout the entire planning process despite the fact that not all HMPC members could be present at every meeting. Additionally, draft documents were distributed via the plan website so that the HMPC members could easily access and review them and provide comments. HMPC members are listed in Table 2.4.

Table 2.4 – HMPC Members

Jurisdiction	Representative	Agency	Position/Title
CRS Steering Committee			
Camden County	Logan Nash	Pasquotank-Camden Emergency Management	Asst. Emergency Mgmt Coordinator
Camden County	Christy Saunders	Pasquotank-Camden Emergency Management	Emergency Mgmt Coordinator
Camden County	Steven Bradshaw	N/A	Citizen/Stakeholder
Camden County	Nathan Lilley	N/A	Citizen/Stakeholder
Edenton	Anne-Marie Knighton	Town of Edenton	Town Manager
Edenton	Elizabeth Bryant	Town of Edenton	Planning Director
Edenton	Mark Powell	N/A	Citizen/Stakeholder
Edenton	Colleen Karl	N/A	Citizen/Stakeholder
HMPC Working Group			
Chowan County	Cord Palmer	Chowan Co Emergency Mgmt	EM Director
Chowan County	Brandon Shoaf	Chowan Co Planning Dept	Planning Director
Chowan County	Kevin Howard	Chowan Co Administration	County Manager
Chowan County	Kent Pierce	Chowan County	Floodplain Administrator/ Building Inspector
Gates County	Billy Winn	Gates County Emergency Services	Emergency Svcs Director
Gates County	Eli Montfort	Gates County Emergency Services	Staff
Gates County	Natalie Rountree	Gates County	County Manager
Gatesville	Elton Winslow	Town of Gatesville	Mayor
Gatesville	C.H. Carter, III	Town of Gatesville	Councilman
Hertford County	Patrick H. Dilday	County Emergency Mgmt	Deputy Director/Fire Marshal
Hertford County	Christopher E. Smith, CFI	County Emergency Mgmt	Emergency Mgmt Director
Ahoskie	Monte Brickhouse	Ahoskie Public Works	Administrative Assistant
Ahoskie	Kerry McDuffie	Ahoskie Administration	Town Manager
Cofield	Anthony Archer	Town of Cofield	Council Member
Cofield	June Wynn	Town of Cofield	Mayor
Cofield	Penny Turner-Hall	Town of Cofield	Town Clerk
Como	Irvin Stephens Sr.	Town of Como	Mayor
Como	Susan Kennington	Town of Como	Town Clerk
Harrellsville	Dina H. White	Town of Harrellsville	Clerk/Finance Officer
Harrellsville	Lisa Hunnicutt	Town of Harrellsville	Mayor Pro Tem
Murfreesboro	Carolyn Brown	Town of Murfreesboro	Town Administrator
Murfreesboro	Hal Thomas	Town of Murfreesboro	Mayor
Winton	Carl Pierce	Town of Winton	Public Works Director
Winton	Amanda Henderson	Town of Winton	Town Clerk

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Jurisdiction	Representative	Agency	Position/Title
Pasquotank County	Christy Saunders	Pasquotank-Camden Emergency Management	Emergency Mgmt Coordinator
Pasquotank County	Logan Nash	Pasquotank-Camden Emergency Management	Asst. Emergency Mgmt Coordinator
Pasquotank County	Shelley Cox	Pasquotank County Planning	Planner
Elizabeth City	Kellen Long	Elizabeth City CD Dept.	Planner II
Elizabeth City	Matthew Schelly	Elizabeth City CD Dept.	Director
Perquimans County	Rhonda Money	County Planning Department	Planner/GIS
Perquimans County	Frank Heath	County Manager's Office	County Manager
Perquimans County	Jonathan Nixon	County Emergency Services	Director
Perquimans County	Julie Solesbee	County Emergency Services	Staff
Hertford	Pam Hurdle	Town of Hertford	Town Manager
Hertford	Quentin Jackson	Town of Hertford	Councilman
Winfall	Frederick Yates	Town of Winfall	Mayor
Winfall	Valerie Jackson	Town of Winfall	Town Clerk
Winfall	Ken Rominger	Town of Winfall	Town Councilman

2.5 MEETINGS AND WORKSHOPS

The preparation of this plan required a series of meetings and workshops for facilitating discussion, gaining consensus, and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the plan.

Table 2.5 summarizes the key meetings and workshops held by the HMPC during the development of the plan. In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency. For example, completing the Local Capability Self-Assessment or seeking approval of specific mitigation actions for their department or agency to undertake and include in their Mitigation Action Plan. These meetings were informal and are not documented here.

Public meetings are summarized in subsection 2.6.

Table 2.5 – Summary of HMPC Meetings

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
HMPC Mtg. #1 – Project Kick-Off	<ol style="list-style-type: none"> 1) Introduction to DMA, CRS, and FMA requirements and the planning process 2) Review of HMPC responsibilities and the project schedule. 	February 26, 2019	Town of Edenton Council Chambers 504 S Broad Street, Edenton
HMPC Mtg. #2	<ol style="list-style-type: none"> 1) Review and update plan goals 2) Brainstorm a vision statement 3) Report on status of actions from the 2015 plan 4) Complete the capability self-assessment 	March 28, 2019	Pasquotank County Public Safety Building, Community Room, 200 E. Colonial Ave, Elizabeth City, NC

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Meeting Title	Meeting Topic	Meeting Date	Meeting Location
HMPC Mtg. #3	<ol style="list-style-type: none"> 1) Review Draft Hazard Identification & Risk Assessment (HIRA) 2) Draft objectives and Mitigation Action Plans 	June 21, 2019	Perquimans County Library 514 S Church Street Hertford
HMPC Mtg. #4	<ol style="list-style-type: none"> 1) Review the Draft Hazard Mitigation Plan 2) Solicit comments and feedback 	December 3, 2019	Emergency Services Building Meeting Room, 159 Creek Drive, Hertford, NC

2.6 INVOLVING THE PUBLIC

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

Public involvement in the development of the plan was sought using various methods including open public meetings, an interactive plan website, a public participation survey, and by making copies of draft plan documents available for public review online and at government offices. Additionally, all HMPC meetings were made open to the public.

All public meetings were advertised on the plan website, which was shared on local community websites, where possible. Copies of meeting announcements are provided in Appendix B. The public meetings held during the planning process are summarized in Table 2.6.

Table 2.6 – Summary of Public Meetings

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
Public Meeting #1	<ol style="list-style-type: none"> 1) Introduction to DMA, CRS, and FMA requirements and the planning process 2) Review of HMPC responsibilities and the project schedule. 	March 28, 2019	Pasquotank County Public Safety Building, Community Room, 200 E. Colonial Ave, Elizabeth City, NC
Public Meeting #2	<ol style="list-style-type: none"> 1) Review “Draft” Hazard Mitigation Plan 2) Solicit comments and feedback 	December 3, 2019	Emergency Services Building Meeting Room, 159 Creek Drive, Hertford, NC

2.7 OUTREACH EFFORTS

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

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Table 2.7 – Public Outreach Efforts

Location	Date	Event/Message
Plan website	Ongoing	Meeting announcements, meeting materials, and description of hazards; contact information provided to request additional information and/or provide comments
Local community websites	March 2019	Public Meeting #1 announcement posted
Local community websites	Ongoing	Link to the plan website shared to expand reach
Public survey	Ongoing	Survey hosted online and made available via shareable link
Plan website - HIRA draft	6/20/2019	Draft HIRA made available for review and comment online
Plan website - Draft Plan	12/2/2019	Full draft plan made available for review and comment online

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

A public outreach survey was made available in March 2019 and remained open for response until May 10, 2019. The public survey requested public input into the Hazard Mitigation Plan planning process and the identification of mitigation activities to lessen the risk and impact of future hazard events. The survey is shown in Appendix B. The survey was available in hard copy at the first public meeting and online on the plan website. In total, 17 survey responses were received.

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

- ▶ All respondents expressed some level of preparedness for hazard events; 64.7% feel somewhat prepared and 35.3% feel very prepared.
- ▶ Nearly 24% of respondents do not know where evacuation centers or storm shelters are located; however, over 94% of respondents say they are able to evacuate or take shelter if necessary, which indicates that most people manage evacuating or taking shelter through their own resources. It is possible that these results skew toward those with more awareness of hazard risk and resources to respond.
- ▶ 17.7% of respondents do not know where to get more information on hazard risk and preparedness.
- ▶ Hurricane was rated the most significant hazard, followed by flood, severe weather, and tornado. Earthquake was rated the least significant hazard, followed by earthquake.
- ▶ Many respondents reported having taken steps to mitigate risk at home; these efforts primarily include preparedness measures; therefore, it may be beneficial to promote prevention and property protection activities via public outreach.
- ▶ Respondents favored preventive activities and structural projects for mitigation.

Detailed survey results are provided in Appendix B.

2.8 INVOLVING THE STAKEHOLDERS

In addition to representatives of each participating jurisdiction, the HMPC included a variety of stakeholders. Stakeholders on the HMPC included local residents from participating communities. Representatives from North Carolina Emergency Management also attended HMPC meetings. Input from additional stakeholders, including neighboring communities, was solicited through invitations to the open public meetings and distribution of the public survey. However, if any additional stakeholders representing other agencies and organizations participated through the public survey, that information is unknown due to the anonymous nature of the survey.

2.9 DOCUMENTATION OF PLAN PROGRESS

Progress on the mitigation strategy developed in the previous plan is documented in this plan update. Table 2.8 below details the status of mitigation actions from the previous plan. More detail on actions being carried forward is provided in Section 7: Mitigation Action Plans.

Table 2.8 – Status of Previous Mitigation Actions

Jurisdiction	Completed	Deleted	Carried Forward
Camden County	6	39	21
Chowan County	8	37	13
Town of Edenton	6	42	13
Gates County	1	1	11
Town of Gatesville	1	1	11
Hertford County	4	10	17
Town of Ahoskie	4	10	17
Town of Cofield	4	10	17
Town of Como	4	10	17
Town of Harrellsville	4	10	17
Town of Murfreesboro	4	10	17
Town of Winton	4	10	17
Pasquotank County	5	26	16
City of Elizabeth City	5	26	16
Perquimans County	5	10	16
Town of Hertford	0	4	3
Town of Winfall	3	12	4
Counties Total	29	123	94

Table 2.9 on the following pages details all completed and deleted actions from the 2015 plan.

Community capability continues to improve with the implementation of new plans, policies, and programs that help to promote hazard mitigation at the local level. The current state of local capabilities for the participating jurisdictions is captured in Section 5: Capability Assessment. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and have proven this by reconvening the HMPC to update this multi-jurisdictional plan and by continuing to involve the public in the hazard mitigation planning process.

Moving forward, information in this plan will be used to help guide and coordinate mitigation activities and decisions for local plans and policies in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. This plan identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage.

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Table 2.9 – Completed and Deleted Actions from the 2015 Albemarle Regional Hazard Mitigation Plan

2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
Camden County				
CAM1	Camden County	Utilize best available data to identify the location and potential impacts of natural hazards on people, property and natural environment.	Deleted	Redundant; merged into CAM18.
CAM2	Camden County	Establish periodic monitoring and review of Multi-Hazard plan and ordinances to determine effectiveness at preventing and mitigating hazards.	Deleted	Redundant; merged into CAM18.
CAM3	Camden County	Continue to ensure through proper planning, zoning and building codes that all safety measures are in place for new construction and placement.	Completed	Completed; now considered a day-to-day capability.
CAM4	Camden County	Continue efforts for post-storm planning in an effort to reduce the time required to return the affected community to pre-storm status.	Deleted	Redundant; merged into CAM18.
CAM6	Camden County	Ensure that building codes are enforced to prevent damages from high winds.	Completed	Completed; now considered a day-to-day capability.
CAM7	Camden County	Continue to enforce regulatory measures that ensure new development will not increase flood threats to existing properties.	Completed	Completed; now considered a day-to-day capability.
CAM11	Camden County	Seek/Encourage the development and implementation of long-term cost effective and environmentally sound mitigation projects.	Deleted	Redundant; merged into CAM18.
CAM12	Camden County	As Funding allows, reduce flood-related damage to repetitive flood loss properties and structures through the buyout program.	Deleted	Redundant; merged into CAM19.
CAM14	Camden County	Reduce the impact of wind on trees near county/city structures.	Deleted	Redundant; merged into CAM15.
CAM17	Camden County	Encourage development of Continuity of Operations Plans in both government and private agencies.	Deleted	Redundant; merged into CAM10.
CAM18	Camden County	Educate and inform residents, businesses and visitors via public education, social media and print materials on ways to mitigate disasters including steps that they can protect themselves.	Deleted	Redundant; merged into CAM20.
CAM20	Camden County	Increase awareness of hazards affecting Camden County and provide information to assist in good decision-making.	Deleted	Redundant; merged into CAM20.
CAM21	Camden County	Educate home and property owners about flood-proofing and wind-proofing measures.	Deleted	Redundant; merged into CAM20.
CAM22	Camden County	Continue to enforce the North Carolina Building Code. The requirement that new structures or structures undergoing significant renovation be resistant to wind loads of 110 mph is of particular importance.	Completed	Completed; now considered a day-to-day capability.
CAM23	Camden County	Educate contractors about safe housing development through written materials or during county sponsored events.	Deleted	Redundant; merged into CAM20.
CAM24	Camden County	Provide hazard mitigation information for the county residents including information on preparedness for all hazards significant to Camden County during various public events, in public buildings, and through media outlets.	Deleted	Redundant; merged into CAM20.

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
CAM25	Camden County	Provide homeowners information on wind resistant measures.	Deleted	Redundant; merged into CAM20.
CAM26	Camden County	Post information about Camden County's emergency evacuation routes.	Deleted	Redundant; merged into CAM21.
CAM28	Camden County	Monitor trees and branches at risk of breaking or falling in windstorms. Prune or thin trees or branches on county property when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the community.	Deleted	Redundant; merged into CAM15
CAM33	Camden County	Provide information to citizens on flooding preparedness. As with other hazards of concern to Camden County, hazard mitigation information should be distributed to residents, including information on preparedness for all hazards significant to its jurisdiction. The information should educate on methods of elevation and flood proofing property.	Deleted	Redundant; merged into CAM20
CAM34	Camden County	Distribute information identifying flood prone areas within the county. Sixty – seven percent of Camden County is within the flood zone. Evacuation and family preparedness information should be distributed to all residents living within flood prone areas and especially to the special needs population located within these areas.	Deleted	Redundant; merged into CAM20
CAM35	Camden County	Work with the National Weather Service to provide early warning to the community and critical facilities.	Deleted	Redundant; merged into CAM20
CAM36	Camden County	Provide new home and property buyers with information on wind proofing. This information may be most efficiently dispersed by the tax assessor's office because all home transactions are recorded there.	Deleted	Redundant; merged into CAM20
CAM37	Camden County	Educate mobile home contractors and owners about wind proofing measures, including wood and light steel construction connectors and anchoring systems.	Deleted	Redundant; merged into CAM20
CAM38	Camden County	Zoning and Subdivision Ordinances should require storm shelters in all mobile home areas and subdivisions.	Deleted	The County does not intend to pursue this strategy at this time.
CAM41	Camden County	Minimize the impacts of lightning strikes. Zoning ordinances should require that lightning detection devices be installed in public outdoor gathering areas such as school stadiums and ball parks.	Deleted	Redundant; merged into CAM14
CAM43	Camden County	Improve the wind resistance of structures in the county. Continue to enforce the NC Building Code. The requirement that new structures or structures undergoing significant renovation be resistant to wind loads of 110 m.p.h. is of particular importance.	Completed	Completed; now considered a day-to-day capability.
CAM44	Camden County	Educate home and property owners about wind proofing measures. Provide hazard mitigation information for the county residents including information on preparedness for all hazards significant to Camden County during various public events, in public buildings, and through media outlets.	Deleted	Redundant; merged into CAM20

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
CAM46	Camden County	Increase driving safety during thunderstorms by installing visibility, reflector tape or paint along road edges and in the dividing line should be placed on all major roads throughout the county.	Deleted	This strategy is a function of NCDOT on all major highways; it is not considered necessary on local access streets.
CAM50	Camden County	Review the Pasquotank-Camden Elizabeth City Multi-Hazard Operation Plan	Deleted	Redundant; merged into CAM9
CAM51	Camden County	Enforce NC Building Code	Completed	Completed; now considered a day-to-day capability.
CAM52	Camden County	Maintain Evacuation Routes and disseminate information to the public	Deleted	Redundant; merged into CAM20
CAM53	Camden County	Provide information to citizens on flooding preparedness.	Deleted	Redundant; merged into CAM20
CAM54	Camden County	Coordination with NWS should continue and additional methods of disseminating early warnings to the community/critical facilities should be continually evaluated and explored.	Deleted	Redundant; merged into CAM9
CAM55	Camden County	Educate the public on severe thunderstorm safety.	Deleted	Redundant; merged into CAM20
CAM56	Camden County	Monitor trees and branches at risk of breaking or falling in windstorms. Prune or thin trees on county property when they pose an immediate threat to property or critical facilities.	Deleted	Redundant; merged into CAM15
CAM59	Camden County	Continue inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires.	Deleted	Redundant; merged into CAM17
CAM60	Camden County	Participate in National Flood Insurance Community Rating System (in addition to continued NFIP compliance)	Deleted	Redundant; merged into CAM13
CAM61	Camden County	Encourage installation of generator switches in new construction critical facilities	Deleted	Redundant; merged into CAM6
CAM62	Camden County	Provide new home and property buyers with information on wind proofing measures.	Deleted	Redundant; merged into CAM20
CAM63	Camden County	Educate contractors about wind proofing measures.	Deleted	Redundant: merged into CAM20
CAM64	Camden County	Educate home and property owners about Wildland/Urban Interface fire safety.	Deleted	Redundant; merged into CAM17
CAM65	Camden County	Educate contractors about principles for quality redevelopment and safe housing development.	Deleted	Redundant; merged into CAM20
CAM66	Camden County	Increase driving safety awareness during thunderstorms. Improve road visibility by adding reflector tape, paint, etc. on all major roads throughout the county.	Deleted	This strategy is a function of NCDOT on all major highways; it is not considered necessary on local access streets.
CAM67	Camden County	Amend Zoning Ordinances to require lightning detection devices be installed in public outdoor gathering areas such as school stadiums and ball parks.	Deleted	This strategy is not being pursued by the County at this time.
Chowan County				
CHO1	Chowan County	GIS mapping locations of damaged utilities caused by previous hurricanes.	Deleted	Redundant; addressed by CHO/EDN1
CHO2	Chowan County	Locate different funding sources that can aid in the improvements of drainage within the County.	Deleted	Redundant; addressed by CHO/EDN2

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
CHO3	Chowan County	Provide public service messages that discuss preparations in the event of a hurricane to be sent out annually in the early spring.	Deleted	Redundant; addressed by CHO/EDN8
CHO4	Chowan County	Update and identify all areas not previously labeled on the 100-year flood map that were flooded during major rainfall events and hurricanes.	Deleted	Redundant; addressed by CHO/EDN4
CHO5	Chowan County	Elevate repetitive loss structures or acquire repetitive loss properties	Deleted	Redundant; addressed by CHO/EDN6
CHO6	Chowan County	Determine specific reasons why each area was damaged (amount of times flooded, and whether this damage is expected from future flooding). This will work in concert with all future repetitive loss analysis.	Deleted	Redundant; addressed by CHO/EDN4
CHO7	Chowan County	Consider and review all changes established through the updated NFIP Floodplain Mapping Program, when required.	Completed	Completed and will be reconsidered as the need arises.
CHO8	Chowan County	Use special consideration for development permits for structures proposed within the Areas of Special Flood Hazard (ASFH)	Completed	Completed; now considered a day-to-day capability.
CHO9	Chowan County	Require all new structures finished floor elevation (FFE) be at or above the current BFE*.	Completed	Completed; now considered a day-to-day capability.
CHO10	Chowan County	Locate different funding sources that can aid in the improvements of drainage within the Town and County caused by regular flooding events (such as grants through CDBG, NCDENR, etc.)	Deleted	Redundant; addressed by CHO/EDN2
CHO13	Chowan County	Compile flood mitigation information and make it available to Chowan County and Edenton residents and business owners."	Deleted	Redundant; addressed by CHO/EDN7
CHO14	Chowan County	The County will assess erosion following substantial natural hazard events in an effort to insure that it does not encroach upon developed portions of the County.	Deleted	Redundant; addressed by CHO/EDN10
CHO15	Chowan County	Provide emergency broadcast the located and approximate time for areas likely to be hit by a tornado.	Deleted	Redundant; addressed by CHO/EDN19
CHO16	Chowan County	Create a systematic warning system aimed at posting electrical highway signs that warn of extreme weather conditions.	Deleted	Redundant; addressed by CHO/EDN11
CHO17	Chowan County	Improve the wind resistance of structures within the County and Town by continuing to enforce the North Carolina Building Code.	Completed	Completed; now considered a day-to-day capability.
CHO18	Chowan County	Support efforts of utility providers to monitor trees and branches at risk of breaking or falling in windstorms.	Completed	Completed; now considered a day-to-day capability.
CHO19	Chowan County	Prepare County and Town notification when water conservation plans are in effect once the water levels drop below the revised County and Town water levels.	Deleted	Redundant; addressed by CHO/EDN9
CHO20	Chowan County	Create a GIS map of areas in critical need of improvement.	Deleted	Redundant; addressed by CHO/EDN1
CHO22	Chowan County	Utilize GPS to transfer to GIS mapping system. Include consistent problem areas on the current flood maps. Those areas include: Pembroke Circle, Dillard Mill, and Cypress Point Marina, as well as Woodlawn Park.	Deleted	Redundant; addressed by CHO/EDN1

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
CHO23	Chowan County	List areas in need of repair, replacement and improvement.	Deleted	Strategy determined to be ambiguous and lacking in substance.
CHO24	Chowan County	Determined priority level by past flooding experience, extent and value of damage, and cost of repairs.	Deleted	Strategy determined to be ambiguous and lacking in substance.
CHO25	Chowan County	Identify all structures located within the revised Areas of Special Flood Hazard (ASFH).	Deleted	Redundant; addressed by CHO/EDN1
CHO26	Chowan County	For structures located within the ASFH, determine whether the structure's finished floor elevation (FFE) is above or below the base flood elevation (BFE).	Deleted	Redundant; addressed by CHO/EDN1
CHO27	Chowan County	Identify structures that have been damaged by flooding in the past due to distance and/or height of structure.	Deleted	Redundant; addressed by CHO/EDN1
CHO28	Chowan County	Require all new structures to include drainage ditches and/or culverts installed around perimeter of property to prevent flooding and flood damage to structures.	Deleted	Redundant; addressed by CHO/EDN1
CHO29	Chowan County	Research possible seawall options to prevent tidal flooding.	Deleted	The County is not pursuing this strategy at this time.
CHO30	Chowan County	Begin monitoring erosion complaints, considering locations, possible events, and past complaints about the areas.	Completed	Completed; now considered a day-to-day capability.
CHO31	Chowan County	Research and interview with property owners	Deleted	Strategy determined to be ambiguous and lacking in substance.
CHO32	Chowan County	Research possible seawall options to prevent future erosion along Edenton Bay and rivers	Deleted	The County is not pursuing this strategy at this time.
CHO33	Chowan County	Consider bringing in fill and additional necessary materials to replace erosion in designated areas.	Deleted	The County is not pursuing this strategy at this time.
CHO34	Chowan County	Posting signs in areas considered eroded	Deleted	The County is not pursuing this strategy at this time.
CHO35	Chowan County	Research and interview with property owners	Deleted	Strategy determined to be ambiguous and lacking in substance.
CHO36	Chowan County	Document specific accounts of storm surge levels within different areas per storm & calculate value of loss. *Information to be included in future Hazard Mitigation Plan updates (once every 5 years).	Deleted	Redundant; addressed by CHO/EDN4
CHO37	Chowan County	Research possible seawall options to prevent future erosion along Edenton Bay and rivers	Deleted	The County is not pursuing this strategy at this time.
CHO38	Chowan County	Provide public mailings to discuss what to do in case of expected storm surge.	Deleted	Redundant; addressed by CHO/EDN8
CHO39	Chowan County	Start radio or newspaper advertisement, to warn citizens of hazards and safety precautions that should be taken.	Deleted	Redundant; addressed by CHO/EDN19
CHO40	Chowan County	Prepare a series of mailings to citizens discussing the proper safety procedures for each hazard addressed in this plan.	Deleted	Redundant; addressed by CHO/EDN8

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
CHO41	Chowan County	Require all new structures to include drainage ditches and/or culverts installed around perimeter of property to prevent flooding and flood damage to structures.	Completed	Completed; now considered a day-to-day capability.
CHO42	Chowan County	Provide safety warning radio broadcasts, determining the approximate time and area a nor'easter would be likely to hit.	Deleted	Redundant; addressed by CHO/EDN19
CHO43	Chowan County	Prepare a series of mailings to citizens discussing what the proper safety procedures for each hazard addressed in this Plan.	Deleted	Redundant; addressed by CHO/EDN6
CHO44	Chowan County	Post warning signs in areas stating the likelihood of fires in the area due to the current weather conditions, including the dangers that may lead to wildfires.	Deleted	Redundant; addressed by CHO/EDN18
CHO45	Chowan County	Require owners (by advertisement in the local papers) to annually remove any brush or downed limbs promptly to prevent fires from moving quickly along the ground.	Deleted	Redundant; addressed by CHO/EDN17
CHO46	Chowan County	Assign new regulations that will revise the current water level for both the Town of Edenton Water Department and the Chowan County Water Department.	Completed	Completed; now considered a day-to-day capability.
CHO47	Chowan County	Start radio or newspaper advertisement, to warn citizens of hazards and safety precautions that should be taken.	Deleted	Redundant; addressed by CHO/EDN19
CHO48	Chowan County	Prepare a series of mailings to citizens discussing what the proper safety procedures for each hazard addressed in this Plan.	Deleted	Redundant; addressed by CHO/EDN8
EDN1	Edenton	Develop plan to assist property owners with safe and efficient post-disaster cleanup (New Strategy).	Deleted	Redundant; addressed by CHO/EDN18
EDN2	Edenton	Improve stormwater drainage and land management preparation for flooding events (New Strategy).	Deleted	Redundant; addressed by CHO/EDN2
EDN3	Edenton	Elevate repetitive loss structures or acquire repetitive loss properties.	Deleted	Redundant; addressed by CHO/EDN6
EDN4	Edenton	Compile flood mitigation information and make it available to Chowan County and Edenton residents and business owners.	Deleted	Redundant; addressed by CHO/EDN7
EDN5	Edenton	Prepare County and Town notification when water conservation plans are in effect once the water levels drop below the revised County and Town water levels.	Deleted	Redundant; addressed by CHO/EDN9
EDN6	Edenton	Advocate the Use of Existing State and Federal Regulatory Programs for Protecting and Preserving Coastal Wetland Areas of Environmental Concern (New Strategy)	Deleted	Redundant; addressed by CHO/EDN10
EDN7	Edenton	Support Improvements to Regional Transportation Systems for Safe Traffic Flow (New Strategy)	Deleted	Redundant; addressed by CHO/EDN11
EDN8	Edenton	Create a systematic warning system aimed at posting electrical highway signs that warn of extreme weather conditions.	Deleted	Redundant; addressed by CHO/EDN11
EDN10	Edenton	Improve the wind resistance of structures within the County and Town by continuing to enforce the North Carolina Building Code.	Completed	Completed; now considered a day-to-day capability.
EDN11	Edenton	Create a GIS map of areas in critical need of improvement.	Deleted	Redundant; addressed by CHO/EDN1

Albemarle Region

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
EDN12	Edenton	GIS mapping locations of damaged utilities caused by previous hurricanes.	Deleted	Redundant; addressed by CHO/EDN1
EDN14	Edenton	Locate different funding sources that can aid in the improvements of drainage within the Town and County.	Deleted	Redundant; addressed by CHO/EDN2
EDN15	Edenton	Provide public service messages that discuss preparations in the event of a hurricane to be sent out annually in the early spring.	Deleted	Redundant; addressed by CHO/EDN19
EDN16	Edenton	Utilize GPS to transfer to GIS mapping system. Include consistent problem areas on the current flood maps. Those areas include: Pembroke Circle, Dillard Mill, and Cypress Point Marina, as well as Woodlawn Park.	Deleted	Redundant; addressed by CHO/EDN1
EDN17	Edenton	Update and identify all areas not previously labeled on the 100-year flood map that were flooded during major rainfall events and hurricanes.	Deleted	Redundant; addressed by CHO/EDN4
EDN18	Edenton	List areas in need of repair, replacement and improvement.	Deleted	Strategy determined to be ambiguous and lacking in substance.
EDN19	Edenton	Determined priority level by past flooding experience, extent and value of damage, and cost of repairs.	Deleted	Redundant; addressed by CHO/EDN1
EDN20	Edenton	Determine specific reasons why each area was damaged (amount of times flooded, and whether this damage is expected from future flooding). The majority of these areas would be located in the Town of Edenton.	Deleted	Redundant; addressed by CHO/EDN1
EDN21	Edenton	Identify all structures located within the revised Areas of Special Flood Hazard (ASFH).	Deleted	Redundant; addressed by CHO/EDN1
EDN22	Edenton	For structures located within the ASFH, determine whether the structure's finished floor elevation (FFE) is above or below the base flood elevation (BFE).	Deleted	Redundant; addressed by CHO/EDN1
EDN23	Edenton	Identify structures that have been damaged by flooding in the past due to distance and/or height of structure.	Deleted	Redundant; addressed by CHO/EDN1
EDN24	Edenton	Use special consideration for development permits for structures proposed within the Areas of Special Flood Hazard (ASFH).	Completed	Completed; now considered a day-to-day capability.
EDN25	Edenton	Require all new structures finished floor elevation (FFE) be elevated at or above the current base flood elevation (BFE).	Completed	Completed; now considered a day-to-day capability.
EDN26	Edenton	Require all new structures to include drainage ditches and/or culverts installed around perimeter of property to prevent flooding and flood damage to structures.	Deleted	Not currently being pursued, the Town relies on local and state stormwater regulations for this purpose.
EDN27	Edenton	Locate different funding sources that can aid in the improvements of drainage within the Town and County caused by regular flooding events (such as grants through CDBG, NCDENR, etc...)	Deleted	Redundant; addressed by CHO/EDN6
EDN28	Edenton	Research possible seawall options to prevent tidal flooding.	Deleted	The Town is not currently pursuing this strategy.

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
EDN29	Edenton	Compile flood mitigation information and make it available to Chowan County and Edenton residents and business owners.	Deleted	Redundant; addressed by CHO/EDN8
EDN31	Edenton	Work with local charities, Meals on Wheels and/or Habitat for Humanity chapters, to apply non-structural mitigation measures to the homes of low-income senior citizens in the Flood Hazard Area.	Deleted	Redundant; addressed by CHO/EDN14
EDN32	Edenton	Begin monitoring erosion complaints, considering locations, possible events, and past complaints about the areas.	Completed	Completed; now considered a day-to-day capability.
EDN33	Edenton	Research and interview with property owners regarding erosion.	Deleted	Strategy determined to be ambiguous and lacking in substance.
EDN34	Edenton	Research possible seawall options to prevent future erosion along Edenton Bay and rivers.	Deleted	The Town is not currently pursuing this strategy.
EDN35	Edenton	Consider bringing in fill and additional necessary materials to replace erosion in designated areas.	Deleted	The Town is not currently pursuing this strategy.
EDN36	Edenton	Posting signs in areas considered eroded.	Deleted	Strategy determined to be ambiguous and lacking in substance.
EDN37	Edenton	Research and interview with property owners regarding storm surge damage.	Deleted	Strategy determined to be ambiguous and lacking in substance.
EDN38	Edenton	Document specific accounts of storm surge levels within different areas per storm & calculate value of loss. *Information to be included in future Hazard Mitigation Plan updates (once every 5 years).	Completed	Completed; now considered a function of the mitigation planning process.
EDN39	Edenton	Research possible seawall options to prevent future erosion along Edenton Bay and rivers.	Deleted	The Town is not currently pursuing this strategy.
EDN40	Edenton	Provide public mailings to discuss what to do in case of expected storm surge.	Deleted	Redundant; addressed by CHO/EDN8
EDN41	Edenton	Provide safety warning radio broadcasts, determining the approximate time and area a tornado would be likely to hit.	Deleted	Redundant; addressed by CHO/EDN19
EDN42	Edenton	Start radio or newspaper advertisement, to warn citizens of hazards and safety precautions that should be taken.	Deleted	Redundant; addressed by CHO/EDN19
EDN43	Edenton	Improve the wind resistance of structures within the County and Town by continuing to enforce the North Carolina Building Code through the County's minimum housing code.	Completed	Completed; now considered a day-to-day capability.
EDN44	Edenton	Require all new structures to include drainage ditches and/or culverts installed around perimeter of property to prevent flooding and flood damage to structures.	Deleted	Not currently being pursued, the Town relies on local and state stormwater regulations for this purpose.
EDN45	Edenton	Provide safety warning radio broadcasts, determining the approximate time and area a nor'easter would be likely to hit.	Deleted	Redundant; addressed by CHO/EDN19
EDN46	Edenton	Prepare a series of mailings to citizens discussing what the proper safety procedures for each hazard addressed in this Plan.	Deleted	Redundant; addressed by CHO/EDN8

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
EDN47	Edenton	Post warning signs in areas stating the likelihood of fires in the area due to the current weather conditions, including the dangers that may lead to wildfires.	Deleted	Redundant; addressed by CHO/EDN17
EDN48	Edenton	Require owners (by advertisement in the local papers) to annually remove any brush or downed limbs promptly to prevent fires from moving quickly along the ground.	Deleted	Redundant; addressed by CHO/EDN17
EDN49	Edenton	Assign new regulations that will revise the current water level for both the Town of Edenton Water Department and the Chowan County Water Department.	Deleted	Redundant; addressed by CHO/EDN9
EDN50	Edenton	Start radio or newspaper advertisement, to warn citizens of hazards and safety precautions that should be taken.	Deleted	Redundant; addressed by CHO/EDN19
EDN51	Edenton	Prepare a series of mailings to citizens discussing what the proper safety procedures for each hazard addressed in this Plan.	Deleted	Redundant; addressed by CHO/EDN8
Gates County				
GAT4	Gates County, Gatesville	Continue to enforce existing building code and fire code, and investigate appropriate ways to advance these codes for greater future effectiveness with regard to natural hazards.	Completed	Completed; day-to-day function of the County building inspections department.
GAT7	Gates County, Gatesville	Ensure floodplain mapping and management are considered in planning documents such as Land Use, Zoning Ordinance	Deleted	Redundant; merged into GAT5
Hertford County				
HER1	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Maintain a continuously updated list of all approved shelters.	Deleted	Redundant; merged into HER1
HER2	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Continuously maintain, on the County's website, instructional information on ensuring that onsite sheltering is as safe an option as possible.	Deleted	Redundant; merged into HER1
HER3	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Inspect local shelters to determine compliance with American Red Cross (ARC) Shelter Standards.	Deleted	Redundant; merged into HER1

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
HER5	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Improve capability of secondary power source at all County and Municipal Critical Facilities	Deleted	Redundant; merged into HER3
HER8	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Coordinate open space planning and preservation with all local certified CAMA land use plans	Deleted	The County does not anticipate updating its CAMA land use plan during the planning period.
HER11	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Coordinate public education on the hazards of wildfires with the NC Forestry Services ongoing wildfire education program.	Deleted	Redundant; merged into HER7
HER16	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA) in both incorporated and unincorporated portions of the County. All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined special flood hazard area without the submittal of the required elevation certificate.	Completed	Completed; day-to-day function of the County building inspections department.
HER18	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Maintain a map information service involving the following: (1) Provide information relating to Flood Insurance Rate Maps (FIRM) to all inquirers, including providing information on whether a given property is located within a flood hazard area. (2) Provide information regarding the flood insurance purchase requirement on the county's website. (3) Maintain historical and current FIRM's. (4) Locally advertise once annually in the local newspaper. (5) Provide information to inquirers about local floodplain management requirements. (6) Include in the county's newsletter (all property owners) and on the county's website a letter on flood insurance. (7) Notify property owners within a flood prone area that they are subject to flooding. (8) Maintain a log of inquiries including: date, FIRM zone of subject property, address/location of subject property, indication that inquirer was informed of Insurance purchase requirement.	Deleted	Redundant; addressed by HER13

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
HER20	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Hertford County will work with local real estate agencies to ensure that agents are informing clients when property for sale is located within a Special Flood Hazard Area (SFHA). The County will provide these agencies with brochures documenting the concerns relating to development located within flood prone areas. Maintain a copy of the brochure and disclosure statements from at least five (5) local real estate agencies confirming brochure availability.	Deleted	Redundant; addressed by HER14
HER23	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Hertford County will provide comprehensive services regarding planning and development activities within the defined SFHA. These services will include (1) Provide site-specific flood and flood related information on an as needed basis, (2) Maintain a list of contractors with experience in floodproofing and retrofitting techniques at the Building Inspections Dept., (3) Maintain materials providing an overview of how to select a qualified contractor at the Building Inspections Dept., (4) Site visits will be performed upon request by the Building Inspections Dept. to review occurrences of flooding, drainage, and sewer problems—if applicable, inspector should provide one-on-one advice to the property owner; (5) Advertise the availability of services once annually within the local newspaper; and (6) Maintain a log of all individuals assisted through these services, including site visits.	Deleted	Redundant; addressed by HER14
HER24	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Hertford County will maintain a comprehensive Geographic Information System (GIS) with current FIRM panels in an effort to make this information readily available to County citizens. In addition to this digital data, bound copies of all historical and current FIRM panels will be maintained within the Hertford County Planning Department.	Completed	Completed; information is now provided by link on the county website to ncfloodmaps.com .
HER26	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	The MAC, in conjunction with Hertford County and the participating municipal jurisdictions, will work on the five-year implementation of this plan.	Completed	Strategy completed and now required through plan implementation.
HER27	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Maintain dialogue with the Tri-County Airport Authority to effectively regulate land use as the County continues to grow and encroach upon the airport environs.	Completed	These efforts are handled through the County's Land Use Plan and Land Development Code.
HER28	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Hertford County will continue to support the NC Office of Dam Safety's efforts to monitor and inspect all dams throughout the state. The county will rely on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Deleted	Although the County supports this effort, it is a function of the Office of Dam Safety.

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
Pasquotank County				
PAS1	Pasquotank County, Elizabeth City	Utilize best available data to identify the location and potential impacts of natural hazards on people, property and natural environment.	Deleted	Redundant; merged into PAS1
PAS2	Pasquotank County, Elizabeth City	Establish periodic monitoring and review of Multi-Hazard plan and ordinances to determine effectiveness at preventing and mitigating hazards.	Deleted	Redundant; merged into PAS1
PAS3	Pasquotank County, Elizabeth City	Continue to ensure through proper planning, zoning and building codes that all safety measures are in place for new construction and placement.	Completed	Completed; now considered a day-to-day capability.
PAS4	Pasquotank County, Elizabeth City	Continue efforts for post-storm planning in an effort to reduce the time required to return the affected community to pre-storm status.	Deleted	Redundant; merged into PAS1
PAS6	Pasquotank County, Elizabeth City	Ensure that building codes are enforced to prevent damages from high winds.	Completed	Completed; now considered a day-to-day capability.
PAS7	Pasquotank County, Elizabeth City	Continue to enforce regulatory measures that ensure new development will not increase flood threats to existing properties.	Completed	Completed; now considered a day-to-day capability.
PAS11	Pasquotank County, Elizabeth City	Seek/Encourage the development and implementation of long-term cost effective and environmentally sound mitigation projects.	Deleted	Redundant; merged into PAS1
PAS12	Pasquotank County, Elizabeth City	As funding allows, reduce flood-related damage to repetitive flood loss properties and structures through the buyout program.	Deleted	Redundant; merged into PAS5
PAS16	Pasquotank County, Elizabeth City	Educate and inform residents, businesses and visitors via public education, social media and print materials on ways to mitigate disasters including steps that they can protect themselves.	Deleted	Redundant; merged into PAS7
PAS18	Pasquotank County, Elizabeth City	Increase awareness of hazards affecting Pasquotank County and provide information to assist in good decision-making.	Deleted	Redundant; merged into PAS7
PAS19	Pasquotank County, Elizabeth City	Educate home and property owners about flood-proofing and wind-proofing measures.	Deleted	Redundant; merged into PAS7
PAS20	Pasquotank County, Elizabeth City	Continue to enforce the North Carolina Building Code. The requirement that new structures or structures undergoing significant renovation be resistant to wind loads of 110 m.p.h. is of particular importance.	Completed	Completed; now considered a day-to-day capability.
PAS21	Pasquotank County, Elizabeth City	Educate contractors about safe housing development through written materials or a county sponsored symposium.	Deleted	Redundant; merged into PAS7
PAS22	Pasquotank County, Elizabeth City	Hold a county/city-sponsored hazard mitigation symposium for the county residents and surrounding municipalities, including information on preparedness for all hazards significant to Pasquotank County.	Deleted	Redundant; merged into PAS7
PAS23	Pasquotank County, Elizabeth City	Provide homeowners information on wind resistant measures.	Deleted	Redundant; merged into PAS7
PAS24	Pasquotank County, Elizabeth City	Educate mobile home contractors and owners about wind proofing measures, including wood and light steel construction connectors and anchoring systems.	Deleted	Redundant; merged into PAS7
PAS25	Pasquotank County, Elizabeth City	Post information about Pasquotank County's emergency evacuation routes.	Deleted	Redundant; merged into PAS9

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
PAS31	Pasquotank County, Elizabeth City	Continue efforts to acquire the "Perry Properties" located in the area of Ehringhaus Street and McMorrine Street in Elizabeth City utilizing hazard mitigation grant funding for repetitive flood loss properties.	Deleted	Redundant; merged into PAS5
PAS32	Pasquotank County, Elizabeth City	Continue efforts to acquire repetitively flooded properties in the Oxford Heights subdivision of Elizabeth City utilizing hazard mitigation grant funding.	Deleted	Redundant; merged into PAS5
PAS34	Pasquotank County, Elizabeth City	Revise zoning and subdivision ordinances to increase lot sizes in areas with poor soils.	Deleted	The County/City is no longer pursuing this strategy.
PAS36	Pasquotank County, Elizabeth City	As with other hazards of concern to Pasquotank County and the City of Elizabeth City, a hazard mitigation symposium should be held for its residents, including information on preparedness for all hazards significant to its jurisdiction. The symposium should encourage property owners in flood prone areas to consider the options of elevation, relocation, and flood proofing.	Deleted	Redundant; merged into PAS7
PAS37	Pasquotank County, Elizabeth City	Distribute information identifying flood prone areas within the county/city. Address the need for evacuation and family preparedness plans especially for residents living within flood prone areas.	Deleted	Redundant; merged into PAS7
PAS39	Pasquotank County, Elizabeth City	In order to reduce storm water runoff, the city should minimize construction of additional impervious surfaces within the floodplain. Elizabeth City's Stormwater Management Ordinance addresses mitigation measures to control the adverse effects of increased storm water runoff associated with both future land development and existing developed land within the City.	Completed	Completed; ongoing effort by the Elizabeth City Administration.
PAS40	Pasquotank County, Elizabeth City	Provide new home and property buyers with information on wind proofing. This information may be most efficiently dispersed by the tax assessor's office because all home transactions are recorded there.	Deleted	Redundant; merged into PAS7
PAS41	Pasquotank County, Elizabeth City	Warning System Improvements.	Deleted	Redundant; merged into PAS9
PAS42	Pasquotank County, Elizabeth City	Encourage the practice of placing storm shelters in all mobile home areas and subdivisions.	Deleted	The County/City is no longer pursuing this strategy.
PAS43	Pasquotank County, Elizabeth City	As with other hazards of concern to Pasquotank County and the City of Elizabeth City, the county/city can sponsor a hazard mitigation symposium for its residents, including information on preparedness for all hazards significant to Pasquotank County.	Deleted	Redundant; merged in PAS7
PAS44	Pasquotank County, Elizabeth City	Encourage the installation of lightning detection devices be installed in public outdoor gathering areas such as school stadiums and ball parks.	Deleted	The County/City is no longer pursuing this strategy.
PAS45	Pasquotank County, Elizabeth City	In order to minimize injury from lightning strikes, shelters should be placed every 10 acres in all public open space recreation areas. This recommendation should be encouraged by the county and the city.	Deleted	The County/City is no longer pursuing this strategy.
PAS46	Pasquotank County, Elizabeth City	Provide new home and property buyers with information on wind proofing. This information may be most efficiently dispersed by the tax assessor's office because all home transactions are recorded there.	Deleted	Redundant; merged into PAS7

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
PAS47	Pasquotank County, Elizabeth City	Driving in storm conditions can create hazardous road conditions, including decreased ability for drivers to see road boundaries. To improve road visibility, reflector tape or paint along road edges and in the dividing line should be placed on all major roads through city/county.	Deleted	This strategy is a function of NCDOT on all major highways; it is not considered necessary on local access streets.
Perquimans County				
PER1	Perquimans County, Hertford, Winfall	Monitor trees and branches at risk of breaking or falling in windstorms. Prune or thin trees or branches on county property when they would pose an immediate threat to property, utility lines, or other significant structures or critical facilities in the county.	Completed	Completed; day-to-day function of the County/Town maintenance departments.
PER5	Perquimans County, Hertford, Winfall	Continue to review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	Deleted	Strategy is ambiguous and vague and, therefore, was removed from the plan.
PER6	Perquimans County, Hertford, Winfall	Ensure that mobile manufactured homes are installed and secured properly.	Completed	Completed; day-to-day function of the County building inspections department.
PER7	Perquimans County, Hertford, Winfall	Complete the review and consider adoption of “Stormwater and Drainage Management Standards” to augment current zoning and subdivision ordinances, as included in the Planning Board’s Fiscal Year 2009-2010 Work Program. The TRC has recommended adoption of this Ordinance.	Completed	Completed during the former planning period.
PER8	Perquimans County, Hertford, Winfall	Continue to enforce the North Carolina Building Code. Enforce the use of wind-resistant construction techniques used in coastal regions. The requirement that new structures or structures undergoing significant renovations be resistant to wind loads of 110 mph is of particular importance.	Completed	Completed; day-to-day function of the County building inspections department.
PER11	Perquimans County, Hertford, Winfall	Maintain evacuation routes.	Deleted	Redundant; merged into PER6
PER12	Perquimans County, Hertford, Winfall	Enhance existing Warning Systems	Deleted	Redundant; merged into PER6
PER13	Perquimans County, Hertford, Winfall	Ensure adequate evacuation time in case of major hazard events.	Deleted	Redundant; merged into PER6
PER17	Perquimans County, Hertford, Winfall	Continue to support NC Sedimentation Control Commission efforts to ensure erosion and sedimentation control measures are properly installed and maintained during construction.	Completed	Completed; day-to-day function of the County building inspections department.
PER20	Perquimans County, Hertford, Winfall	Post information about emergency evacuation routes.	Deleted	Redundant; merged into PER6
PER21	Perquimans County, Hertford, Winfall	Use written materials to educate contractors about principles for quality redevelopment and safe housing development.	Deleted	Redundant; merged into PER12

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
PER22	Perquimans County, Hertford, Winfall	Provide new home and property buyers with information on wind proofing. The information is probably most effectively dispersed by the Building Inspections Department.	Deleted	Redundant; merged into PER12
PER23	Perquimans County, Hertford, Winfall	Create and disperse information about the plan and relevant emergency response actions the public can take.	Deleted	Redundant; merged into PER13
PER24	Perquimans County, Hertford, Winfall	Continue to provide flood maps for public use with staff continuing to be available for public assistance.	Deleted	Redundant; merged into PER12
PER25	Perquimans County, Hertford, Winfall	Collect FEMA and NCEM educational material on natural hazards and place in public library.	Deleted	Redundant; merged into PER12
HFT3	Hertford	Update the Town of Hertford's Zoning Ordinance and Subdivision Regulations.	Deleted	Redundant; merged into HRT2
HFT5	Hertford	In cooperation with Perquimans County, continue to review areas adversely impacted by major storm events and to examine existing policies that can minimize repetitive losses in those areas.	Deleted	Redundant; addressed by PER15
HFT6	Hertford	Work to develop continuity of operations plans (COOP) for county/town departments, assisted living facilities, long-term care facilities, day care centers, etc.	Deleted	Redundant; addressed by PER8
HFT7	Hertford	In conjunction with NCDOT, continue to examine the roadways of the town to determine if improvements are needed in areas affected by development and that all roadway are sufficient to carry traffic in time of evacuation.	Deleted	Redundant; addressed by PER5
WIN1	Winfall	Complete Land Use Plan and ensure that hazard mitigation objectives are addressed.	Deleted	Redundant; merged into WIN1
WIN2	Winfall	Update as needed the wastewater collection system and water system ordinances to meet hazard mitigation objectives.	Deleted	Redundant; merged into WIN1
WIN4	Winfall	Continue efforts to improve roads and bridges (both public and private) for critical services – fire, rescue, medical, evacuation, etc.	Deleted	Redundant; addressed by PER5
WIN5	Winfall	Seek funding and/or action to clear debris in canals, waterways and drainage ditches to prevent flooding and to improve drainage and water quality.	Deleted	Redundant; addressed by PER18
WIN6	Winfall	Work with the County Building Inspector to continue to enforce the NC Building Code, in particular, the tie down of buildings and resistance to wind loads.	Completed	Completed; day-to-day function of the County building inspections department.
WIN8	Winfall	Establish program for evacuation and improvement of Town critical services and facilities – wastewater collection system.	Deleted	Redundant; addressed by PER5
WIN9	Winfall	Continue to partner with Perquimans County in the annual review and update of the Emergency Operations Plan (i.e. evacuation warnings, removal of persons in flood prone areas).	Deleted	Redundant; addressed by PER5
WIN10	Winfall	Evaluate access problems for critical facilities; develop protection options. Identify alternate command post sites.	Deleted	Redundant; addressed by PER5

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2015 Action #	Jurisdictions	Description	2019 Status	Status Comments/Explanation
WIN11	Winfall	Work to develop continuity of operations plans (COOP) for county/town departments, assisted living facilities, long-term care facilities, day care centers, etc.	Deleted	Redundant; addressed by PER8
WIN12	Winfall	Continue to work on removal of projectile/debris such as junked vehicles, mobile homes and dilapidated homes.	Completed	Completed; day-to-day function of County building inspections department.
WIN14	Winfall	Participate in the annual review and update of the Hazard Mitigation Plan.	Completed	Completed; function of the implementation of the Hazard Mitigation Plan.
WIN15	Winfall	Establish both a regular and emergency plan to communicate with residents.	Deleted	Redundant; addressed by PER5
WIN16	Winfall	Disseminate information on emergency actions procedures – notification, shelters, evacuation routes, etc.	Deleted	Redundant; addressed by PER5
WIN17	Winfall	Each Town department establish/update plans for their respective operations for emergency operation situations.	Deleted	Redundant; addressed by PER5
WIN18	Winfall	Continue to partner with Perquimans County to improve warning system, to ensure residents understand the system and that homebound residents are notified.	Deleted	Redundant; addressed by PER6

3 Planning Area Profile

This section provides an overview of the current conditions and characteristics of the Albemarle Region. As Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties collectively comprise the Albemarle Region, general information for the region such as location, topography/geology, and climate have been combined in this section. Following the Region’s introductory information is a summary for each county and participating municipal jurisdictions containing pertinent information regarding history, natural functions, demographics such as population, housing, and economic characteristics, and land development trends. The section is organized into the following sub-sections:

- ▶ 3.1 Regional Characteristics

This regional section discusses the Region’s overall location within North Carolina, as well as significant geographic, transportation, and geologic features. It also provides an overview of average annual climactic conditions, documents the presence of mapped wetlands located throughout each of the participating County jurisdictions, and outlines the presence of threatened and endangered species.

- ▶ 3.2 Camden County Characteristics
- ▶ 3.3 Chowan County Characteristics
- ▶ 3.4 Gates County Characteristics
- ▶ 3.5 Hertford County Characteristics
- ▶ 3.6 Pasquotank County Characteristics
- ▶ 3.7 Perquimans County Characteristics

Each of the county profiles contains the following information: a brief summary of each participating county’s history; an overview of each county’s hydrology and a discussion of parks/open space; a summary of demographic data for all participating jurisdictions including an overview of total population counts, racial composition, housing characteristics, and information regarding employment and industry; a listing of all properties within each participating county jurisdiction that have been listed on the National Register of Historic Places; and a brief overview of development trends throughout each participating jurisdiction with information on parcel development and pre-FIRM property counts where available.

3.1 REGIONAL CHARACTERISTICS

Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties are located in the northeastern corner of North Carolina, as shown in Figure 3.1.

Although the Albemarle Region is a largely rural area, there is an abundance of attractions that draw visitors to the area. Regional attractions include the Roanoke River Lighthouse, the Great Dismal Swamp, Historic Edenton, Merchants Mill Pond State Park, and the Museum of the Albemarle.

The Albemarle Region comprises 1,867 square miles of land area, as detailed by participating jurisdiction in Table 3.1.

Table 3.1 – Albemarle Region Total Land Area

Jurisdiction	Total Land Area (Square Miles)
Camden County	310.0
Chowan County	233.0
Edenton	5.6
Gates County	346.0

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Jurisdiction	Total Land Area (Square Miles)
Gatesville	0.4
Hertford County	360.0
Ahoskie	4.3
Cofield	3.1
Como	3.2
Harrellsville	0.3
Murfreesboro	2.3
Winton	0.8
Pasquotank County	289.0
Elizabeth City	12.2
Perquimans County	329.0
Hertford	2.7
Winfall	2.1

Source: County Profiles - Wikipedia.

Camden County is located in northeastern North Carolina and bordered to the north by the State of Virginia, Currituck County to the east, Pasquotank and Gates Counties to the west, and the Albemarle Sound to the south. Although outside the state borders, Camden County's economy draws from the Hampton Roads region (Norfolk, Chesapeake, Virginia Beach). It is a short drive from the North Carolina Outer Banks, Downtown Norfolk, and Chesapeake, Virginia. No formally incorporated municipalities are located in Camden County. In 2006, the County approved an ordinance via referendum to create a unified government that incorporated the former townships of South Mills, Camden, and Shiloh into the County. These townships comprise the three core community areas: South Mills in the north, Camden in the center of the County, and Shiloh Village near the south end. The Great Dismal Swamp, the largest swamp in the nation, covers the northern portion of the County.

Chowan County is the smallest county in the State by land area. The County maintains one municipality, Edenton, which serves as the County seat. Chowan County is situated parallel to Bertie and Perquimans County, and lies south of Hertford/Gates County. The County's western boundary is predominantly comprised of the Chowan River, which runs toward the Albemarle Sound bordering the County to the South. NC Highway 17 traverses through the County east to west, while NC Highway 32 runs north to south and provides immediate access to Tidewater Virginia through Hertford County.

Gates County is located in the coastal plain of northeastern North Carolina and is bordered by Hertford County to the west and southwest, Chowan and Perquimans Counties to the south, Pasquotank and Camden counties to the east, and Suffolk County, Virginia to the north. The center of Gates County is located approximately 25 miles from Suffolk, Virginia; 48 miles from Norfolk, Virginia; 18 miles from Ahoskie, North Carolina; and 25 miles from Murfreesboro, North Carolina. The Town of Gatesville, the county's only incorporated municipality, is the county seat of Gates County. Gatesville has a total land area of less than one square mile and comprises less than 3 percent of the total county population.

Hertford County is located in the northeastern region of North Carolina, bounded on the north by the Virginia state line and to the east by Gates County. The County lies 55 miles southwest of Norfolk, 105 miles southeast of Richmond, and 120 miles northeast of the NC state capital of Raleigh. Major highways serving the County include US Routes 13, 158, and 258, and NC Highways 11, 42, 45, 305, 461, and 561. The County has six municipalities including the towns of Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, and Winton.

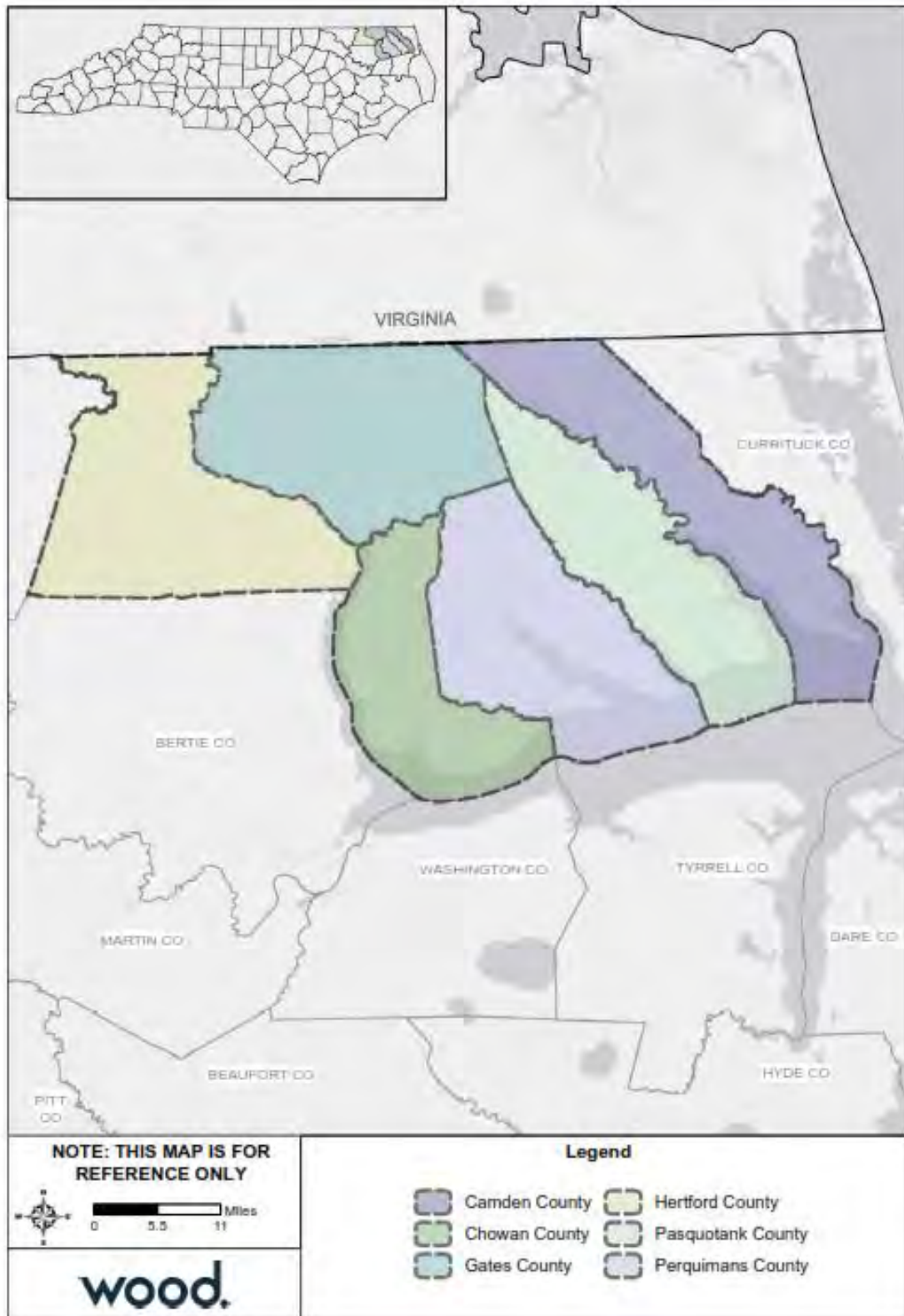
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Pasquotank County is located in the northeastern section of North Carolina and is bordered by Camden County to the north and east, Gates County to the northwest, Perquimans County to the southwest, and the Albemarle Sound to the south. The County has always been known for its water passages. The Dismal Swamp canal now forms part of the Intracoastal Waterway which runs along the east coast of the United States. Elizabeth City is the county seat of Pasquotank County.

Perquimans County is located in northeastern North Carolina and is bounded to the north by Gates County, to the east by Pasquotank County, to the south by the Albemarle Sound, and to the west by Chowan County. Hertford is the County's largest town and is the County seat. Winfall is the County's other incorporated town. Perquimans County boasts a diverse and impressive natural environment. The Little River flows through the eastern part of the County while the Perquimans River flows through the center. The Yeopim River and the Albemarle Sound make up the southernmost boundaries of the County.

Figure 3.1 – Albemarle Region Location Map



Source: U.S. Census Bureau

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The Albemarle Region is hot and humid in summer, although cooling winds blow in from the abundance of open water lining southern portions of the region. Afternoon thunderstorms are the main form of precipitation during the summer, with most summer precipitation occurring in July and August. Precipitation is generally adequate for all crops, and the region benefits by a lengthy growing season.

The average annual maximum temperature is 70.4 degrees F., and the average minimum temperature is 52.5 degrees F. In winter, the average daily minimum temperature is 36 degrees F. In summer, the average daily maximum temperature is 87 degrees F. Rainfall is usually well distributed throughout the year, with an average annual precipitation of 48.03 inches. The average seasonal snowfall is about 3 inches.

Figure 3.2 shows the average monthly temperature and precipitation for the region, approximated by a local weather station.

Figure 3.2 – Average Monthly Precipitation



Source: NOAA

The following provides a breakdown of weather averages by month:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F	51	55	62	71	78	85	88	86	80	72	63	54
Average low in °F	34	36	42	50	59	68	72	70	64	53	45	37
Average precipitation (in.)	3.5	3.15	4.02	2.91	3.74	4.8	5.47	5.91	4.92	3.39	3.19	3.03
Average snowfall (in.)	1	1	0	0	0	0	0	0	0	0	0	1

Source: NOAA

Wetlands

According to data from the U.S. Fish and Wildlife Service’s National Wetlands Inventory, there are approximately 258,798 acres of wetlands in the Region. Development within these areas is regulated by either the US Army Corps of Engineers, the NC Division of Coastal Management, or both. These entities have established regulations aimed at protecting fragile areas that are intended to work in concert with

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all other locally adopted land use regulations. Wetlands areas are shown by type in each county's annex. Table 3.2 provides a summary of wetland coverage within each County.

Table 3.2 – Albemarle Region Wetlands Acreage

County	Wetland Acreage	% of Total County Acreage
Camden County	20,143	10.3%
Chowan County	80,125	53.7%
Gates County	61,626	27.9%
Hertford County	33,806	14.6%
Pasquotank County	35,637	19.3%
Perquimans County	27,461	13.0%
Total	258,798	--

Source: U.S. Fish & Wildlife Service, National Wetlands Inventory

Natural and Beneficial Wetland Functions: The benefits of wetlands are hard to overestimate. They provide critical habitat for many plant and animal species that could not survive in other habitats. They are also critical for water management as they absorb and store vast quantities of storm water, helping reduce floods and recharge aquifers. Not only do wetlands store water like sponges, they also filter and clean water as well, absorbing toxins and other pollutants.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service maintains a regular listing of threatened species, endangered species, species of concern, and candidate species for counties across the United States. The Albemarle Region has four species that are listed with the U.S. Fish and Wildlife Services. Table 3.3 below lists the species identified as threatened, endangered, or other classification.

Table 3.3 – Albemarle Region Threatened and Endangered Species

Group	Common Name	Scientific Name	Federal Status	Counties Identified
Birds	Red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	Ca, G, H
Birds	Red knot	<i>Calidris canutus rufa</i>	Threatened	Ca, Ch, Pa, Pe
Mammals	Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	Threatened	Ca, G, Pa
Reptiles	American alligator	<i>Alligator mississippiensis</i>	Similarity of Appearance (Threatened)	Ca, G

Source: U.S. Fish & Wildlife Service

Note: Ca = Camden, Ch = Chowan, G = Gates, H = Hertford, Pa = Pasquotank, Pe = Perquimans

3.2 CAMDEN COUNTY

3.2.1 Hydrology

All of Camden County falls within the Pasquotank River Basin (called the Albemarle watershed by the USGS National Hydrology Dataset, mapped below). The Pasquotank River Basin (USGS CU 03010205) begins in the Great Dismal Swamp in Virginia. It is an expansive area of flat to gently sloping land surrounding the Albemarle Sound. Several major river systems flow into the Albemarle Sound, including the Chowan, Perquimans, Little, Pasquotank, North, Roanoke and Alligator Rivers.

In the eastern portion of the river basin, Currituck and Croatan Sounds run from north to south and are bound on the east by the Outer Banks. The Pasquotank River Basin is about 2,140 square miles including both land and open water.

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Edenton, Hertford/Winfall, and Elizabeth City are the largest municipalities in the basin. The Pasquotank Basin encompasses 45 14-digit hydrologic units and contains part or all of nine counties in the coastal plain. Waterbodies in the basin exhibit a broad range of conditions, from the brackish waters of the Albemarle Sound to the tidal freshwater marshes of the upper Currituck to freshwater rivers and streams throughout. Unique in this basin is Lake Phelps, a large shallow lake located in Pettigrew State Park.

A detailed overview of Camden County's river basin boundaries is provided in Figure 3.3.

Figure 3.3 – Camden County, HUC8 River Basins



Source: National Hydrology Dataset

3.2.2 Parks and Open Space

Camden County maintains several facilities that provide both active and passive recreational opportunities. These include the following:

- Camden Community Park (125 Noblitt Drive)
 - 8 Baseball/Softball Fields
 - 2 Batting Cages
 - Football/Soccer Fields
 - Large Practice Area
 - Tennis Court
 - Sand Volleyball Court
 - Walking Trails & Track
 - Outdoor Fitness Trail (Youth & Adult)
 - Pavilion & Playground
 - Basketball Court
 - 9 Hole Disc Golf Course
 - Inclusive Playground
- Dismal Swamp Trail (2356 US-17)
 - 3 Miles of Paved Trail that Parallels the Dismal Swamp Canal
 - Picnic Tables
 - Historic Landmarks
- One Mill Park (293 1 Mill Road)
 - Boat Ramp, Pier, and Boardwalk
 - Playground
 - Pavilion
 - Picnic Tables
 - Restrooms
 - Canoe & Kayak Launch
 - Water Access Ladder
- Treasure Point (123 Treasure Point Road)
 - Pier
 - Nature Trail
 - Picnic Tables
 - Canoe & Kayak Launch
 - Restrooms
- Senior Trail (117 N Carolina Highway)
 - 1/3 Mile Boardwalk
 - Gazebo
 - Pier

The County also maintains two boat ramps including: Milltown Boat Ramp (230 Milltown Road, Shiloh) and Sawyers Creek Boat Access (155 NC Highway 343, Camden).

3.2.3 Demographics

Population Total

Camden County is unique in that there are no incorporated jurisdictions within the County; thus, the population counts provided apply only to unincorporated areas. According to the US Census and the American Community Survey, the Camden County population has increased by approximately 50% since the year 2000. A majority of this growth occurred between 2000 and 2010, where the County experienced a 45% increase in total population.

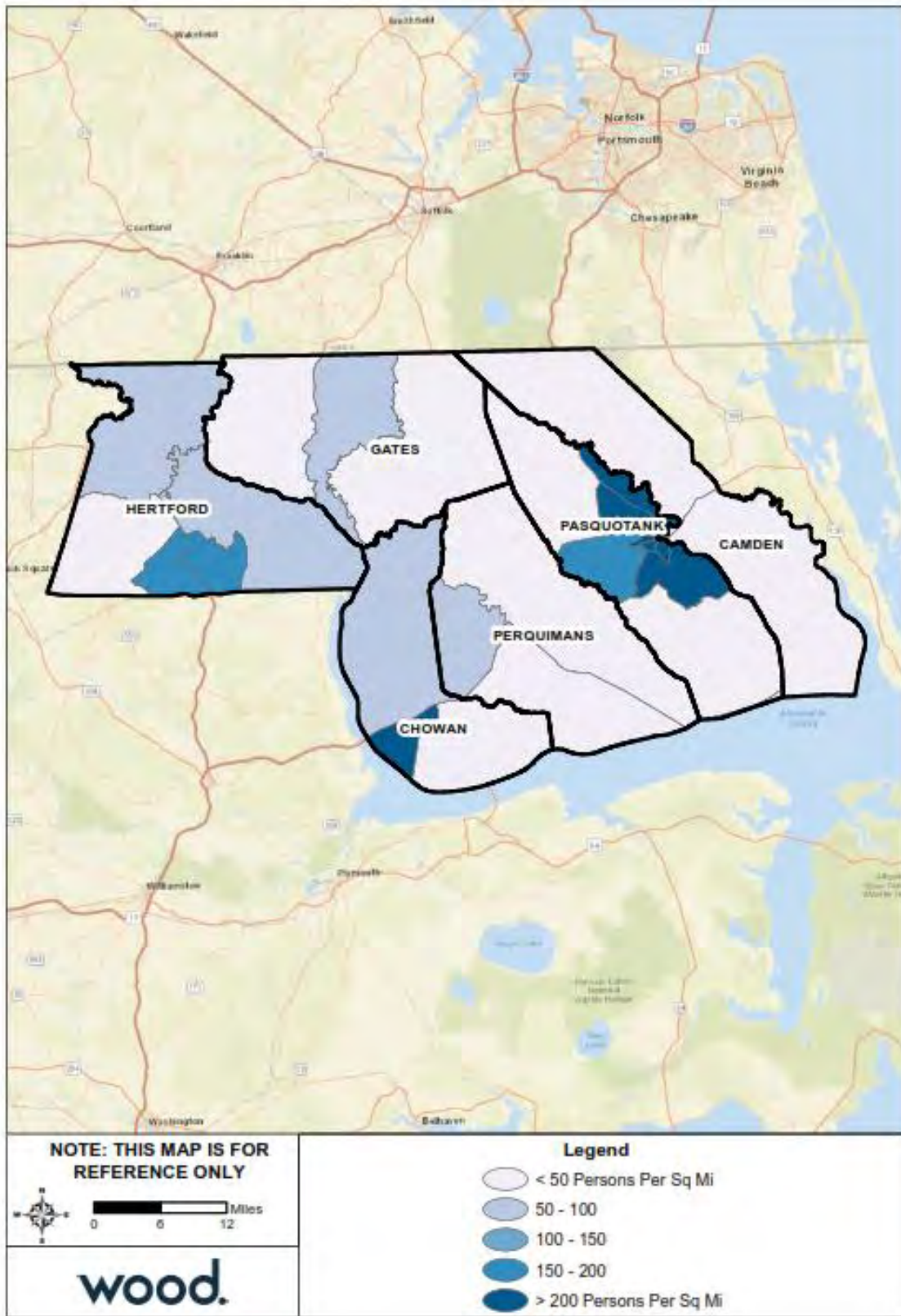
Table 3.4 provides a breakdown of total population for Camden County for 2000, 2010, and 2017.

Table 3.4 – Camden County Total Population

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Camden County	6,885	9,980	10,336	45.0%	3.6%	50.1%

Source: US Census Bureau American Community Survey

Figure 3.4 – Albemarle Region Population Density



Source: American Community Survey 2013-2017 5-Year Estimates

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Growth Trends

Table 3.5 provides population forecast through the year 2050 for Camden County. These forecasts are based on established trends between the years 2000 and 2017. According to these estimates, Camden County is expected to increase in population at a rate of 97.3% through 2050 (a total of 10,057 individuals).

Table 3.5 – Camden County Population Projections, 2017-2050

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Camden County	10,336	11,250	14,298	17,345	20,393	97.3%

Source: US Census Bureau American Community Survey and HCP, Inc.

Racial Demographics

The population within Camden County is overwhelmingly Caucasian, at 82%. Of the remaining population, roughly 14% are African American and 1.9% are Asian or Pacific Islander. Less than one percent are defined as either “Other Race” or “Two or More Races”. Additionally, nearly three percent of the County’s population is Hispanic or Latino origin. The median age for Camden County residents is 40.8 years, while approximately 16% of citizens is over the age of 65. Table 3.6 provides a summary of racial composition for Camden County.

Table 3.6 – Camden County Racial Composition

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Camden County	82.3%	14.3%	1.9%	0.6%	0.9%	2.7%

*Other race includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

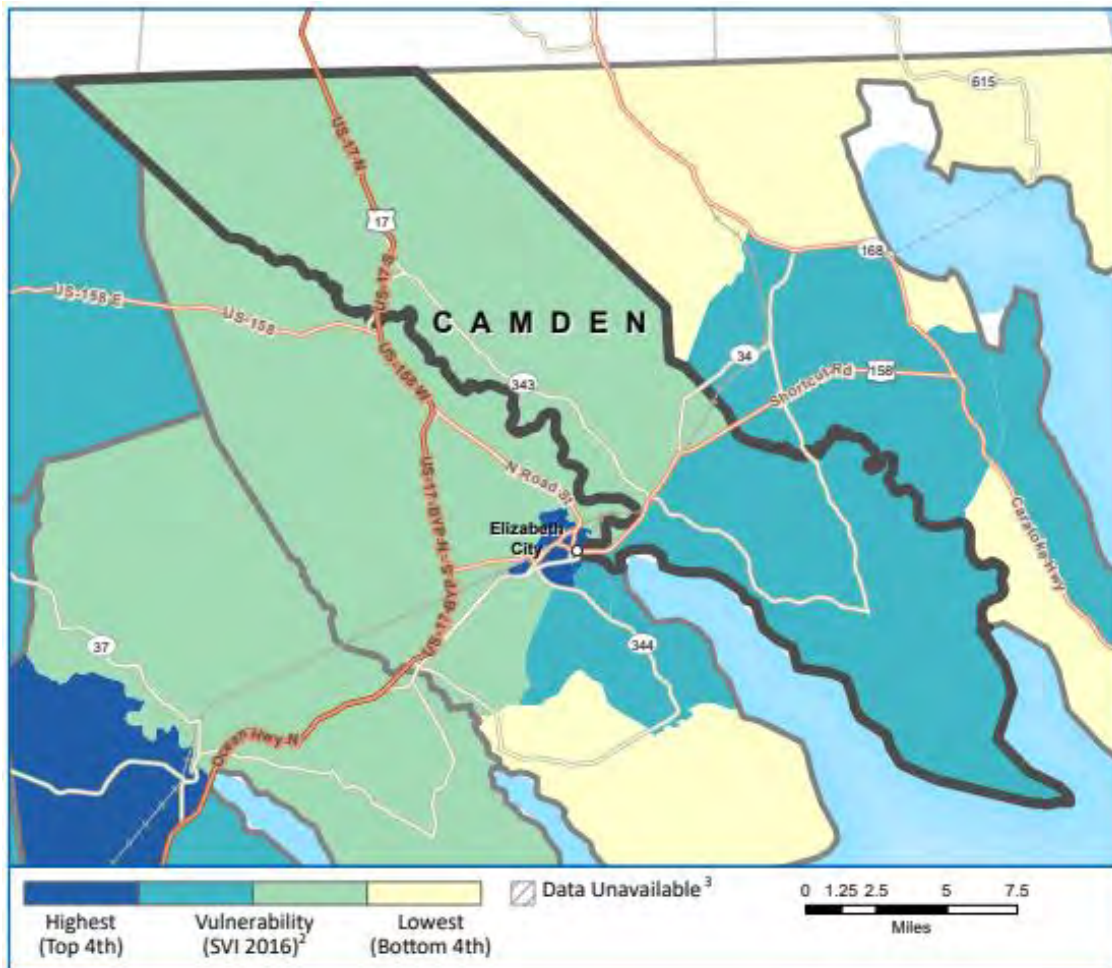
Source: US Census Bureau American Community Survey.

Social Vulnerability

Figure 3.5 below displays social vulnerability information for Camden County by census tract according to 2016 data and analysis by the Centers for Disease Control and Prevention (CDC). The CDC’s Social Vulnerability Index (SVI) indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age (65 or older), age (17 or younger), disability, household composition, minority status, language, housing type (multi-unit structures, mobile homes, crowding, group quarters), and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Social vulnerability throughout Camden County is fairly moderate. No portions of the County exhibit land area subject to the lowest or highest vulnerability classification. Overall the County’s vulnerability is consistent; however, southern portions of the County are more subject to the effect of flooding and all impacts associated with it.

Figure 3.5 – Camden County Social Vulnerability Index



3.2.4 Housing Characteristics

According to the 2017 American Community Survey, there were approximately 4,197 housing units in Camden County. This figure marks a 2.3%, or 93-unit, increase since 2010 for the County overall. Throughout Camden County, housing is predominantly comprised of owner occupants at 80.1%. This factor is important with regard to mitigation and post-disaster recovery because homeownership directly correlates to the long-term maintenance and floodproofing of property, as well as eligibility for funding of impacted units following a flooding event associated with nor'easters and tropical storm events.

In terms of vulnerability associated with natural hazard events such as tropical storms, hurricanes, and tornadoes, roughly 16.3% of the Camden County housing stock is comprised of manufactured homes, slightly higher than the state overall (13%). The prevalence of manufactured housing poses a unique threat regarding both sustainability, as well as emergency response with defined flood hazard areas.

Table 3.7 below provides a summary of housing characteristics for Camden County.

Table 3.7 – Camden County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Camden County	4,104	4,197	2.3%	80.1%	9.6%

Source: US Census Bureau American Community Survey.

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3.2.5 Wages, Employment and Industry

According to the 2017 American Community Survey, the median household income for the Camden County was \$68,327, which is 35.8% higher than the state’s median household income (\$50,320). However, approximately 6.8% of households are living below the poverty level. Moreover, 15.4 percent of people under 18 years of age are living below the poverty level in Camden County.

Within Camden County, approximately 37.6% of the population is considered to be in the labor force, with 56% currently employed. According to the 2017 American Community Survey, the unemployment rate for Camden County overall was 8.9%. Additionally, as of 2017, approximately 12.2% of households throughout Camden County relied on food stamps/SNAP benefits.

The following tables provide a summary of key economic indicators and population employed by industry for Camden County.

Table 3.8 – Camden County Key Economic Indicators

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Camden County	62.4%	55.5%	5.4%	37.6%	8.9%

Source: US Census Bureau American Community Survey.

Table 3.9 – Camden County Employment by Industry

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Camden County	37.4%	21.5%	19.4%	11.8%	9.8%

Source: US Census Bureau American Community Survey.

The top employers in Camden County represent the Management, Business, Science and Arts, as well as Sales and Office industries. These employers include:

- ▶ Camden County Board of Education
- ▶ Camden County
- ▶ Caci Technology, Inc.
- ▶ Swain & Temple, Inc.
- ▶ SXC Health Solutions, Inc.
- ▶ C&L Concrete Works, Inc.
- ▶ Frog Island Seafood, Inc.
- ▶ Burkes Outlet Store SC, Inc.
- ▶ Lambs of Camden, Inc.
- ▶ Tidewater Agronomics, Inc.

3.2.6 Historic Properties

As of September 2019, Camden County had 9 listings on the National Register of Historic Places. This list includes 7 historic structures and 2 historic schooners, which are situated within the County. Presence on the National Register signifies that these structures have been determined to be worthy of preservation for their historical or cultural values. The following provides a comprehensive listing of all Nationally Registered Properties in Camden County:

- ▶ Grandy, Caleb House (Belcross) – 4/29/1982
- ▶ Camden County Courthouse (Camden) – 2/1/1972

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- ▶ Camden County Jail (Camden) – 5/3/1984
- ▶ Lamb-Ferebee House (Camden) – 9/22/1980
- ▶ Milford (Camden) – 3/16/1972
- ▶ C.S.S. BLACK WARRIOR Two Masted Schooner (Elizabeth City) – 8/24/2018
- ▶ SCUPPERNONG Two Masted Schooner (Shawboro) – 8/24/2018
- ▶ Abbott, William Riley House (South Mills) – 8/11/1978
- ▶ Dismal Swamp Canal (South Mills) – 6/6/1988

3.2.7 Land Development Trends

Approximately 55% of parcels in Camden County are currently developed. Development throughout the County is generally situated along the key transportation corridors of NC Highway 343, and US Highways 17 and 158. Camden County does not have any incorporated jurisdictions; therefore, all development is regulated by the County. This scenario has resulted in a more rural developed landscape. There is a concentration of non-residential development centered along the US Highway 158 corridor entering the County from Elizabeth City.

Table 3.10 provides an overview of developed and undeveloped properties located throughout Camden County.

Table 3.10 – Camden County Developed and Undeveloped Parcel Counts

Jurisdiction	Developed Parcels	Undeveloped Parcels	Pre-Firm Buildings	% Developed
Camden County	4,316	3,471	*	55.4%

*NOTE: Data necessary to determine Pre-FIRM developed properties was not available for Camden County.
Source: HCP, Inc., Camden County Tax Office.

Detailed summaries of future land development trends, including Future Land Use Maps, are provided in the community annexes.

3.3 CHOWAN COUNTY

3.3.1 Hydrology

The northern half of Chowan County is situated within the Chowan River Basin, while the southern portion of the County is located within the Pasquotank River Basin (called the Albemarle watershed by the USGS National Hydrology Dataset). For a summary of the Pasquotank River Basin, refer to the Camden County Community Profile. The boundaries of these two river basins in relation to Chowan County is shown in Figure 3.6.

The Chowan River is formed at the border of Virginia and North Carolina by the confluence of the Nottoway and Blackwater Rivers, and its streams flow southeastward towards the Albemarle Sound. Approximately 75 percent (4,061 square miles) of the river's watershed lies within the Virginia border. The Chowan River Basin is located in the northeastern coastal plain of North Carolina and southeastern Virginia. The North Carolina portion includes all or part of Northampton, Hertford, Gates, Bertie, and Chowan Counties.

The Chowan River Basin in North Carolina is composed of two major drainages: Chowan River and Meherrin River. The Chowan River Basin is part of the Albemarle-Pamlico Estuarine system, the second largest estuarine system in the United States. All of the waters in the basin are designated as Nutrient Sensitive Waters. Many waterbodies in this basin are transitional in nature making water quality monitoring difficult. Some creeks and rivers flushing rates are influenced by tides and wind, while others receive swamp drainage.

Figure 3.6 – Chowan County, HUC8 River Basins



Source: National Hydrology Dataset

3.3.2 Parks and Open Space

There are several recreational facilities located throughout Chowan County in both incorporated and unincorporated portions of the County. In addition to these facilities, there are ample opportunities for active recreation on the Chowan River and Albemarle Sound that border a majority of the County’s boundary. The following provides a listing of parks and facilities located throughout Chowan County:

- ▶ Bennett’s Mill Pond (2100 Rocky Hock Road, Edenton)
- ▶ Robert Hendrix Park & Cannon’s Ferry Heritage Walk (315 Cannon’s Ferry Road, Tyner)
- ▶ Cape Colony Park (324 Blackbeards Road, Edenton)
- ▶ Chowan River Fishing Pier (248 Wharf Landing Road, Edenton)
- ▶ Earnhardt Softball Fields (1366 North Broad Street, Edenton)
- ▶ Fisher Baseball Fields (911 Badham Road, Edenton)
- ▶ Park Avenue Softball Field (705 North Oakum Street, Edenton)
- ▶ Pembroke Creek Park (716 West Queen Street, Edenton)
- ▶ Purser Soccer/Football Complex (528 B Coke Avenue, Edenton)
- ▶ Edenton Tennis Courts (702 North Broad Street, Edenton)
- ▶ South River Park (Beaufort)

3.3.3 Demographics

Population Total

Population growth within Chowan County, as well as the Town of Edenton, has been extremely slow dating back to the year 2000. The County population overall has decreased by a rate of 3.6%, with a 10.5% reduction within Edenton and a 1.1% decrease throughout unincorporated Chowan County. The median age for Chowan County citizens is 44.7, which is slightly older than the State overall (38.3). The County’s age range is fairly evenly distributed, with roughly 50% of the population under the age of forty-five and 50% over. Approximately 22% of the population is sixty-five years or older.

Table 3.11 provides a breakdown of total population in Chowan County for 2000, 2010, and 2017.

Table 3.11 – Chowan County Total Population

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Edenton	5,364	5,004	4,800	-6.7%	-4.1%	-10.5%
Unincorporated Areas	14,526	14,793	14,370	1.8%	-2.9%	-1.1%
Chowan County	19,890	19,797	19,170	-0.5%	-3.2%	-3.6%

Source: US Census Bureau American Community Survey.

Growth Trends

Table 3.12 provides population forecast through the year 2050 for Chowan County. These forecasts are based on established trends between the years 2000 and 2017. Per these estimates, Chowan County is expected to decrease in population at a rate of -7.0% through 2050 (a total decrease of 1,347 individuals).

Table 3.12 – Chowan County Population Projections, 2017-2050

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Edenton	4,800	4,711	4,414	4,117	3,820	-20.4%
Unincorporated Areas	14,370	14,343	14,252	14,161	14,070	-2.1%
Chowan County	19,170	19,048	18,639	18,231	17,823	-7.0%

Source: US Census Bureau American Community Survey and HCP, Inc.

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Racial Demographics

Racial composition varies significantly between incorporated and unincorporated portions of the County. Rural Chowan County is predominantly Caucasian (62.5%), while Edenton's citizens are mostly African American (60.9%). In addition to the Caucasian and African American population, there are a few citizens defined as either Other Race or Two or More Races. Both the County and Town have a very small Hispanic population with 3.6% and 1.0%, respectively. According to the 2017 American Community Survey, the County's population is predominantly comprised of females, which make up nearly sixty percent of the population. Table 3.13 provides a summary of racial composition for Chowan County and the Town of Edenton.

Table 3.13 – Chowan County Racial Composition

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Edenton	35.9%	60.9%	0.5%	1.2%	1.4%	1.0%
Chowan County	62.5%	33.9%	0.2%	2.0%	1.4%	3.6%

*Other race includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

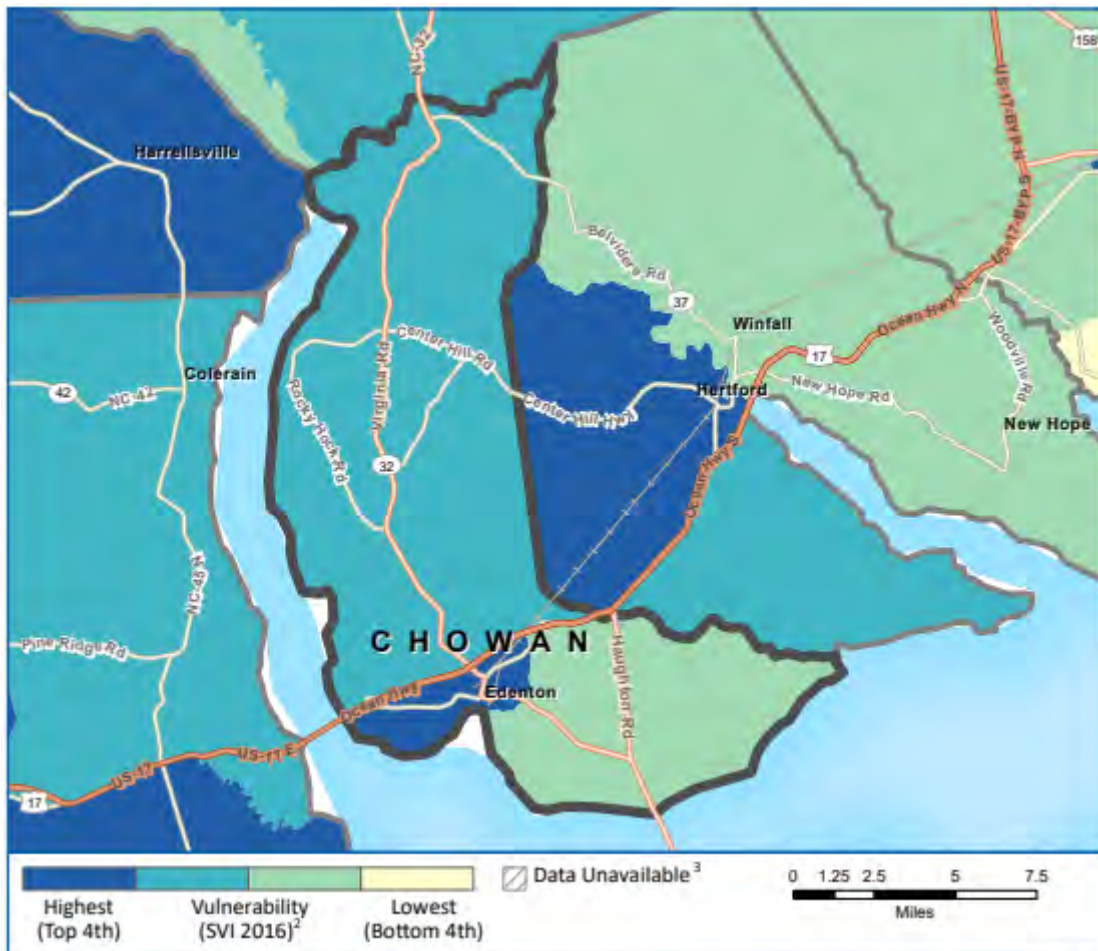
Source: US Census Bureau American Community Survey.

Social Vulnerability

Figure 3.7 below displays social vulnerability information for Chowan County by census tract according to 2016 data and analysis by the CDC. The CDC's SVI indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age (65 or older), age (17 or younger), disability, household composition, minority status, language, housing type (multi-unit structures, mobile homes, crowding, group quarters), and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

The social vulnerability index for Chowan County is similar to other rural Counties located throughout the State. The vulnerability is much lower within portions of the County with close proximity to municipal services. The portion of the County surrounding Edenton has access to a range of central services including fire, central water, law enforcement, etc. As you move away from this centralized area, vulnerability increases. The southern extent of the County has slightly more vulnerability, principally due to flooding potential.

Figure 3.7 – Chowan County Social Vulnerability Index



3.3.4 Housing Characteristics

The Chowan County housing stock is fairly old in that roughly 32% of homes were constructed prior to 1970. Between 1970 and the year 2000, 3,602 housing units were built. Over this period nearly fifty percent of the County housing stock was developed. In recent years housing starts have been slow to materialize within Chowan County. Since 2010, the County has experienced an increase of 199 homes (8.3% growth), while Edenton's growth has been nearly static with a growth rate of 0.1% (five additional units). The County's housing stock is predominantly owner-occupied (73.0%), while tenure within Edenton is fairly evenly split with 45.8% occupied by the home's owner. Owner-occupied housing is generally preferred for a variety of reasons including: better home maintenance, lower crime rates, stronger sense of community, and generally more resilient.

A majority of homes within Chowan County are single-family attached or detached structures. The remaining homes are nearly all comprised of manufactured homes. Roughly 23% of the Chowan County housing stock is comprised of manufactured homes, which is much higher than the state overall (13%). The prevalence of manufactured housing poses a unique threat with regard to sustainability, as well as emergency response, within defined flood hazard areas.

Table 3.14 below provides a summary of housing characteristics for Chowan County and the Town of Edenton.

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Table 3.14 – Chowan County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Edenton	2,411	2,610	8.3%	45.8%	10.7%
Chowan County	7,289	7,294	0.1%	73.0%	19.1%

Source: US Census Bureau American Community Survey.

3.3.5 Wages, Employment and Industry

The median household income for Chowan County residents is \$41,979. The figure is quite a bit lower for the Town of Edenton at \$27,596. Both jurisdictions maintain a median household income much lower than the State's of \$50,320. Currently, the number of families living below poverty level throughout Chowan County is approximately 23%.

Within Chowan County, approximately 53.2% of the population is considered to be in the labor force. The Town of Edenton's population in the labor force is slightly higher at 56.0%. The unemployment rate for Edenton is high at 20.6%, while the County has a more moderate unemployment of 11.9%. Both jurisdictions unemployment rates are exorbitantly higher than NC overall, which maintains a 4.2% unemployment rate. Employment throughout the County is generally split between three industries as shown in the table below. The Natural Resources, Construction, and Maintenance industry is nearly non-existent, employing less than two percent of the overall population.

The following tables provides a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Chowan County.

Table 3.15 – Chowan County Key Economic Indicators

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Edenton	56.0%	43.3%	11.2%	44.0%	20.6%
Chowan County	53.2%	46.5%	6.3%	46.8%	11.9%

Source: US Census Bureau American Community Survey.

Table 3.16 – Chowan County Employment by Industry

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Edenton	28.9%	30.1%	21.9%	1.7%	17.3%
Chowan County	29.6%	25.4%	19.8%	7.4%	17.7%

Source: US Census Bureau American Community Survey.

The top employers in Chowan County represent the Management, Business, Science and Arts, as well as Sales and Office industries. These employers include:

- ▶ Edenton-Chowan Schools
- ▶ Vidant Medical Center
- ▶ Meherrin Agricultural and Chemical Company
- ▶ Chowan County
- ▶ Colony Tire Corporation
- ▶ Regulator Marine, Inc.
- ▶ United Parcel Service

- ▶ Seabrook Ingredients
- ▶ Principal Long-Term Care
- ▶ Food Lion

3.3.6 Historic Properties

As of September 2019, Chowan County had 26 listings on the National Register of Historic Places. This list includes 23 historic structures or sites and 3 Historic Districts. Presence on the National Register signifies that these structures have been determined to be worthy of preservation for their historical or cultural values. The following provides a comprehensive listing of all Nationally Registered Properties in Chowan County.

- ▶ Albania (Edenton) – 5/13/1976
- ▶ Athol (Edenton) – 5/22/1980
- ▶ Barker House (Edenton) – 3/24/1972
- ▶ Chowan County Courthouse (Edenton) – 4/15/1970
- ▶ Cupola House (Edenton) – 4/15/1970
- ▶ Edenton Cotton Mill Historic District (Edenton) – 2/5/1999
- ▶ Edenton Historic District (Edenton) – 7/16/1973
- ▶ Edenton Historic District (Boundary Increase II) (Edenton) – 9/28/2007
- ▶ Edenton Historic District (Boundary Increase) (Edenton) – 10/5/2001
- ▶ Edenton Peanut Factory (Edenton) – 9/20/1979
- ▶ Edenton Station, United States Fish and Fisheries Commission (Edenton) – 9/14/2002
- ▶ Hayes Plantation (Edenton) – 2/26/1974
- ▶ Hicks Field (Edenton) – 9/13/1995
- ▶ Iredell, James House (Edenton) – 2/26/1970
- ▶ Jones, Cullen and Elizabeth House (Edenton) – 5/3/2006
- ▶ Moore, Susan J. Armistead House (Edenton) – 5/18/2005
- ▶ Mulberry Hill (Edenton) – 5/13/1976
- ▶ Pembroke Hall (Edenton) – 11/7/1976
- ▶ Sandy Point (Edenton) – 4/25/1985
- ▶ Shelton Plantation House (Edenton) – 10/29/1974
- ▶ Speight House and Cotton Gin (Edenton) – 9/22/1980
- ▶ St. Paul's Episcopal Church and Churchyard (Edenton) – 5/29/1975
- ▶ Strawberry Hill (Edenton) – 5/22/1980
- ▶ Wessington House (Edenton) – 3/20/1973
- ▶ Cullins-Baker House (Smalls Crossroads) – 4/29/1982
- ▶ Greenfield Plantation (Somerset) – 5/6/1976

3.3.7 Land Development Trends

Throughout Chowan County, approximately 41% of parcels are currently developed. Table 3.17 provides an overview of developed and undeveloped properties located throughout Chowan County. Developed land is fairly evenly distributed throughout unincorporated portions of the County. Most structures are either residential or are associated with agricultural production and/or industry. The largest concentrations of development occur in northwestern Chowan County involving the Arrowhead Beach subdivision and southern Chowan County, the location of the Cape Colony Subdivision. A large percentage of the County's residents reside in these two locations. Edenton is 75% developed and provides a majority of goods and services necessary to support County residents. All County and Town facilities are located in Edenton, as well as Vidant Medical Center. Redevelopment is limited throughout the planning area.

Table 3.17 – Chowan County Developed and Undeveloped Parcel Counts

Jurisdiction	Developed Parcels	Undeveloped Parcels	Pre-Firm Buildings	% Developed
Edenton	1,889	615	*	75.4%
Chowan County	4,329	6,238	*	41.0%

*NOTE: Data necessary to determine Pre-FIRM developed properties was not available for Chowan County.
Source: HCP, Inc., Chowan County Tax Office.

Detailed summaries of future land development trends, including Future Land Use Maps, are provided in the community annexes.

3.4 GATES COUNTY

3.4.1 Hydrology

Gates County is predominantly located within the Chowan River Basin. Approximately, 75% of Gates County falls within the Chowan River Basin, while the remaining 25% is situated within the Pasquotank River Basin (called the Albemarle watershed by the USGS National Hydrology Dataset), as shown in Figure 3.6. Descriptions of these river basins can be found in Section 3.2.1 and Section 3.3.1.

Figure 3.8 – Gates County, HUC8 River Basins



Source: National Hydrology Dataset

3.4.2 Parks and Open Space

There are several recreational facilities located throughout Gates County, including County Park facilities as well as the Merchants Mill State Park. The Gates County Community Center was built in 1978 by a joint effort between the Gates County Board of Education and Gates County Board of Commissioners. Since that time, many changes have taken place. A little over \$750,000 in renovations were completed in 2009, funded by the Golden Leaf Foundation. A grant received from the Roanoke-Chowan Foundation allowed the Center to establish a Wellness Center. The Gates County Community Center includes the following facilities:

- ▶ 9 hole - Par 3 disc golf course
- ▶ ½ mi. paved walking/fitness trail
- ▶ 5 lighted tennis courts
- ▶ 80' by 50' skateboard park
- ▶ Britches and Braids Pre-school
- ▶ Senior Citizens' lunch feeding program and Meals on Wheels
- ▶ Horseshoe pits
- ▶ Ping pong tables
- ▶ Large handicapped accessible playground
- ▶ Bocce Court
- ▶ Open Gym

Southern swamp and hardwood forest mingle at Merchants Millpond State Park, adorning the landscape with massive bald cypress trees, beech groves, Spanish moss and exotic wildlife. Canoes can be rented, or visitors can bring their own for a unique paddling experience. Three types of camping are available at family and group campgrounds, primitive backpacking sites, and three remote canoe-in campgrounds reached by paddling trails. The scenic pond is surrounded by picnic grounds, nine miles of hiking trails, and a visitor center offering museum-quality exhibits.

3.4.3 Demographics

Population Total

Gates County overall is very rural in nature and maintains the second lowest population in the region behind Camden County, with just under 12,000 persons. Unlike Camden County, there is one incorporated jurisdiction – the Town of Gatesville – with a population of 313 individuals. Population growth throughout the County has been modest dating back to the year 2000, with a 16% increase for unincorporated Gates County, and 14.2% growth rate for the Town of Gatesville. This growth occurred between the years 2000 and 2010. The County has actually experienced a slight decline in population since 2010. Overall, the County's population is fairly evenly distributed with respect to age. Roughly 21% of citizens are under eighteen years of age, while nearly nineteen percent are sixty-five years or older. The median age for both Gates County and the Town of Gatesville residents is 45 years.

Table 3.18 provides a breakdown of total population for Gates County and the participating municipalities for the years 2000, 2010, and 2017.

Table 3.18 – Gates County Total Population

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Gatesville	281	321	313	14.2%	-2.5%	11.4%
Unincorporated Areas	10,516	12,197	11,601	16.0%	-4.9%	10.3%
Gates County	10,797	12,518	11,914	15.9%	-4.8%	10.3%

Source: US Census Bureau American Community Survey.

SECTION 3: PLANNING AREA PROFILE

Growth Trends

Table 3.19 provides population forecast through the year 2050 for Gates County, as well as all participating municipal jurisdictions. These forecasts are based on established trends between the years 2000 and 2017. According to these estimates, Gates County is expected to increase in population at a rate of 20.1% through 2050 (a total of 2,393 individuals).

Table 3.19 – Gates County Population Projections, 2017-2050

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Gatesville	313	319	340	361	382	22.1%
Unincorporated Areas	11,601	11,812	12,516	13,220	13,924	20.0%
Gates County	11,914	12,132	12,857	13,582	14,307	20.1%

Source: US Census Bureau American Community Survey and HCP, Inc.

Racial Demographics

According to the 2017 American Community Survey, the Gates County population is fairly evenly distributed with respect to gender. Roughly 49% of citizens are male and 51% female. In terms of racial composition, a majority of citizens are Caucasian (63.1%), while 32.9% reported being African American. The racial composition of Gatesville is much different with nearly all residents (90.4%) reporting being Caucasian. The Hispanic population in Gates County, as well as Gatesville, is extremely limited, at under one percent of the overall population.

Table 3.20 provides a summary of racial composition for Gates County, as well as all participating municipal jurisdictions.

Table 3.20 – Gates County Racial Composition

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Gatesville	90.4%	8.0%	0.3%	0.6%	0.6%	0.6%
Gates County	63.1%	32.9%	0.4%	1.3%	2.3%	0.7%

*Other race includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

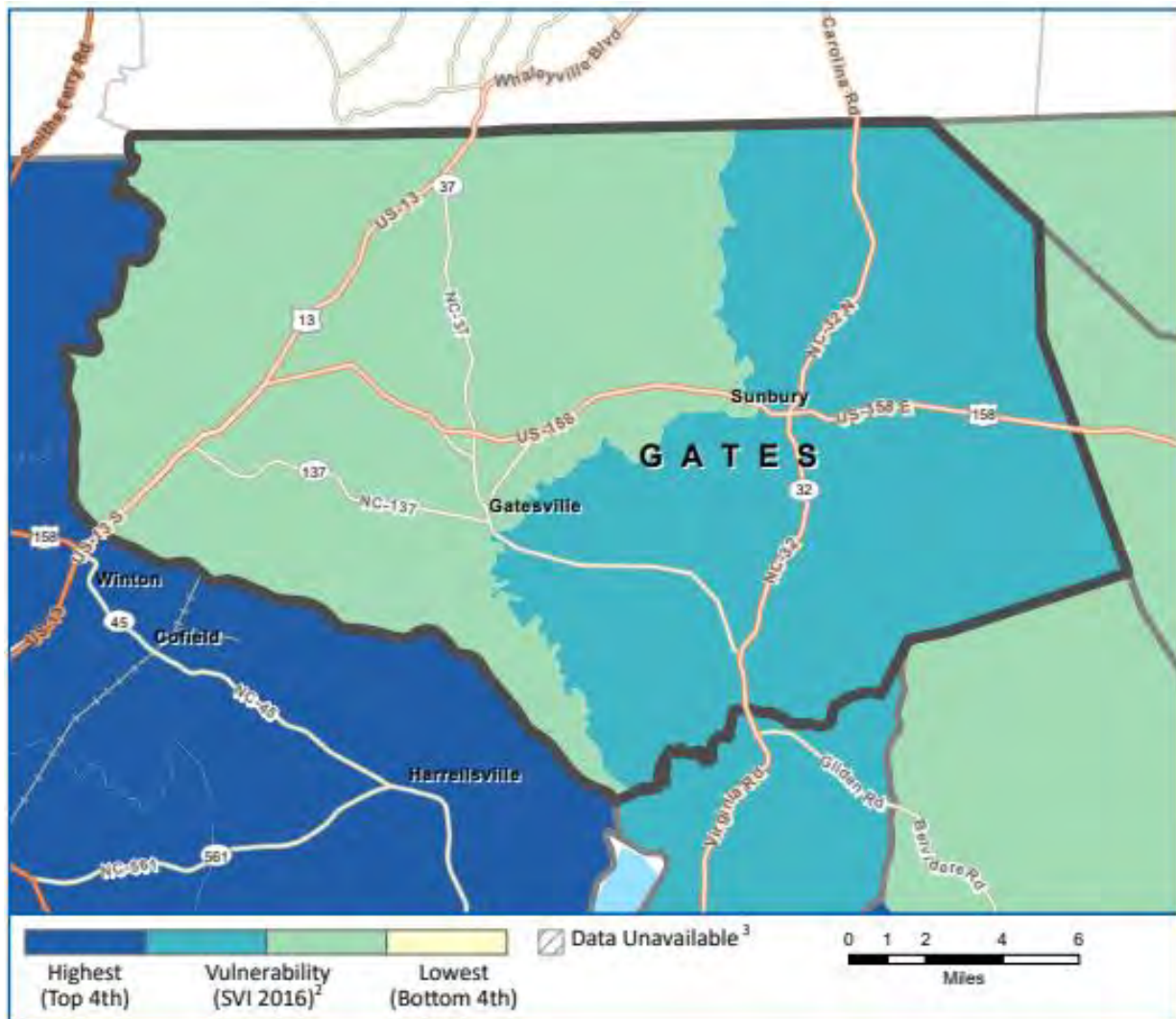
Source: US Census Bureau American Community Survey.

Social Vulnerability

Figure 3.9 below displays social vulnerability information for Gates County by census tract according to 2016 data and analysis by the Centers for Disease Control and Prevention (CDC). The CDC's SVI indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age, disability, household composition, minority status, language, housing type, and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

The SVI throughout Gates County overall is considered moderate. As stated, the County is rural in nature and services in certain portions of the County are limited, especially with regard to emergency response. The County is prepared for response; however, issues like response time and the general proximity of resources have increased vulnerability within portions of the County.

Figure 3.9 – Gates County Social Vulnerability Index



3.4.4 Housing Characteristics

Nearly sixty percent of the housing stock in Gates County has been developed since 1980. This young housing stock results in a more resilient community, due to the fact that a majority of homes were built subsequent to the establishment of the National Flood Insurance Program and the enforcement of local floodplain development regulations. In recent years, housing development has been fairly modest. Since 2010, thirteen additional homes have been built within Gatesville, and 259 throughout unincorporated Gates County. Within both rural Gates County, as well as Gatesville, housing is predominantly owner-occupied.

In terms of vulnerability associated with natural hazard events such as tropical storms, hurricanes, and tornadoes, roughly 30% of the Gates County housing stock is comprised of manufactured homes – one of the highest percentages in the Region. The prevalence of manufactured housing poses a unique threat regarding sustainability, as well as emergency response, with regard to defined flood hazard areas.

Table 3.21 below provides a summary of housing characteristics for Gates County, as well as the Town of Gatesville.

Albemarle Region

Table 3.21 – Gates County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Gatesville	171	184	7.6%	71.3%	19.9%
Gates County	5,046	5,305	5.1%	79.9%	16.3%

Source: US Census Bureau American Community Survey.

3.4.5 Wages, Employment and Industry

According to the 2017 American Community Survey, the median household income for the Gates County was \$52,481, which is slightly higher than the state’s median household income (\$50,320). However, approximately 12.3% of the population is considered to be living below the poverty level.

Approximately 58.5% of the population in Gates County is considered to be in the labor force. According to the American Community Survey, the unemployment rate for the County overall was 8.8%, while Gatesville’s unemployment rate was slightly lower at 5.8%.

The following table provides a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Gates County.

Table 3.22 – Gates County Key Economic Indicators

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Gatesville	60.5%	56.2%	3.4%	39.5%	5.8%
Gates County	58.5%	53.1%	5.1%	41.5%	8.8%

Source: US Census Bureau American Community Survey.

Table 3.23 – Gates County Employment by Industry

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Gatesville	32.1%	22.1%	19.8%	16.8%	9.2%
Gates County	29.2%	16.6%	19.2%	12.0%	23.0%

Source: US Census Bureau American Community Survey.

The top employers in Gates County represent the Management, Business, Science and Arts, as well as Sales and Office industries. These employers include:

- ▶ Gates County Board of Education
- ▶ Gates County
- ▶ Ashton Lewis Lumber Company, Inc.
- ▶ Gates Milling, Inc.
- ▶ Shoreline Healthcare Management
- ▶ Gates Cotton Gin
- ▶ LGC Group
- ▶ Blas Yovanni R Sanchez
- ▶ Family Foods of Gatesville
- ▶ Doris and Rogers Kitchen

3.4.6 Historic Properties

As of May 2019, Gates County had 10 listings on the National Register of Historic Places. This list includes 10 historic structures/sites. Presence on the National Register signifies that these structures have been determined to be worthy of preservation for their historical or cultural values. The following provides a comprehensive listing of all Nationally Registered Properties in Gates County.

- ▶ Buckland (Buckland) – 3/5/1986
- ▶ Freeman House (Gates) – 9/23/1982
- ▶ Freeman, Joseph Farm (Gates) – 11/12/1999
- ▶ Elmwood Plantation (Gatesville) – 2/1/1972
- ▶ Eure--Roberts House (Gatesville) – 9/20/2006
- ▶ Gates County Courthouse (Gatesville) – 10/22/1976
- ▶ Reid's Grove School (Gatesville) – 8/30/2011
- ▶ Roberts-Carter House (Gatesville) – 3/1/1984
- ▶ Rountree Family Farm (Gatesville) – 8/2/2000
- ▶ Sunbury High School (Sunbury) – 5/12/2009

3.4.7 Land Development Trends

Development is characterized by low density residential housing and highway commercial uses. The highest concentration within the County is situated within and in close proximity to the Town of Gatesville. The predominant land use throughout the County is generally either agricultural, or businesses and manufacturing associated with agricultural operations.

Table 3.24 provides an overview of developed and undeveloped properties located throughout Gates County.

Table 3.24 – Gates County Developed and Undeveloped Parcel Counts

Jurisdiction	Developed Parcels	Undeveloped Parcels	Pre-Firm Buildings	% Developed
Gatesville	182	44	*	80.5%
Gates County	4,607	2,972	*	60.8%

*Note: Data necessary to determine Pre-FIRM developed properties was not available for Gates County.

Source: HCP, Inc., Craven County Tax Office.

Detailed summaries of future land development trends, including Future Land Use Maps, are provided in the community annexes.

3.5 HERTFORD COUNTY

3.5.1 Hydrology

Hertford County is situated within the Chowan River Basin, which includes two USGS HUC8 watersheds, as shown in Figure 3.10. A description of this river basin can be found in Section 3.3.1.

Figure 3.10 – Hertford County, HUC8 River Basins



Source: National Hydrology Dataset

3.5.2 Parks and Open Space

Hertford County does not own or maintain any County Park Facilities, nor does the County maintain a Parks and Recreation Department. There are several municipal park facilities located throughout the County within municipal jurisdictions as follows:

- ▶ Town of Ahoskie:
 - Ahoskie Creek Amphitheater and Park
 - Ahoskie Old Park
 - Dupont Davis Memorial Park
 - Mitchell Park
 - Futrell Park
 - Hall Park
- ▶ Town of Cofield:
 - Cofield Community Recreation Center
- ▶ Town of Murfreesboro:
 - Riverside Park
- ▶ Town of Winton:
 - Winton Town Park

3.5.3 Demographics

Population Total

Hertford County has the largest of number of incorporated jurisdictions within the Albemarle Region, with a total of six small towns. Hertford County’s total unincorporated population as of 2017 was slightly over 24,000 persons, a 7.3% increase since the 2000 Census. The largest municipal jurisdiction in the County is the Town of Ahoskie with nearly 4,900 residents, followed by Murfreesboro with a population of almost 3,000. Growth over the last twenty years has been modest within Ahoskie at 3.3%, while Murfreesboro’s population has nearly doubled since the year 2000 (44.4%). The Town of Como is the County’s smallest community with just 86 persons. Como’s population has remained fairly steady. Both the Towns of Cofield and Winton have experienced a slight decline in population since the 2000 US Census count.

Table 3.25 provides a breakdown of total population for Hertford County and the participating municipalities for the years 2000, 2010, and 2017.

Table 3.25 – Hertford County Total Population

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Ahoskie	4,739	5,039	4,895	6.3%	-2.9%	3.3%
Cofield	347	413	331	19.0%	-19.9%	-4.6%
Como	78	91	86	16.7%	-5.5%	10.3%
Harrellsville	102	106	113	3.9%	6.6%	10.8%
Murfreesboro	2,045	2,835	2,952	38.6%	4.1%	44.4%
Winton	956	769	947	-19.6%	23.1%	-0.9%
Municipalities	8,267	9,253	9,324	11.9%	0.8%	12.8%
Unincorporated Areas	22,601	24,669	24,262	9.2%	-1.6%	7.3%
Hertford County	30,868	33,922	33,586	9.9%	-1.0%	8.8%

Source: US Census Bureau American Community Survey.

SECTION 3: PLANNING AREA PROFILE

Growth Trends

Table 3.26 provides population forecast through the year 2050 for Hertford County. These forecasts are based on established trends between the years 2000 and 2017. According to these estimates, Hertford County is expected to increase in population at a rate of 25.6% through 2050 (a total of 8,589 individuals).

Table 3.26 – Hertford County Population Projections, 2017-2050

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Ahoskie	4,895	4,923	5,018	5,113	5,208	6.4%
Cofield	331	328	319	310	301	-9.0%
Como	86	88	93	98	103	19.9%
Harrellsville	113	115	122	129	137	20.9%
Murfreesboro	2,952	3,183	3,953	4,723	5,494	86.1%
Winton	947	945	940	935	930	-1.8%
Unincorporated Areas	24,262	24,784	26,523	28,263	30,003	23.7%
Hertford County	33,586	34,367	36,969	39,572	42,175	25.6%

Source: US Census Bureau American Community Survey and HCP, Inc.

Racial Demographics

The median population for Hertford County overall is slightly over 42.4 years. The County's population overall is fairly evenly distributed, with roughly 20% of the population under eighteen years of age, and slightly under 19% over the age of 65. The County's gender composition is nearly evenly split at 50% male and 50% female. The racial composition of Hertford County overall is predominantly African American (59%). The remaining County population is 35.5% Caucasian, 0.7% Asian, and 5.7% either Other Race or Two or More Races. The County's Hispanic population is fairly minimal at 3.7%.

Racial composition within Hertford County's towns varies. The populations of Winton, Murfreesboro, Ahoskie, and Cofield are predominantly African American, while the populations of Como and Harrellsville are predominantly Caucasian. The County's largest Hispanic population is situated within the Town of Ahoskie at 4.6%. Table 3.27 provides a summary of racial composition for Hertford County, as well as all participating municipal jurisdictions.

Table 3.27 – Hertford County Racial Composition

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Ahoskie	27.9%	65.6%	0.8%	3.6%	2.0%	4.6%
Cofield	16.3%	81.9%	0.0%	1.8%	0.0%	0.0%
Como	66.3%	25.6%	0.0%	0.0%	8.1%	0.0%
Harrellsville	64.6%	35.4%	0.0%	0.0%	0.0%	1.8%
Murfreesboro	46.6%	51.1%	0.2%	0.0%	2.1%	4.8%
Winton	27.6%	66.3%	0.0%	0.4%	5.7%	1.5%
Hertford County	35.5%	58.0%	0.7%	2.3%	3.4%	3.7%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

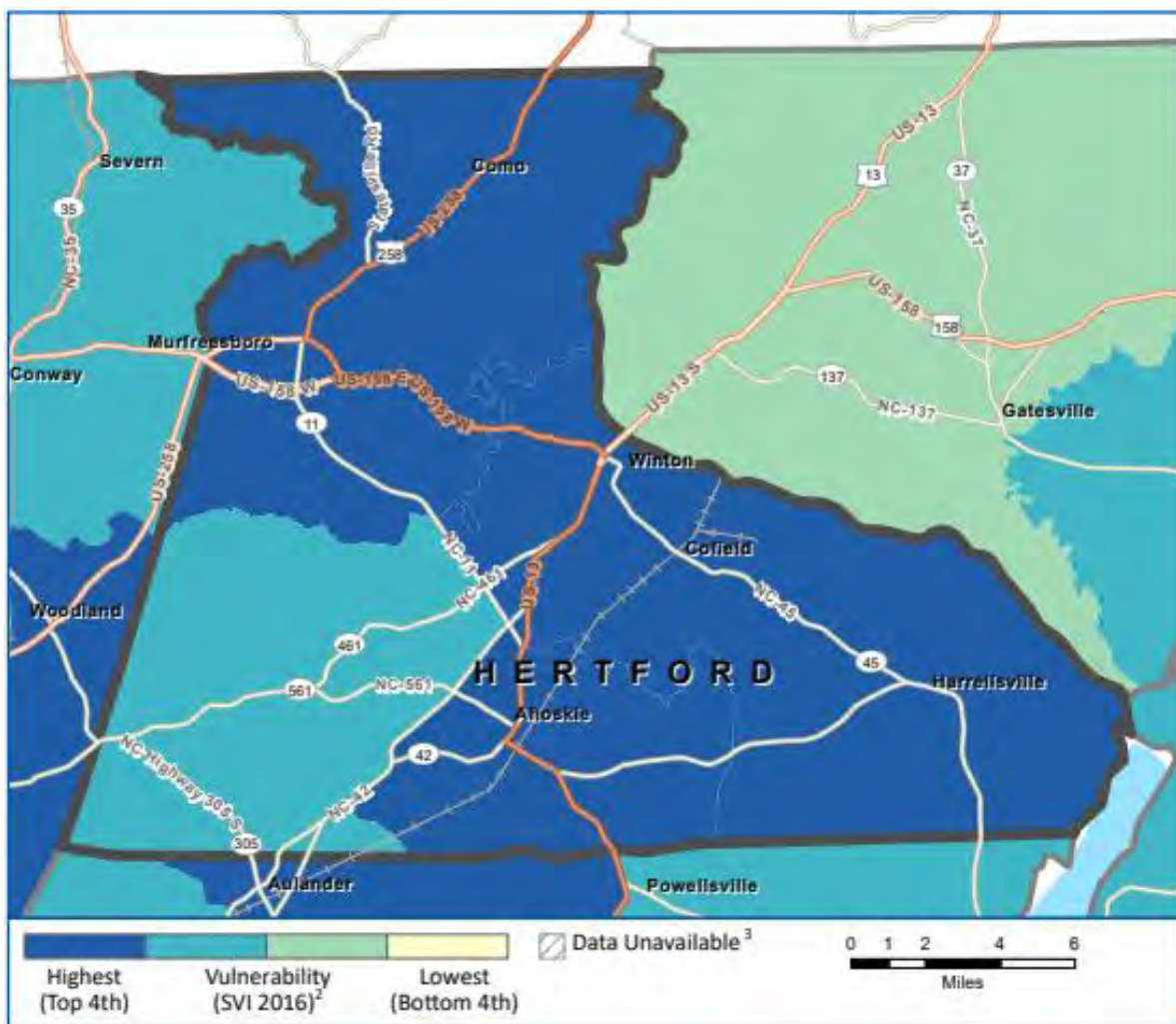
SECTION 3: PLANNING AREA PROFILE

Social Vulnerability

Figure 3.11 below displays social vulnerability information for Hertford County by census tract according to 2016 data and analysis by the CDC. The CDC's SVI indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age (65 or older), age (17 or younger), disability, household composition, minority status, language, housing type (multi-unit structures, mobile homes, crowding, group quarters), and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

The Social Vulnerability Index throughout Hertford County is the highest within the Albemarle Region. This situation can be attributed to the rural nature of the County and the decentralized nature of emergency resources and infrastructure. Although Hertford County has the largest number of municipal jurisdictions, these communities are generally very small, with limited resources. The Towns of Ahoskie and Murfreesboro have adequate resources to address most emergency situations; however, response capacity is generally limited to the Towns' corporate limits.

Figure 3.11 – Hertford County Social Vulnerability Index



Albemarle Region

Regional Hazard Mitigation Plan
2020

3.5.4 Housing Characteristics

Housing development through nearly all of Hertford County has been very slow since 2010. There have been an additional 136 housing units developed throughout unincorporated Hertford County, a modest growth rate of 1.3%. A majority of housing within the County is owner-occupied (67.2%), while roughly 16% of all housing units were reported as vacant. The County's housing stock in unincorporated areas is fairly new, with just over 50% of homes being constructed between the years of 1970 and 2000. Additionally, nearly 35% of homes were constructed prior to 1970. A majority of homes within the county are single-family structures (65%), and of the remaining housing stock, just under 25% are manufactured homes.

The increase in housing stock within the County's municipal jurisdictions has also been fairly slow; however, most communities have experienced slightly faster growth than unincorporated Hertford County. Murfreesboro has experienced the most significant growth since 2010 adding seventy-seven units (7.0%), followed by Winton (6.9%), and Harrellsville (9.4%). In nearly all of the municipalities, a majority of the housing inventory was developed prior to 1970; and therefore, the housing stock is beginning to age a bit. Ahoskie, the County's largest municipality, experienced the lowest growth rate, increasing by a total of nineteen homes since 2010 – a growth rate of only 0.8%.

Table 3.28 provides a summary of housing characteristics for Hertford County, as well as participating municipal jurisdictions.

Table 3.28 – Hertford County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Ahoskie	2,309	2,328	0.8%	67.2%	17.1%
Cofield	216	222	2.8%	74.8%	33.8%
Como	47	39	-17.0%	85.7%	10.3%
Harrellsville	53	58	9.4%	72.2%	20.0%
Murfreesboro	1,107	1,184	7.0%	53.7%	12.5%
Winton	393	420	6.9%	53.7%	19.3%
Hertford County	10,509	10,645	1.3%	67.2%	16.6%

Source: US Census Bureau American Community Survey.

3.5.5 Wages, Employment and Industry

According to the 2017 American Community Survey, the median household income for Hertford County was \$35,806, which is significantly lower than the state's median household income (\$50,320). The median income for residents of the County's municipalities is comparable to the County, with the exception of Harrellsville (\$51,000) and Murfreesboro (\$42,148). Ahoskie reported the lowest median household income of the County at \$30,288.

Within Hertford County, approximately 50.8% of the population is considered to be in the labor force. This figure is generally characteristic of all participating municipal jurisdictions as well, with the exception Como (59%) and Harrellsville (70%). With the exception of Harrellsville and Como, the percentage of this population currently employed within the workforce falls between forty and fifty percent. According to the 2017 American Community Survey, the unemployment rate for Hertford County overall was 10.0%. The highest unemployment rate reported throughout the County was Winton (16.8%), while the lowest was the Town of Como (0.0%).

The following table provides a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Hertford County.

Albemarle Region

Regional Hazard Mitigation Plan
2020

SECTION 3: PLANNING AREA PROFILE

Table 3.29 – Hertford County Key Economic Indicators

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Ahoskie	53.7%	46.0%	7.6%	46.3%	14.2%
Cofield	48.5%	46.4%	2.0%	51.5%	4.2%
Como	58.9%	58.9%	0.0%	41.1%	0.0%
Harrellsville	69.7%	61.8%	7.9%	30.3%	11.3%
Murfreesboro	47.9%	43.5%	4.4%	52.1%	9.2%
Winton	49.0%	40.6%	8.2%	51.0%	16.8%
Hertford County	50.8%	45.5%	5.1%	49.2%	10.0%

Source: US Census Bureau American Community Survey.

Table 3.30 – Hertford County Employment by Industry

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Ahoskie	30.9%	24.6%	18.3%	5.3%	21.0%
Cofield	36.5%	30.7%	8.0%	9.5%	15.3%
Como	25.6%	16.3%	20.9%	23.3%	14.0%
Harrellsville	27.7%	10.6%	25.5%	23.4%	12.8%
Murfreesboro	38.3%	16.2%	26.6%	8.5%	10.4%
Winton	23.3%	30.5%	9.9%	7.9%	28.4%
Hertford County	29.7%	22.2%	21.0%	8.1%	19.0%

Source: US Census Bureau American Community Survey.

As noted above, the top employers in Hertford County represent the Management, Business, Science and Arts (29.7%). The County's top employers include:

- ▶ Vidant Medical Center
- ▶ Hertford County Board of Education
- ▶ Nucor Corporation
- ▶ Jernigan Oil Company
- ▶ Geo Corrections and Detention
- ▶ Hertford County
- ▶ Chowan College
- ▶ Wal-Mart Associates
- ▶ Signature Payroll Services
- ▶ Kerr Glass Manufacturing

3.5.6 Historic Properties

As of September 2019, Hertford County had 33 listings on the National Register of Historic Places. This list includes 30 historic structures/sites and three Historic Districts. Presence on the National Register signifies that these structures have been determined to be worthy of preservation for their historical or cultural values. The following provides a detailed listing of these historical sites, their location, and listing date.

- ▶ Ahoskie Downtown Historic District (Ahoskie) – 4/25/1985
- ▶ Ahoskie Historic District (Ahoskie) – 4/24/2012

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- ▶ Ahoskie School (Ahoskie) – 9/7/2005
- ▶ East End Historic District (Ahoskie) – 1/31/2008
- ▶ Jernigan, Roberts H House (Ahoskie) – 2/16/2001
- ▶ King-Casper-Ward-Bazemore House (Ahoskie) – 11/26/1982
- ▶ Mitchell, William House (Ahoskie) – 12/4/1972
- ▶ Newsome, James House (Ahoskie) – 12/28/1984
- ▶ Mulberry Grove (Ahoskie) – 11/25/1980
- ▶ Bethlehem Baptist Church (Bethlehem) – 1/10/2019
- ▶ Thomas, Dr. Roscius P. and Mary Mitchell House and Outbuildings (Bethlehem) – 8/28/2007
- ▶ Deane House (Cofield) – 4/15/1982
- ▶ Hare Plantation House (Como) – 2/18/1971
- ▶ Riddick House (Como) – 2/18/1971
- ▶ Vernon Place (Como) – 4/29/1982
- ▶ Harrellsville Historic District (Harrellsville) – 11/29/1995
- ▶ Barnes, David A House (Murfreesboro) – 6/13/2014
- ▶ Cedars, The (Murfreesboro) – 9/22/1983
- ▶ Columns, The (Murfreesboro) – 2/18/1971
- ▶ Cowper-Thompson House (Murfreesboro) – 1/9/1992
- ▶ Freeman House (Murfreesboro) – 2/18/1971
- ▶ Melrose (Murfreesboro) – 3/31/1971
- ▶ Murfreesboro Historic District (Murfreesboro) – 8/26/1971
- ▶ Myrick House (Murfreesboro) – 3/31/1971
- ▶ Myrick-Yeates-Vaughan House (Murfreesboro) – 3/17/1983
- ▶ Rea, William, Store (Murfreesboro) – 9/15/1970
- ▶ Roberts-Vaughan House (Murfreesboro) – 2/18/1971
- ▶ Wheeler, John, House (Murfreesboro) – 3/31/1971
- ▶ Pleasant Plains School (Pleasant Plains) – 5/17/2016
- ▶ Brown, Wiley and Jane Vann House (Union) – 2/13/2007
- ▶ Brown, C. S., School Auditorium (Winton) – 7/29/1985
- ▶ Gray Gables (Winton) – 6/1/1982
- ▶ Parker, King House (Winton) – 12/31/2002

3.5.7 Land Development Trends

Throughout Hertford County approximately 60% of parcels are currently developed. Of this percentage, roughly 43% were developed prior to 1978, the year that the National Flood Insurance Program was put into effect within Hertford County. This percentage approximates the number of structures that were built prior to the establishment of required minimum standards aimed at protecting property from damages associated with flooding events.

Development within Hertford County is similar in nature to the rest of the Albemarle Region. Development within unincorporated portions of the County is generally comprised of single-family homes and non-residential uses associated with agricultural operations. The most concentrated development patterns are situated within the County's six municipalities, the largest of which is Ahoskie. Ahoskie provides a majority of the commercial and service type businesses serving Hertford County residents. Although Ahoskie serves as the commercial hub of the County, the Town of Winton serves as the County seat.

Table 3.31 – Hertford County Developed and Undeveloped Parcel Counts

Jurisdiction	Developed Parcels	Undeveloped Parcels	Pre-FIRM Buildings	% Developed Pre-FIRM
Ahoskie	1,779	550	1,270	54.5%
Cofield	184	166	85	24.3%
Como	50	22	32	44.4%
Harrellsville	77	29	62	58.5%
Murfreesboro	1,033	209	704	56.7%
Winton	343	138	226	47.0%
Hertford County	5,960	5,257	1,635	14.6%

Source: HCP, Inc., Hertford County Tax Office.

Detailed summaries of future land development trends, including Future Land Use Maps, are provided in the community annexes.

3.6 PASQUOTANK COUNTY

3.6.1 Hydrology

Pasquotank County is situated within the Pasquotank River Basin (called the Albemarle watershed by the USGS National Hydrology Dataset), as shown in Figure 3.12. A description of this river basin can be found in Section 3.2.1.

Figure 3.12 – Pasquotank County, HUC8 River Basins



Source: National Hydrology Dataset

3.6.2 Parks and Open Space

Pasquotank County maintains a number of parks and recreation facilities that provide both active and passive recreational opportunities. These include the following:

- ▶ Causeway Park: Located along the Camden Causeway, this park consists of a boardwalk, which winds through the wetlands along the Pasquotank River.
- ▶ Chalk Street Tot Lot: Located on the corner of Chalk and Baxter Streets. Designed for small children, this park has shade trees, playground equipment and park benches.
- ▶ Charles Creek Park: This 3-acre park is suitable for fishing, outdoor games, boating, volleyball, picnics and just enjoying the waterfront.
- ▶ COA Canoe Launch: Located on Riverside Avenue across from Charles Creek Park.
- ▶ Coast Guard Park: Coast Guard Park is located along the shores of the beautiful Pasquotank River and Charles Creek on Riverside Avenue.
- ▶ Dog Corner Park: This open space park is located across the creek from Charles Creek Park.
- ▶ Edgewood Play Lot: Located on the corner of Hopkins Drive and Aydlett Circle, this park is designed for younger children and neighborhood outings.
- ▶ Elizabeth Street Mini Park: Located in the 800 block of Elizabeth Street, this park has playground equipment for kids and an open area for outdoor games such as croquet, Frisbee, horseshoes, kickball and touch football. Also known as Triangle Park.
- ▶ Elizabeth Street Tennis Courts: Almost surrounded by Elizabeth, Harney and Cedar Streets, the four tennis courts located at this site are used extensively.
- ▶ Enfield Recreation Area: Located just off Ehringhaus Street on Corsair Circle and Catalina Avenue, this athletic complex consists of two lighted tennis courts, lighted basketball courts, five ball fields (3 lighted), a children's playground, and the Parks and Recreation's Maintenance Division facilities.
- ▶ Fun Junction: Located on Simpson Ditch Road just off Body Road, Fun Junction has much two man-made ponds, both of which are stocked for catch and release fishing.
- ▶ George Wood Park: This park is dedicated in memory of Mr. George Wood, a lifelong resident of Camden County. Located along the Camden Causeway on Highway 158, this park consists of a boardwalk elevated above the wetlands out into the Pasquotank River.
- ▶ Gosnold Park: Sometimes called Sunset Park, this park is located on Gosnold Avenue and consists of approximately three acres with playground equipment, a softball field, a basketball court and an abundance of woods.
- ▶ Holmes Field: Named in honor of Wilton "Hester" Holmes who coached children in Elizabeth City for thirty years.
- ▶ Jennette Property: This property was donated to the City by the Walton Jennette family. It is located on the northwest side of the Knobbs Creek Bridge and will be developed into a canoe/kayak launch.
- ▶ Knobbs Creek Park: This park is located at 200 E. Ward Street, within seven blocks of downtown Elizabeth City. This park sits on approximately 30 acres. It has a 15,800 square foot recreation center, a 4,400 square foot senior center, and a nine hole par-3 golf course measuring 800 yards in length.
- ▶ Mariner's Wharf: This riverfront attraction is located at the corner of East Fearing and Water Streets on the Pasquotank River. Public boat slips are provided for sailing and motor vessels that come through town.
- ▶ Moth Boat Park: This park is located at the foot of Main Street along the Pasquotank River.
- ▶ Northeastern Park: Located at Northeastern High School along Oak Stump Road, this park was constructed in conjunction with the Elizabeth City/Pasquotank County School system. The park

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features six lighted tennis courts. The park also has a playground designed especially for younger children.

- ▶ Pasquotank/Perquimans County Line Boat Ramp: Located on Woodville Road, it features a canoe and boat ramp.
- ▶ Pool Street Park: Located on Main Street across from the Pasquotank County Courthouse.
- ▶ River Road Soccer Complex: This park is located on the school grounds of River Road Middle School and is a joint effort of the City and County Recreation Departments.
- ▶ Sawmill Park: Located on Weeksville Road and Sawmill Road. This park features a public boat ramp and boardwalk.
- ▶ Sheep Harney/PAL Football Field: The Police Athletic League football field is located on the former Memorial Field behind the Sheep Harney Elementary School.
- ▶ South Park Sports Complex: This complex is located on Capital Trace, just off Weeksville Road. This park features a driving range, batting cages, five lighted youth baseball/softball fields, playground, picnic shelter, concession/restroom building, and trails.
- ▶ Southern and Dawson Play Lot: Also known as the “Fish Courts,” this park is situated on the corner of Southern Avenue and Dawson Street. It is equipped with an asphalt basketball court, lighted for night play, swings, slide and other playground equipment, as well as a fishing pier and picnic area.
- ▶ Veteran's Park: This small quarter-acre park is located on North Water Street beside the Pasquotank/Camden Bridge, and was developed as a memorial honoring all United States veterans.
- ▶ Walnut Park: This neighborhood park is located on Walnut Street.
- ▶ Waterfront Park: This park for outdoor recreation provides two boat ramps, picnic tables, park benches, a pavilion, a boardwalk, and a pier along the Pasquotank River.
- ▶ Waterfront Park Pavilion: This park is the home of “The Dome,” one of Elizabeth City’s historical waterfront landmarks. It was built as a memorial to the old Albemarle Hospital and College of the Albemarle.

3.6.3 Demographics

Population Total

Population growth within Pasquotank County, as well as Elizabeth City, has been modest dating back to the year 2000. The County population overall experienced a 13.3% increase, while Elizabeth City saw a much lower growth rate of 2.8%. The median age for Pasquotank County citizens is 38.1, which is in line with the NC State median of 38.3. The County’s age range is fairly evenly distributed, with roughly 58% of the population under the age of forty-five and 42% over. Approximately 15.6% of the population is sixty-five years or older.

Table 3.32 provides a breakdown of total population for Pasquotank County and the participating municipalities for the years 2000, 2010, and 2017.

Table 3.32 – Pasquotank County Total Population

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Elizabeth City	17,243	18,683	17,732	8.4%	-5.1%	2.8%
Unincorporated Areas	34,897	40,661	39,546	16.5%	-2.7%	13.3%
Pasquotank County	52,140	59,344	57,278	13.8%	-3.5%	9.9%

Source: US Census Bureau American Community Survey.

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Growth Trends

Table 3.33 provides population forecast through the year 2050 for Pasquotank County. These forecasts are based on established trends between the years 2000 and 2017. According to these estimates, Pasquotank County is expected to increase in population at a rate of 19.1% through 2050 (a total of 10,957 individuals).

Table 3.33 – Pasquotank County Population Projections, 2017-2050

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Elizabeth City	17,732	17,821	18,117	18,412	18,708	5.5%
Unincorporated Areas	39,546	40,476	43,575	46,674	49,773	25.9%
Pasquotank County	57,278	58,274	61,594	64,914	68,235	19.1%

Source: US Census Bureau American Community Survey and HCP, Inc.

Racial Demographics

The population within Pasquotank County is predominantly Caucasian, at 58.8%. Of the remaining population, roughly 37% are African American and just over 4% are reported as Asian or “Other Race” or “Two or More Races.” Additionally, nearly 5% percent of the County’s population is Hispanic or Latino origin. Elizabeth City’s demographic composition is slightly different than the County at large, hosting a majority African American population (52%), and a slightly higher percentage of Hispanic citizens (6.6%). The gender breakdown for the County is fairly evenly split, although the female population is slightly larger at 51%.

Table 3.34 provides a summary of racial composition for Pasquotank County, as well as all participating municipal jurisdictions.

Table 3.34 – Pasquotank County Racial Composition

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Elizabeth City	44.2%	52.0%	0.8%	1.1%	1.9%	6.6%
Pasquotank County	58.8%	36.3%	1.7%	0.9%	2.4%	4.9%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Social Vulnerability

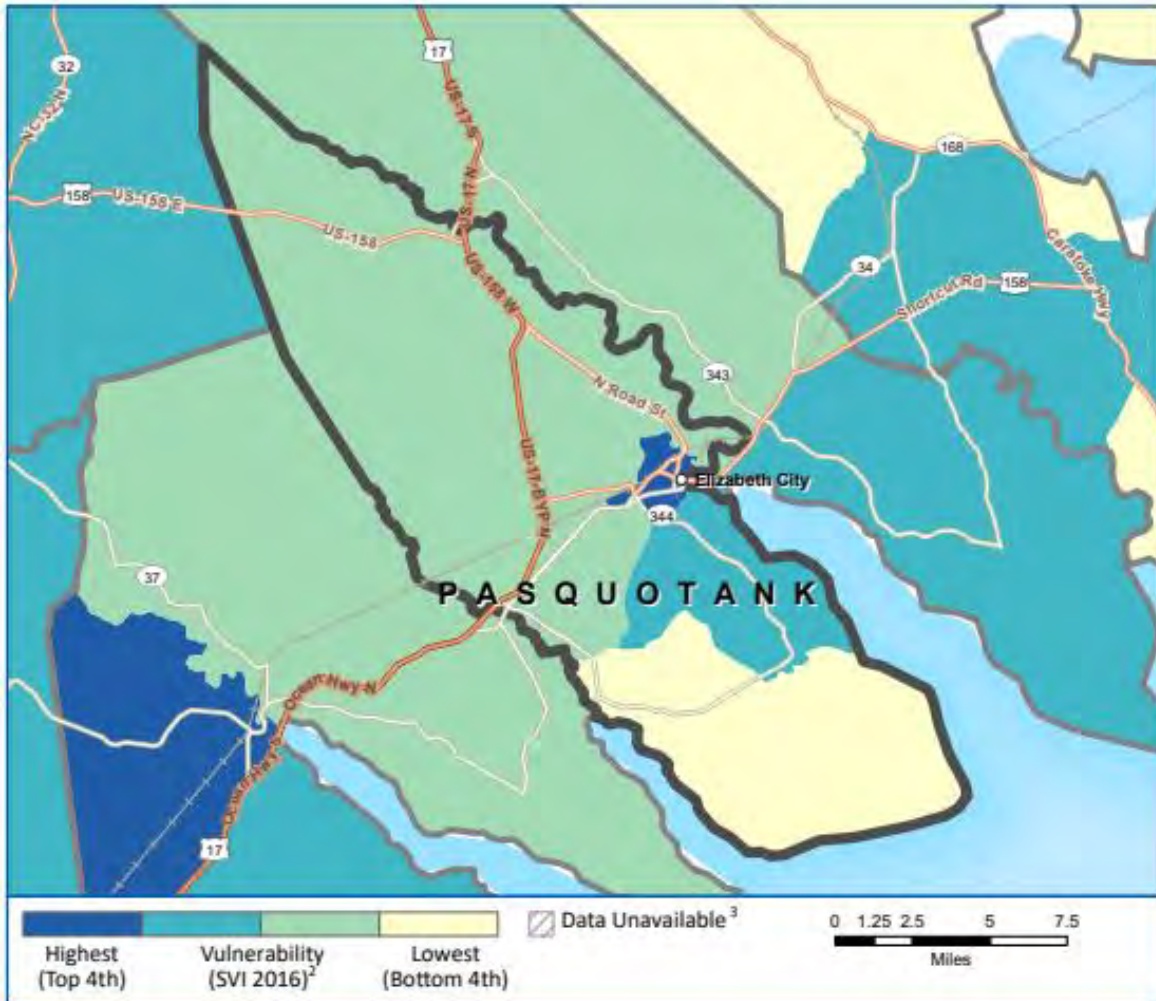
Figure 3.13 below displays social vulnerability information for Pasquotank County by census tract according to 2016 data and analysis by the CDC. The CDC’s SVI indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age (65 or older), age (17 or younger), disability, household composition, minority status, language, housing type (multi-unit structures, mobile homes, crowding, group quarters), and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Pasquotank County has one of the most favorable social vulnerability index ratings in the Albemarle Region. This factor can be attributed to Elizabeth City’s central location within the County. As discussed, Elizabeth City is the largest municipal jurisdiction in the Albemarle Region. Pasquotank County, and in

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particular Elizabeth City, maintains a much more robust emergency services program. Additionally, there are other response capabilities available within the County as well including a US Coast Guard Air Station and facilities and services associated with Elizabeth City State University.

Figure 3.13 – Pasquotank County Social Vulnerability Index



3.6.4 Housing Characteristics

According to the 2017 American Community Survey, there were approximately 17,027 housing units in Pasquotank County. This situation marks a 3.3%, or 539-unit, increase since 2010 for the County overall. Throughout Pasquotank County, housing is predominantly comprised of owner occupants at 60.5%. This factor is important with regard to mitigation and post-disaster recovery because homeownership directly correlates to the long-term maintenance and flood proofing of property, as well as the eligibility for funding of impacted units following a flooding event. This figure is much lower for Elizabeth City at 38.2%.

In terms of vulnerability associated with natural hazard events such as tropical storms, hurricanes, and tornadoes roughly 12.0% of the Pasquotank County housing stock is comprised of manufactured homes, which is slightly lower than the state overall (13%). The prevalence of manufactured housing poses a unique threat, with regard to sustainability, as well as emergency response for defined flood hazard areas.

Table 3.35 provides a summary of housing characteristics for Pasquotank County, as well as participating municipal jurisdictions.

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Table 3.35 – Pasquotank County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Elizabeth City	8,482	8,097	-4.5%	38.2%	18.7%
Pasquotank County	16,488	17,027	3.3%	60.5%	14.1%

Source: US Census Bureau American Community Survey.

3.6.5 Wages, Employment and Industry

According to the 2017 American Community Survey, the median household income for the Pasquotank County was \$47,264, which is about 6% lower than the state’s median household income (\$50,320). Within Pasquotank County, approximately 57.5% of the population is considered to be in the labor force. Throughout Pasquotank County, the percentage of the population currently employed is approximately 51.6%. The unemployment rate for the County overall was 6.5%, which is slightly higher than Elizabeth City at 4.7%.

The following tables provide a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Pasquotank County.

Table 3.36 – Pasquotank County Key Economic Indicators

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Elizabeth City	55.4%	48.6%	5.1%	44.6%	9.5%
Pasquotank County	57.5%	51.6%	3.9%	42.5%	7.0%

Source: US Census Bureau American Community Survey.

Table 3.37 – Pasquotank County Employment by Industry

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Elizabeth City	31.7%	23.1%	23.0%	10.5%	11.7%
Pasquotank County	32.6%	19.2%	24.8%	12.9%	10.5%

Source: US Census Bureau American Community Survey.

The top employers in Pasquotank County represent the Management, Business, Science and Arts. Additionally, there are a significant number of individuals that work within the public administration employment sector, which is not reflected in the table above. These employers include:

- ▶ Pasquotank County Board of Education
- ▶ Sentara Internal Medicine Physician
- ▶ US Department of Homeland Security
- ▶ Elizabeth City State University
- ▶ Wal-Mart Associates
- ▶ Pasquotank County
- ▶ NC Department of Public Safety
- ▶ Elizabeth City
- ▶ Ollie’s Bargain Outlet
- ▶ College of the Albemarle

3.6.6 Historic Properties

As of September 2019, Pasquotank County had 11 listings on the National Register of Historic Places. This list includes 7 historic structures and 4 Historic Districts, which are situated within the County. Presence on the National Register signifies that these structures have been determined to be worthy of preservation for their historical or cultural values. The following provides a comprehensive listing of all Nationally Registered Properties in Pasquotank County.

- ▶ Elizabeth City Historic District (Elizabeth City) – 10/18/1977
- ▶ Elizabeth City Historic District (Boundary Increase) (Elizabeth City) – 3/7/1994
- ▶ Elizabeth City State Teachers College Historic District (Elizabeth City) – 2/28/1994
- ▶ Elizabeth City Water Plant (Elizabeth City) – 3/4/1994
- ▶ Episcopal Cemetery (Elizabeth City) – 4/21/1994
- ▶ Norfolk Southern Passenger Station (Elizabeth City) – 2/25/1994
- ▶ Northside Historic District (Elizabeth City) – 3/4/1994
- ▶ Old Brick House (Elizabeth City) – 3/16/1972
- ▶ Riverside Historic District (Elizabeth City) – 3/11/1994
- ▶ Shepard Street--South Road Street Historic District (Elizabeth City) – 3/11/1994
- ▶ Newland Road Site (Morgan's Corner) – 4/14/1983
- ▶ Morgan House (South Mills) – 2/1/1972

3.6.7 Land Development Trends

Approximately 70% of parcels throughout Pasquotank County are currently developed. As has been mentioned, Pasquotank County is the most densely developed portion of the Albemarle Region. Development is generally centered along the County’s three main thoroughfares including: NC Highway 355 and US Highways 17 and 158. In addition to this more rural development, Elizabeth City serves as the largest municipality in northeastern North Carolina. Elizabeth City provides a broad range of goods and services for County residents, as well as people throughout the Albemarle region

Table 3.38 – Pasquotank County Developed and Undeveloped Parcel Counts

Jurisdiction	Developed Parcels	Undeveloped Parcels	Pre-FIRM Buildings	% Developed
Elizabeth City	6,364	1,812	*	77.8%
Pasquotank County	9,109	4,821	*	65.4%

*Note: Data necessary to determine Pre-FIRM developed properties was not available for Pasquotank County.
Source: HCP, Inc., Hertford County Tax Office.

Detailed summaries of future land development trends, including Future Land Use Maps, are provided in the community annexes.

3.7 PERQUIMANS COUNTY

3.7.1 Hydrology

Perquimans County is situated within the Pasquotank River Basin (called the Albemarle watershed by the USGS National Hydrology Dataset), as shown in Figure 3.14. A description of this river basin can be found in Section 3.2.1.

Figure 3.14 – Perquimans County, HUC8 River Basins



Source: National Hydrology Dataset

3.7.2 Parks and Open Space

Perquimans County maintains a number of parks and recreation facilities that provide both active and passive recreational opportunities. These include the following:

- ▶ Perquimans County Community Center (located on Granby Street, Hertford)
- ▶ Walking trail around the center on Granby Street with a 0.9 mile loop.
- ▶ Perquimans County Tennis Courts/Basketball Court (located on Grubb Street, Hertford)
- ▶ Perquimans County Athletic Fields (located on Wiggins Road, Winfall)
- ▶ Perquimans County Basketball Court (located on King Street, Hertford)

3.7.3 Demographics

Population Total

There are two municipal jurisdictions located within Perquimans County including the Towns of Hertford and Winfall. Population growth dating back to the year 2000 has been modest within Winfall; however, the Town of Hertford has experienced a 22.4% increase in population over this period. Between the two communities, the overall municipal population within the County has increased by a rate of 20.3%. Unincorporated Perquimans County has experienced comparable growth. Unincorporated portions of the County experienced fairly significant growth between 2000 and 2010 (18.3%) but has seen only a slight increase (0.7%) since 2010.

Table 3.39 provides a breakdown of total population for Perquimans County and the participating municipalities for the years 2000, 2010, and 2017.

Table 3.39 – Perquimans County Total Population

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Hertford	2,070	2,143	2,533	3.5%	18.2%	22.4%
Winfall	554	594	624	7.2%	5.1%	12.6%
Unincorporated Areas	11,368	13,453	13,506	18.3%	0.4%	18.8%
Perquimans County	13,992	16,190	16,663	15.7%	2.9%	19.1%

Source: US Census Bureau American Community Survey.

Growth Trends

Table 3.40 provides population forecast through the year 2050 for Perquimans County. These forecasts are based on established trends between the years 2000 and 2017. According to these estimates, Perquimans County is expected to increase in population at a rate of 37.1% through 2050 (a total of 6,184 individuals).

Table 3.40 – Perquimans County Population Projections, 2017-2050

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Hertford	2,533	2,633	2,966	3,300	3,633	43.4%
Winfall	624	638	384	731	777	24.5%
Unincorporated Areas	13,506	13,954	15,448	16,943	18,437	36.5%
Perquimans County	16,663	17,225	19,099	20,973	22,847	37.1%

Source: US Census Bureau American Community Survey and HCP, Inc.

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Racial Demographics

The median population for Perquimans County overall is slightly over 48.9 years. The County's population overall is fairly evenly distributed, with nearly 20% of the population under eighteen years of age, and slightly under 26% over the age of 65. The County's gender composition is split at 48% male and 52% female. The racial composition of Perquimans County overall is predominantly Caucasian (73%). The remaining County population is 24% African American, 0.3% Asian, and 2.1% either Other Race or Two or More Races. The County's Hispanic population is fairly minimal at 2.5%.

Racial composition within the County's towns are slightly different. The populations of both Hertford and Winfall are 58% and 52% Caucasian, respectively, with nearly all of the remaining population reported as African American. The County's largest Hispanic populations is situated within the Town of Hertford at 8.2%. Table 3.41 provides a summary of racial composition for Perquimans County, as well as all participating municipal jurisdictions.

Table 3.41 – Perquimans County Racial Composition

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Hertford	58.2%	38.8%	0.0%	0.9%	2.1%	8.2%
Winfall	52.7%	45.5%	0.0%	0.3%	1.4%	2.1%
Perquimans County	73.4%	24.2%	0.3%	0.8%	1.3%	2.5%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

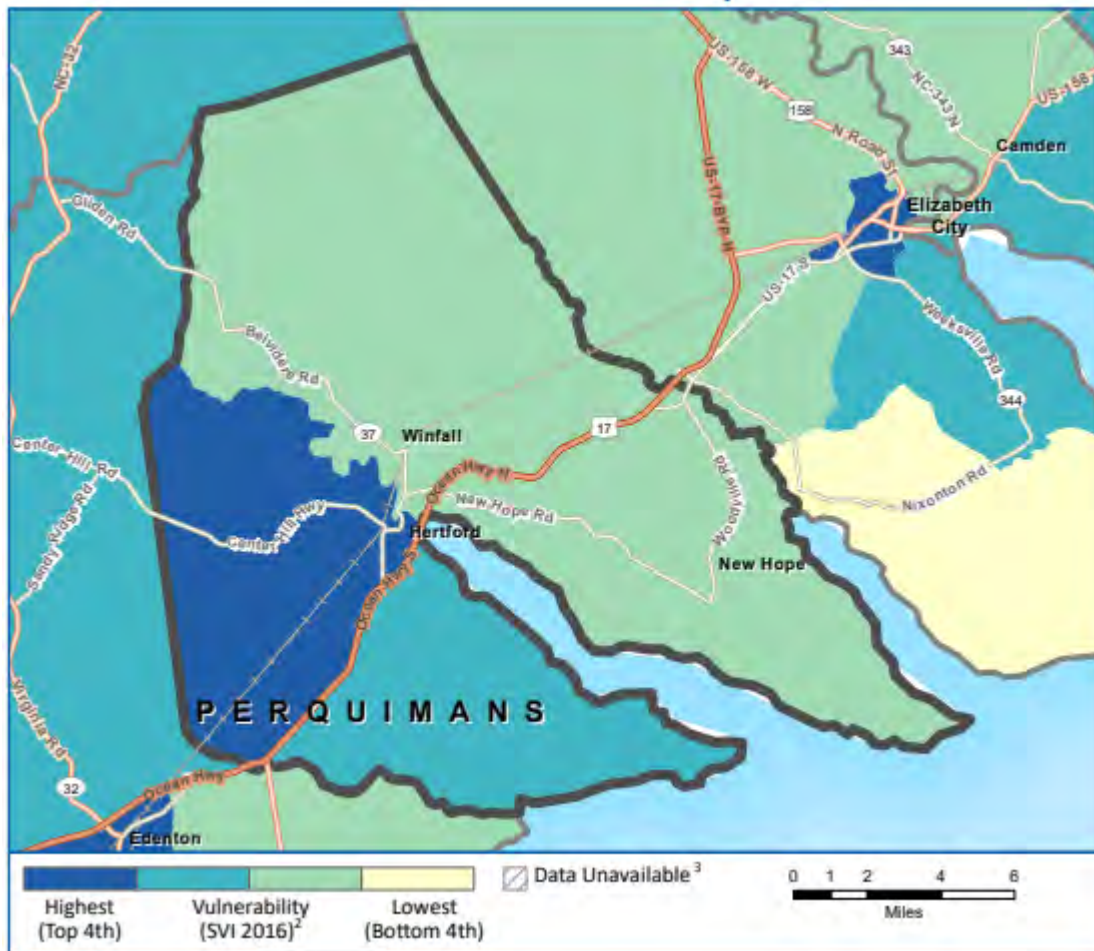
Source: US Census Bureau American Community Survey.

Social Vulnerability

Figure 3.15 below displays social vulnerability information for Perquimans County by census tract according to 2016 data and analysis by the CDC. The CDC's SVI indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age (65 or older), age (17 or younger), disability, household composition, minority status, language, housing type (multi-unit structures, mobile homes, crowding, group quarters), and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Perquimans County like a majority of the Counties in the Albemarle Region is very rural in nature. Thus, the County social vulnerability index is moderate to high. This situation can be attributed to a general lack of government services and lower socioeconomic conditions. The Town of Hertford does provide a wide range of services, but these are focused on serving Town residents and portions of the Town's extraterritorial jurisdiction.

Figure 3.15 – Perquimans County Social Vulnerability Index



3.7.4 Housing Characteristics

According to the American Community Survey, there were approximately 8,364 housing units in Perquimans County as of 2017. This figure marks a 4.2%, or 374-unit, increase since 2010 for the County overall. Throughout Perquimans County, housing is predominantly comprised of owner occupants at 72.8%. This factor is important with regard to mitigation and post disaster recovery because homeownership directly correlates to the long-term maintenance and floodproofing of property, as well as the eligibility for funding of impacted units following a flooding event associated with nor’easters and tropical storm events.

In terms of vulnerability associated with natural hazard events such as tropical storms, hurricanes, and tornadoes roughly 21.7% of the Perquimans County housing stock is comprised of manufactured homes, which is slightly lower than the state overall (13%). The prevalence of manufactured housing poses a unique threat with regard to both sustainability, as well as emergency response with defined flood hazard areas.

Table 3.42 provides a summary of housing characteristics for Perquimans County, as well as participating municipal jurisdictions.

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Table 3.42 – Perquimans County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Hertford	1,104	1,270	15.0%	46.5%	18.3%
Winfall	373	334	-10.5%	62.7%	21.3%
Perquimans County	6,887	7,134	3.6%	72.8%	17.5%

Source: US Census Bureau American Community Survey.

3.7.5 Wages, Employment and Industry

The median household income for Perquimans County residents is \$44,039. This figure is quite a bit lower for the Towns of Hertford and Winfall at \$26,510 and \$32,159, respectively. All County jurisdictions maintain a median household income much lower than the State overall of \$50,320.

Within Perquimans County, approximately 51.5% of the population is considered to be in the labor force. This figure is generally comparable to the County's municipal jurisdictions as well. The unemployment rate for Hertford is fairly high at 14.1%, while the County has an even higher unemployment rate of 18.4%. The Town of Winfall is lower, at 10.0%. Both jurisdictions, as well as the County, unemployment rates are exorbitantly higher than NC overall, which maintains a 4.2% unemployment rate.

The following tables provide a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Perquimans County.

Table 3.43 – Perquimans County Key Economic Indicators

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Hertford	53.3%	45.4%	7.4%	46.7%	14.1%
Winfall	58.6%	50.9%	5.7%	41.4%	10.0%
Perquimans County	51.5%	46.6%	4.2%	48.5%	8.4%

Source: US Census Bureau American Community Survey.

Table 3.44 – Perquimans County Employment by Industry

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Hertford	26.0%	24.5%	21.0%	16.4%	12.0%
Winfall	19.0%	30.6%	20.6%	21.0%	8.7%
Perquimans County	34.5%	19.6%	21.5%	13.9%	10.5%

Source: US Census Bureau American Community Survey.

The top employers in Perquimans County represent the Management, Business, Science and Arts. These employers include:

- ▶ Perquimans County Schools
- ▶ Perquimans County
- ▶ Guest Services Inc.
- ▶ Albemarle Plantation
- ▶ Food Lion
- ▶ SSC Hertford Operating Company
- ▶ NC Department of Transportation

- ▶ McDonalds
- ▶ Albemarle Commission
- ▶ Hardee's
- ▶ Wal-Mart Associates
- ▶ Signature Payroll Services
- ▶ Kerr Glass Manufacturing

3.7.6 Historic Properties

As of September 2019, Perquimans County had 18 listings on the National Register of Historic Places. This list includes 14 historic structures and 4 Historic Districts, which are situated within the County. Presence on the National Register signifies that these structures have been determined to be worthy of preservation for their historical or cultural values. The following provides a comprehensive listing of all Nationally Registered Properties in Perquimans County.

- ▶ Belvidere (Belvidere) – 8/2/1977
- ▶ Mitchell-Ward House (Belvidere) – 6/25/1999
- ▶ Myers-White House (Bethel) – 1/20/1972
- ▶ White, Isaac House (Bethel) – 3/23/1979
- ▶ Belvidere Historic District (Hertford) – 6/4/1999
- ▶ Church of the Holy Trinity (Hertford) – 6/11/1998
- ▶ Cove Grove (Hertford) – 8/7/1974
- ▶ Fletcher-Skinner-Nixon House and Outbuildings (Hertford) – 1/21/1994
- ▶ Hertford Historic District (Hertford) – 10/22/1998
- ▶ Land's End (Hertford) – 9/20/1973
- ▶ Newbold-White House (Hertford) – 6/24/1971
- ▶ Nixon, Samuel House (Hertford) – 10/15/1973
- ▶ Old Neck Historic District (Hertford) – 9/6/1996
- ▶ Perquimans County Courthouse (Hertford) – 5/10/1979
- ▶ Sutton-Newby House (Hertford) – 9/10/1974
- ▶ Jacocks, Jonathan Hill House (New Hope Township) – 4/1/1998
- ▶ Winfall Historic District (Winfall) – 1/15/2003
- ▶ Stockton (Woodville) – 6/7/1974

3.7.7 Land Development Trends

Perquimans County is unique in that its tax parcel data does not provide a breakdown of improved/building value on a parcel by parcel basis. Thus, the land development analysis and mapping as defined under the other counties in the region is not able to be completed. Perquimans County will work to establish this data during the implementation phase of this plan.

Detailed summaries of future land development trends, including Future Land Use Maps, are provided in the community annexes.

4 Risk Assessment

4.1 OVERVIEW

This section describes the Hazard Identification and Risk Assessment process for the development of the Albemarle Regional Hazard Mitigation Plan. It describes how the Region met the following requirements from the 10-step planning process:

- ▶ Planning Step 4: Assess the Hazard
- ▶ Planning Step 5: Assess the Problem

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

This hazard risk assessment covers all of the Albemarle Region, including the unincorporated Counties and all incorporated jurisdictions participating in this plan.

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



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

- ▶ **Section 4.2: Hazard Identification** identifies the natural and human-caused hazards that threaten the planning area.
- ▶ **Section 4.3: Risk Assessment Methodology and Assumptions**
- ▶ **Section 4.4: Asset Inventory** details the population, buildings, and critical facilities at risk within the planning area.
- ▶ **Section 4.5: Hazard Profiles, Analysis, and Vulnerability** discusses the threat to the planning area, describes previous occurrences of hazard events and the likelihood of future occurrences, and assesses the planning area’s exposure to each hazard profiled; considering assets at risk, critical facilities, and future development trends.
- ▶ **Section 4.6: Conclusions on Hazard Risk** summarizes the results of the Priority Risk Index and defines each hazard as a Low, Medium, or High Risk hazard.

4.2 HAZARD IDENTIFICATION

To identify hazards relevant to the planning area, the HMPC began with a review of the list of hazards identified in the 2018 State Hazard Mitigation Plan and the 2015 Albemarle Regional Hazard Mitigation Plan. This review of hazards is summarized in Table 4.1. The HMPC used these lists to identify a full range of hazards for potential inclusion in this plan update and to ensure consistency across these planning efforts. All hazards on the below list were evaluated for inclusion in this plan update.

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Table 4.1 – Full Range of Hazards Evaluated

Hazard	Included in 2018 State HMP?	Included in 2015 Albemarle Regional HMP?
Flooding	Yes	Yes
Hurricanes and Coastal Hazards	Yes	Yes
Nor'easters	No	Yes
Severe Winter Weather (Freezing Rain, Snow, Blizzards, Wind Chill, Extreme Cold)	Yes	Yes
Extreme Heat	Yes	Yes
Earthquake	Yes	Yes
Wildfire	Yes	Yes
Dam Failure	Yes	Yes
Levee Failure	No	Yes
Drought	Yes	Yes
Severe Thunderstorm (Tornado, Hailstorm, Torrential Rain, Thunderstorm Wind, High Wind, Lightning)	Yes	Yes (Tornadoes evaluated as a separate hazard)
Landslide	Yes	Yes
Sinkholes	Yes	Yes
Erosion	Yes	Yes
Rip Currents	No	Yes
Tsunami	No	Yes
Hazardous Materials Incident	Yes	No
Radiological Emergency	Yes	No
Terrorism	Yes	Yes
Infectious Disease	Yes	Yes (as Public Health Events and Pandemic Events)
Cyber Threat	Yes	Yes
Electromagnetic Pulse	Yes	No
Active Shooter/Mass Casualty	No	Yes
Transportation Infrastructure Impacts	No	Yes

The HMPC evaluated the above list of hazards using existing hazard data, past disaster declarations, local knowledge, and information from the 2018 State Plan and the 2015 Albemarle Regional Plan to determine the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage.

One significant resource in this effort was the National Oceanic and Atmospheric Administration's National Center for Environmental Information (NCEI), which has been tracking various types of severe weather since 1950. Their Storm Events Database contains an archive by county of destructive storm or weather data and information which includes local, intense and damaging events. NCEI receives storm data from the National Weather Service (NWS). The NWS receives their information from a variety of sources, which include but are not limited to: county, state and federal emergency management officials, local law enforcement officials, SkyWarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public, among others. The NCEI database contains 796 records of severe weather events that occurred in Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties in the 20-year period from 1999 through 2018. Table 4.2 summarizes these events.

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Table 4.2 – NCEI Severe Weather Reports for the Albemarle Region Counties, Nov 1998 – Oct 2018

Type	# of Events	Property Damage	Crop Damage	Deaths	Injuries
Blizzard	2	\$0	\$0	0	0
Coastal Flood	0	\$0	\$0	0	0
Cold/Wind Chill	0	\$0	\$0	0	0
Drought	0	\$0	\$0	0	0
Extreme Cold/Wind Chill	0	\$0	\$0	0	0
Excessive Heat	6	\$0	\$0	0	0
Flash Flood	51	\$7,150,000	\$18,400,000	1	0
Flood	25	\$2,200,000	\$0	0	0
Frost/Freeze	20	\$0	\$0	0	0
Hail	97	\$57,000	\$5,000	0	0
Heat	7	\$0	\$0	1	0
Heavy Rain	87	\$0	\$0	0	0
Heavy Snow	0	\$0	\$0	0	0
High Wind	17	\$472,000	\$0	0	0
Hurricane	20	\$19,934,000	\$43,500,000	1	0
Ice Storm	2	\$0	\$0	0	0
Lightning	7	\$51,000	\$0	0	2
Storm Surge	0	\$0	\$0	0	0
Strong Wind	9	\$26,000	\$0	0	0
Thunderstorm Wind	208	\$601,000	\$0	2	1
Tornado	33	\$6,826,000	\$2,017,000	1	2
Tropical Storm	22	\$2,020,000	\$21,000,000	0	0
Wildfire	0	\$0	\$0	0	0
Winter Storm	104	\$0	\$0	0	0
Winter Weather	79	\$0	\$0	0	0
Total:	796	\$39,337,000	\$84,922,000	6	5

Source: National Center for Environmental Information Events Database, accessed February 2019

Note: Losses reflect totals for all impacted areas for each event.

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

Records of designated counties for FEMA major disaster declarations start in 1964. Since then, Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties have been designated in 13 different major disaster declarations. Table 4.3 summarizes the count of declarations per county, and Table 4.4 provides details for these declarations.

Table 4.3 – Summary of Disaster Declarations by County

County	Major Declarations Received
Camden	7
Chowan	8
Gates	7

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County	Major Declarations Received
Hertford	11
Pasquotank	7
Perquimans	7

Source: FEMA Disaster Declarations Summary, updated December 20, 2018

Table 4.4 – FEMA Major Disaster Declarations for Albemarle Region Counties

County*	Disaster #	Date	Incident Type	Event Title
Ca, Ch, G, H, Pa, Pe	4285	10/10/2016	Hurricane	Hurricane Matthew
Ca, Ch, G, H, Pa, Pe	4019	8/31/2011	Hurricane	Hurricane Irene
H	1969	4/19/2011	Severe Storm(s)	Severe Storms, Tornadoes, And Flooding
Ca, H	1942	10/14/2010	Severe Storm(s)	Severe Storms, Flooding, And Straight-Line Winds
Ca, Ch, G, H, Pa, Pe	1490	9/18/2003	Hurricane	Hurricane Isabel
Ca, Ch, G, H, Pa, Pe	1292	9/16/1999	Hurricane	Hurricane Floyd Major Disaster Declarations
Ca, Ch, Pa, Pe	1240	8/27/1998	Hurricane	Hurricane Bonnie
Ch, H	1134	9/6/1996	Hurricane	Hurricane Fran
Ch,	1127	7/18/1996	Hurricane	Hurricane Bertha
G, H	1103	2/23/1996	Snow	Winter Storm
Ca, Ch, G, H, Pa	1087	1/13/1996	Snow	Blizzard Of 96
G, H, Pe	699	3/30/1984	Tornado	Severe Storms & Tornadoes
Ch, H, Pa, Pe	234	2/10/1968	Severe Ice Storm	Severe Ice Storm

Source: FEMA Disaster Declarations Summary, updated December 20, 2018

*County code: Ca = Camden, Ch = Chowan, G = Gates, H = Hertford, Pa = Pasquotank, Pe = Perquimans

Using the above information and additional discussion, the HMPC evaluated each hazard’s significance to the planning area in order to decide which hazards to include in this plan update. Some hazard titles have been updated either to better encompass the full scope of a hazard or to assess closely related hazards together. Table 4.5 summarizes the determination made for each hazard.

Table 4.5 – Hazard Evaluation Results

Hazard	Included in this plan update?	Explanation for Decision
Flood	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. Multiple disaster declarations for the region are related to flooding. NCEI reports 163 flood-related events.
Hurricane and Tropical Storm	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. Past disaster declarations and NCEI storm reports indicate hurricanes are a significant hazard for the region.
Nor’easters	No	Nor’easters cause damage through high winds, erosion, and heavy rains. These hazards will be addressed under the following hazards: hurricane and tropical storm; severe thunderstorm, lighting, and hail; and erosion.
Severe Winter Storm	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. The region has received several past disaster declarations related to this hazard. NCEI reports 205 severe winter weather events.
Extreme Heat	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. NCEI reports 13 heat events for the region.
Earthquake	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. The Albemarle region could be impacted by the Eastern Tennessee Seismic Zone and the Charleston fault.

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Hazard	Included in this plan update?	Explanation for Decision
Wildfire	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard.
Dam & Levee Failure	Yes	The 2015 Albemarle plan and 2018 State plan addressed dam failure and there are multiple dams in the region. The 2015 Albemarle plan also addressed levee with the dam failure hazard. The USACE's National Levee Database identifies one USACE levee in the region.
Drought	Yes	The 2015 Albemarle plan and the 2018 State plan addressed this hazard. Despite limited records of past drought in the region, it is still considered a priority for inclusion in the plan.
Severe Weather (Thunderstorm, Lightning, Hail)	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. Multiple disaster declarations have been made in the region for severe storms. NCEI reports 338 severe weather events in the past 20 years.
Tornado	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. NCEI reports 33 tornado segments have passed through the region. Two past disaster declarations have included tornadoes.
Landslide	No	The 2015 Albemarle plan and 2018 State HMP addressed this hazard; however risk is low and occurrence is unlikely in the region.
Sinkholes	No	The 2015 Albemarle plan and 2018 State plan addressed this hazard. USGS data shows little to no geological basis for sinkhole risk in the region.
Erosion	Yes	The 2015 Albemarle plan and 2018 State plan addressed this hazard. Past hurricane activity and the region's coastal location indicate this is a significant hazard for the region.
Rip Currents	No	The 2015 Albemarle plan addressed this hazard; however, it is only applicable to coastal areas that are no longer part of the region.
Tsunami	No	The 2015 Albemarle plan addressed this hazard but found it unlikely. There were no past events in or near the planning area.
Hazardous Materials Incident	No	The 2015 Albemarle plan did not address this hazard. Hazardous materials incidents will be addressed through emergency operations planning.
Radiological Emergency	Yes	The 2018 State plan addressed this hazard and notes that several counties in the Albemarle region are within the Ingestion Pathway Zone for the Surry Power Station in Virginia.
Terrorism	No	The 2015 Albemarle plan and the 2018 State plan addressed this hazard. The 2015 Albemarle plan found terrorism to be a moderate priority hazard to the planning area but did not provide a risk assessment or data on specific vulnerabilities in the region. This hazard is better handled through state level mitigation and local emergency operations planning.
Infectious Disease	No	The State HMP reports the entire State is equally at risk, but vulnerability is low across all but one impact category.
Cyber Threat	No	The region considers this hazard more appropriately addressed through emergency operations planning and local staff training.
Electromagnetic Pulse	No	The region considers this hazard more appropriately addressed at the State level.
Active Shooter/ Mass Casualty	No	This hazard is not addressed in the State plan; therefore, it was not deemed necessary to reevaluate.
Transportation Infrastructure Impacts	No	This hazard is not addressed in the State plan. Vulnerability of transportation infrastructure will be evaluated relative to each natural hazard that may affect it.

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The final list of hazards included in this plan are as follows:

- ▶ Coastal Erosion
- ▶ Dam & Levee Failure
- ▶ Drought
- ▶ Earthquake
- ▶ Extreme Heat
- ▶ Flood
- ▶ Hurricane & Tropical Storm
- ▶ Severe Weather (Thunderstorm Wind, Lightning, & Hail)
- ▶ Severe Winter Storm
- ▶ Tornado
- ▶ Wildfire
- ▶ Radiological Incident

4.3 RISK ASSESSMENT METHODOLOGY AND ASSUMPTIONS

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

Each hazard is profiled in the following format:

Hazard Description

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

Location

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

Extent

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

Past Occurrences

This section contains information on historical events, including the location and consequences of all past events on record within or near the Albemarle Region.

Probability of Future Occurrence

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

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

Climate Change

Where applicable, this section discusses how climate change may or may not influence the risk posed by the hazard on the planning area in the future.

Vulnerability Assessment

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

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

- ▶ Geographic Information System (GIS) datasets, including building footprints, topography, aerial photography, and transportation layers;
- ▶ Hazard layer GIS datasets from state and federal agencies;
- ▶ Written descriptions of inventory and risks provided by the State Hazard Mitigation Plan; and
- ▶ Written descriptions of inventory and risks provided by the previous Albemarle Regional Hazard Mitigation Plan.
- ▶ Exposure and vulnerability estimates provided by the North Carolina Emergency Management IRISK database.
- ▶ Crop insurance claims by cause from USDA's Risk Management Agency

NCEM's IRISK database incorporates county building footprint and parcel data. Footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the mapped hazard areas. If a building intersects two or more hazard areas (such as the 1-percent-annual-chance flood zone and the 0.2-percent-annual-chance flood zone), it is counted as being in the hazard area of highest risk. The parcel data provided building value and year built. Building value was used to determine the value of buildings at risk. Year built was used to determine if the building was constructed prior to or after the community had joined the NFIP and had an effective FIRM and building codes enforced.

Census blocks and Summary File 1 from the 2010 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects the 1-percent-annual-chance flood hazard area. The ratio estimates that 20

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people are then at risk within the 1-percent-annual-chance flood hazard area (5% of the total population for that census block).

Two distinct risk assessment methodologies were used in the formation of the vulnerability assessment. The first consists of a **quantitative** analysis that relies upon best available data and technology, while the second approach consists of a **qualitative** analysis that relies on local knowledge and rational decision making. The quantitative analysis involved the use of NCEM's IRISK database, which provides modeled damage estimates for earthquake, flood, wind, and wildfire hazards.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Where hazard risk cannot be distinctly quantified and modeled, other information can be collected in regard to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information conveys the vulnerability of that area to that hazard.

Certain assumptions are inherent in any risk assessment. For the Albemarle Regional HMP, three primary assumptions were discussed by the HMPC from the beginning of the risk assessment process: (1) that the best readily available data would be used, (2) that the hazard data selected for use is reasonably accurate for mitigation planning purposes, and (3) that the risk assessment will be regional in nature with local, municipal-level data provided where appropriate and practical.

Key methodologies and assumptions made for specific hazards analysis are described in their respective profiles.

Priority Risk Index

The conclusions drawn from the hazard profiling and vulnerability assessment process can be used to prioritize all potential hazards to the Albemarle Region. The Priority Risk Index (PRI) was applied for this purpose because it provides a standardized numerical value so that hazards can be compared against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time, and duration). Each degree of risk was assigned a value (1 to 4) and a weighting factor as summarized in Table 4.6.

The results of the risk assessment and PRI scoring are provided in Section 4.6 Conclusions on Hazard Risk.

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Table 4.6 – Priority Risk Index

RISK ASSESSMENT CATEGORY	LEVEL	DEGREE OF RISK CRITERIA	INDEX	WEIGHT
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	UNLIKELY	LESS THAN 1% ANNUAL PROBABILITY	1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	2	
	LIKELY	BETWEEN 10 & 100% ANNUAL PROBABILITY	3	
	HIGHLY LIKELY	100% ANNUAL PROBABILITY	4	
IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?	MINOR	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 DAY	2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 WEEK.	3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES > 30 DAYS.	4	
SPATIAL EXTENT How large of an area could be impacted by a hazard event? Are impacts localized or regional?	NEGLIGIBLE	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	4	
WARNING TIME Is there usually some lead time associated with the hazard event? Have warning measures been implemented?	MORE THAN 24 HRS	SELF DEFINED	1	10%
	12 TO 24 HRS	SELF DEFINED	2	
	6 TO 12 HRS	SELF DEFINED	3	
	LESS THAN 6 HRS	SELF DEFINED	4	
DURATION How long does the hazard event usually last?	LESS THAN 6 HRS	SELF DEFINED	1	10%
	LESS THAN 24 HRS	SELF DEFINED	2	
	LESS THAN 1 WEEK	SELF DEFINED	3	
	MORE THAN 1 WEEK	SELF DEFINED	4	

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

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

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

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4.4 ASSET INVENTORY

4.4.1 Population

North Carolina Emergency Management’s (NCEM) IRISK database provided the asset inventory used for this vulnerability assessment. Population data in IRISK is pulled from the 2010 Census and includes a breakdown of population into two subpopulations considered to be a greater risk than the general population, elderly and children. Table 4.7 details the population counts by jurisdiction used for the vulnerability assessment.

Table 4.7 – Population Counts by Jurisdiction, 2010

Jurisdiction	2010 Census Population	Elderly (Age 65 and Over)	Children (Age 5 and Under)
Camden			
Unincorporated Camden County	9,954	1,280	593
Subtotal Camden	9,954	1,280	593
Chowan			
Unincorporated Chowan County	9,056	1,780	538
Town of Edenton	5,743	1,128	341
Subtotal Chowan	14,799	2,908	879
Gates			
Unincorporated Gates County	11,902	1,788	679
Town of Gatesville	287	43	16
Subtotal Gates	12,189	1,831	695
Hertford			
Unincorporated Hertford County	13,318	2,105	764
Town of Ahoskie	5,625	889	323
Town of Como	91	14	5
Town of Harrellsville	106	17	6
Town of Murfreesboro	4,348	687	249
Town of Winton	759	120	44
Village of Cofield	413	65	24
Subtotal Hertford	24,660	3,897	1,415
Pasquotank			
Unincorporated Pasquotank County	20,040	2,718	1,328
City of Elizabeth City	20,614	2,795	1,366
Subtotal Pasquotank	40,654	5,513	2,694
Perquimans			
Unincorporated Perquimans County	10,361	2,223	574
Town of Hertford	2,406	516	133
Town of Winfall	688	148	38
Subtotal Perquimans	13,455	2,887	745
Total Region	115,711	18,316	7,021

Source: NCEM IRISK Database; 2010 Decennial Census

4.4.2 Property

Building counts were also provided by the IRISK database and are detailed in Table 4.8. These values were generated using locally-provided building footprint and parcel data. The methodology for generating the building asset inventory is described in greater detail in Section 4.3. Note that these building counts were provided in 2010, and thus do not account for recent changes in development. Therefore, the exposure reflected in the following tables may be an underestimate of actual present-day exposure. Chapter 2 Planning Area Profile describes the growth that has occurred since 2010 and provides a means of estimating the degree to which exposure and vulnerability may have increased.

Table 4.8 – Building Counts and Values by Jurisdiction

Jurisdiction	Building Count	Building Value
Camden		
Unincorporated Camden County	5,399	\$607,856,739
Subtotal Camden	5,399	\$607,856,739
Chowan		
Unincorporated Chowan County	6,314	\$636,630,642
Town of Edenton	2,976	\$573,869,321
Subtotal Chowan	9,290	\$1,210,499,963
Gates		
Unincorporated Gates County	6,637	\$526,858,623
Town of Gatesville	204	\$27,526,739
Subtotal Gates	6,841	\$554,385,362
Hertford		
Unincorporated Hertford County	8,307	\$831,282,214
Town of Ahoskie	2,744	\$432,519,569
Town of Como	91	\$3,710,336
Town of Harrellsville	100	\$4,999,696
Town of Murfreesboro	2,275	\$233,894,542
Town of Winton	479	\$31,709,099
Village of Cofield	287	\$27,563,079
Subtotal Hertford	14,283	\$1,565,678,535
Pasquotank		
Unincorporated Pasquotank County	10,460	\$1,152,786,829
City of Elizabeth City	8,713	\$1,131,846,529
Subtotal Pasquotank	19,173	\$2,284,633,358
Perquimans		
Unincorporated Perquimans County	6,255	\$726,551,697
Town of Hertford	1,224	\$169,699,936
Town of Winfall	419	\$54,030,362
Subtotal Perquimans	7,898	\$950,281,995
Total Region	62,884	\$7,173,335,952

Source: NCEM IRISK Database; GIS analysis

* City of Elizabeth City building counts and values are accounted for under Pasquotank County.

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4.4.3 Critical Infrastructure & Key Resources and High Potential Loss Properties

The IRISK database also identifies Critical Infrastructure and Key Resources (CIKR) buildings as well as High Potential Loss Properties. These properties were also identified in 2010 and are likely an underestimate of the exposure of current CIKR and High Potential Loss Properties. These properties are detailed in Table 4.9 and Table 4.10, respectively.

Table 4.9 – Critical Infrastructure and Key Resources by Type and Jurisdiction

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Other	Total
Camden County																			
Unincorporated Camden County	1,028	2	2	274	0	36	0	224	10	0	0	0	6	36	2	6	0	0	1,626
Chowan County																			
Unincorporated Chowan County	782	1	0	201	1	70	0	24	7	0	0	0	0	57	0	1	3	0	1,147
Town of Edenton	94	24	0	482	4	140	0	106	92	0	0	0	0	90	6	6	2	0	1,046
Gates County																			
Unincorporated Gates County	3,184	2	0	482	0	92	0	118	14	0	0	0	0	60	0	0	4	0	3,956
Town of Gatesville	14	0	0	64	0	16	0	40	2	0	0	0	0	8	0	0	0	0	144
Hertford																			
Unincorporated Hertford County	2,712	0	0	320	0	136	0	102	12	0	0	0	0	10	26	0	60	0	3,378
Town of Ahoskie	34	6	0	480	0	70	0	126	70	0	0	0	0	66	2	0	30	2	886
Town of Como	42	0	0	10	0	0	0	4	0	0	0	0	0	0	0	0	2	0	58
Town of Harrellsville	0	0	0	20	0	0	0	8	0	0	0	0	0	0	0	0	2	0	30
Town of Murfreesboro	120	0	0	222	0	28	0	110	12	0	0	0	0	26	0	0	14	4	536
Town of Winton	0	0	0	90	0	14	0	44	2	0	0	0	0	2	0	0	8	0	160
Village of Cofield	18	0	0	20	0	58	0	4	0	0	0	0	0	0	4	0	4	0	108
Pasquotank County																			
Unincorporated Pasquotank County	602	2	0	349	0	213	5	116	17	0	0	0	0	79	0	5	25	0	1,413
City of Elizabeth City	35	29	0	678	4	168	1	157	81	0	0	1	0	104	6	3	17	0	1,284
Perquimans County																			

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Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Other	Total
Unincorporated Perquimans County	316	0	0	354	0	32	0	110	20	0	0	0	0	14	0	10	0	0	856
Town of Hertford	10	30	0	254	6	12	0	52	16	0	0	4	2	34	0	10	0	0	430
Town of Winfall	6	0	0	48	0	12	0	40	4	0	0	2	0	10	2	2	0	0	126
Total	8,997	96	2	4,348	15	1,097	6	1,385	359	0	0	7	8	596	48	43	171	6	17,184

Source: NCEM Risk Management Tool

Table 4.10 – High Potential Loss Properties by Use and Jurisdiction

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Camden County								
Unincorporated Camden County	4	0	0	16	0	0	0	20
Chowan County								
Unincorporated Chowan County	2	1	1	6	0	4	0	14
Town of Edenton	14	30	8	24	0	16	0	92
Gates County								
Unincorporated Gates County	0	10	0	8	2	2	4	26
Town of Gatesville	0	0	0	2	0	0	0	2
Hertford								
Unincorporated Hertford County	2	0	8	12	0	0	50	72
Town of Ahoskie	6	30	2	6	0	2	18	64
Town of Como	-	-	-	-	-	-	-	-
Town of Harrellsville	-	-	-	-	-	-	-	-
Town of Murfreesboro	0	8	2	30	0	2	2	44
Town of Winton	0	0	0	6	0	0	0	6
Village of Cofield	0	0	6	0	0	0	4	10
Pasquotank County								
Unincorporated Pasquotank County	0	9	2	29	0	1	0	41
City of Elizabeth City	6	40	1	50	0	11	1	109

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Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Perquimans County								
Unincorporated Perquimans County	2	0	0	36	0	2	0	40
Town of Hertford	2	4	0	20	0	0	0	26
Town of Winfall	0	2	0	4	0	0	0	6
Total	38	134	30	249	2	40	79	572

Source: NCEM Risk Management Tool

Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

In addition to examining CIKR overall, the following critical facilities and assets were examined against known hazard areas, where possible, in this risk assessment. These facilities are those that could severely disrupt emergency operations or response and recovery efforts should they be damaged by a hazard event. Note that these facilities are a subset of the CIKR inventory; critical facility exposure and risk is accounted for in the exposure and vulnerability of CIKR.

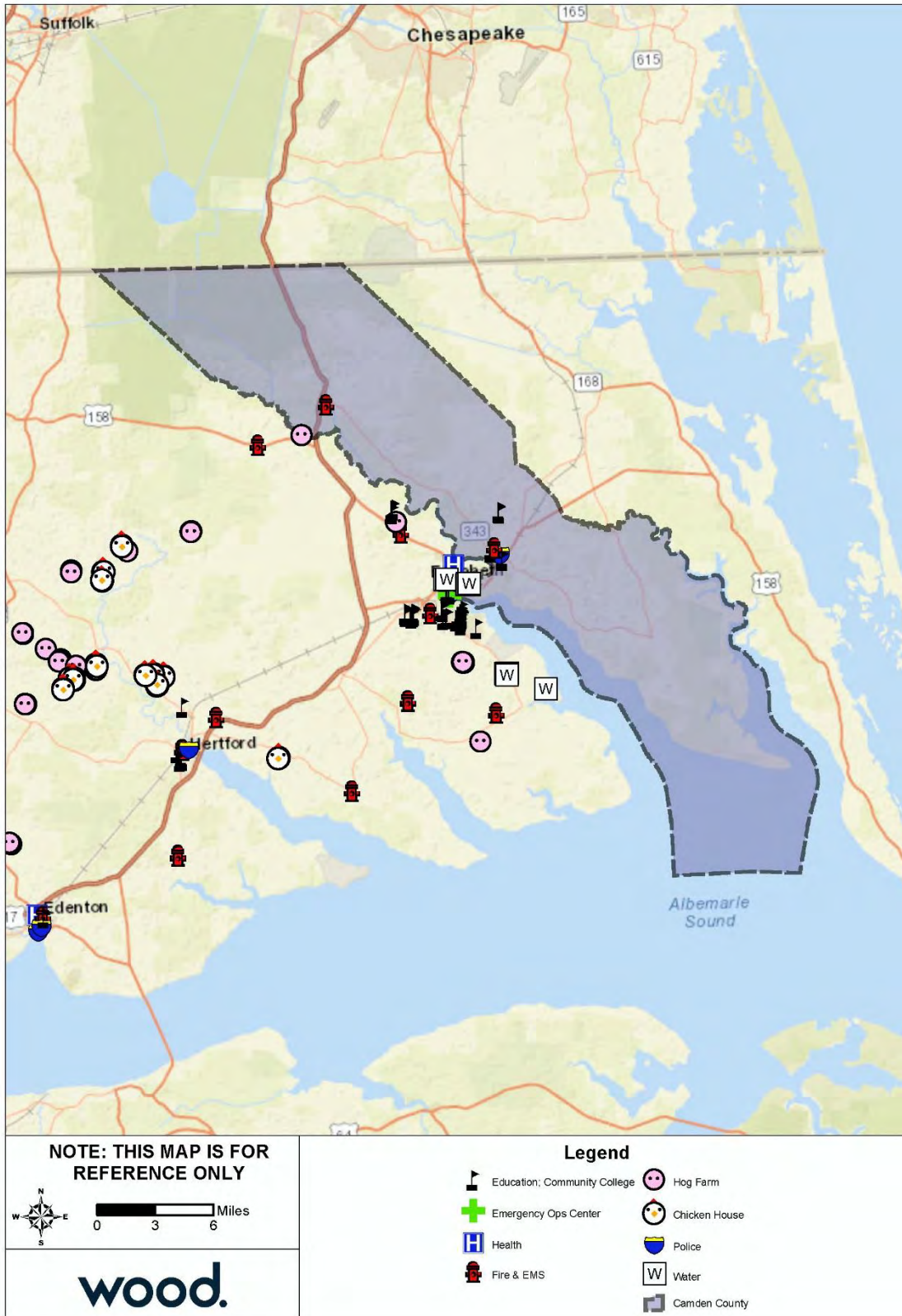
Critical facilities are summarized in Table 4.11 and shown by County in Figure 4.1 through Figure 4.4. No critical facilities data was available in the IRISK database for Gates or Hertford Counties. Critical facility counts and values are also provided by County in the jurisdictional annexes.

Table 4.11 – Critical Facilities

Critical Facility Type	Building Count	Total Value
Chicken House	46	\$2,585,418.09
Community College	30	\$57,177,992.44
Emergency Operations Center	1	\$,856,121.00
Fire Station	18	\$7,963,128.00
Hog Farm	52	\$4,005,171.00
Hospital	2	\$55,468,813.90
Police Station	5	\$4,007,505.66
School	85	\$116,146,492.50
Treatment Plant	28	\$5,277,863.14
Grand Total	267	\$253,488,505.70

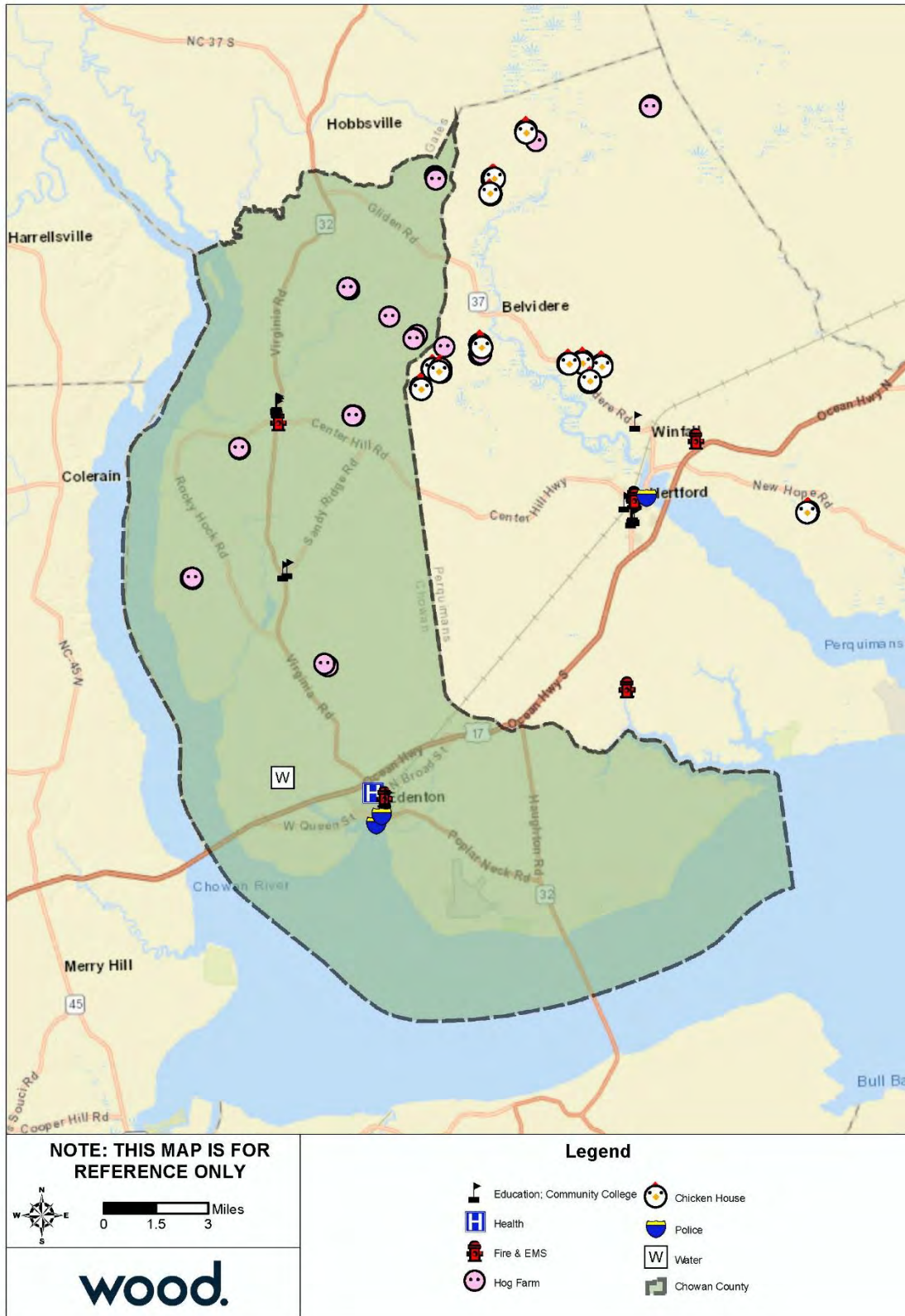
Source: NCEM IRISK Database; GIS analysis

Figure 4.1 – Camden County Critical Facilities



Source: NCEM IRISK Database, GIS Analysis

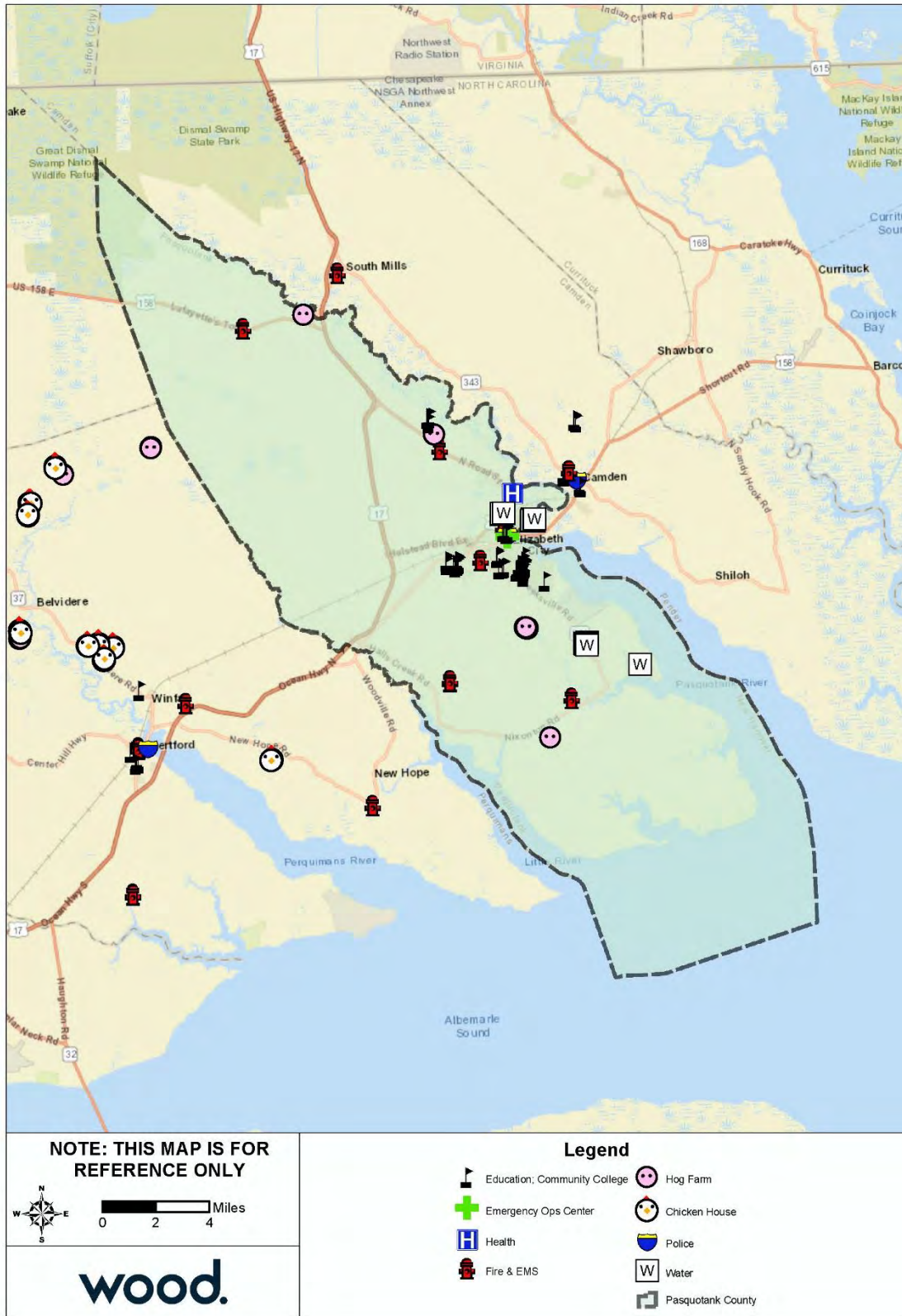
Figure 4.2 – Chowan County Critical Facilities



Source: NCEM IRISK Database, GIS Analysis

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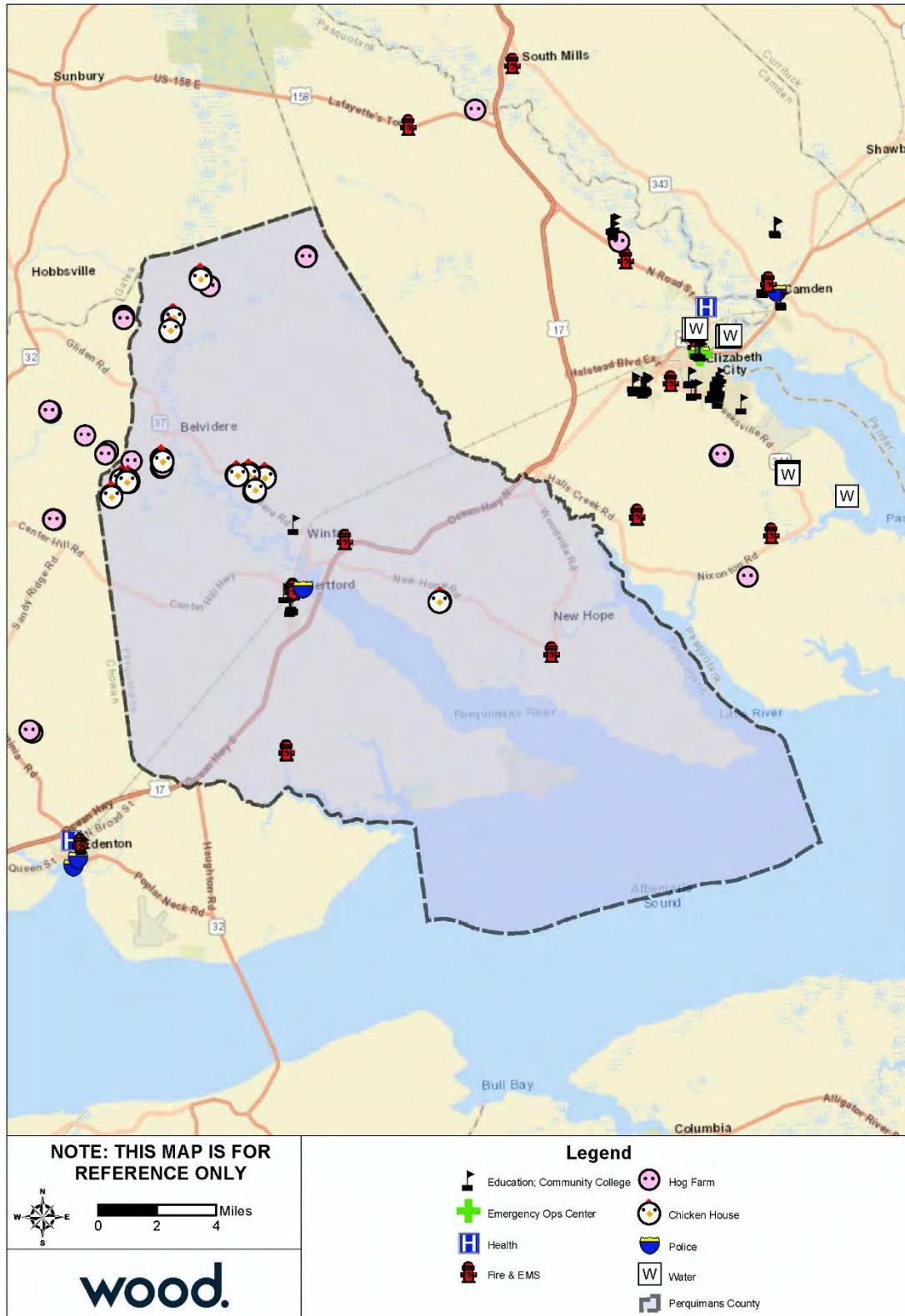
Figure 4.3 – Pasquotank County Critical Facilities



Source: NCEM IRISK Database, GIS Analysis

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Figure 4.4 – Perquimans County Critical Facilities



Source: NCEM IRISK Database, GIS Analysis

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4.4.4 Agriculture

The agricultural industry is also highly vulnerable to natural hazards, which can cause both crop and livestock losses. The exposure of agriculture in the region was measured using the USDA's 2017 Census of Agriculture. Table 4.12 below summarizes the agricultural exposure in the Region by county.

Table 4.12 – Summary of Agriculture Exposure by County

County	Number of Farms	Acreage in Farms	Proportion of Total Land Area in Farms	Acreage with Crop Insurance	Estimated Market Value of Land & Buildings
Camden County	81	59,239	38.5%	36,857 (62.2%)	\$188,524,000
Chowan County	97	53,528	48.4%	20,417 (38.1%)	\$187,026,000
Gates County	141	57,985	26.6%	39,185 (67.6%)	\$210,221,000
Hertford County	126	80,902	35.8%	44,502 (55.0%)	\$258,767,000
Pasquotank County	126	72,174	49.7%	55,110 (76.4%)	\$287,539,000
Perquimans County	149	80,322	50.8%	54,755 (68.2%)	\$285,977,000

Source: USDA 2017 Census of Agriculture

4.5 HAZARD PROFILES, ANALYSIS, AND VULNERABILITY

4.5.1 Dam & Levee Failure

Hazard Background

Dam Failure

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

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

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

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

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

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

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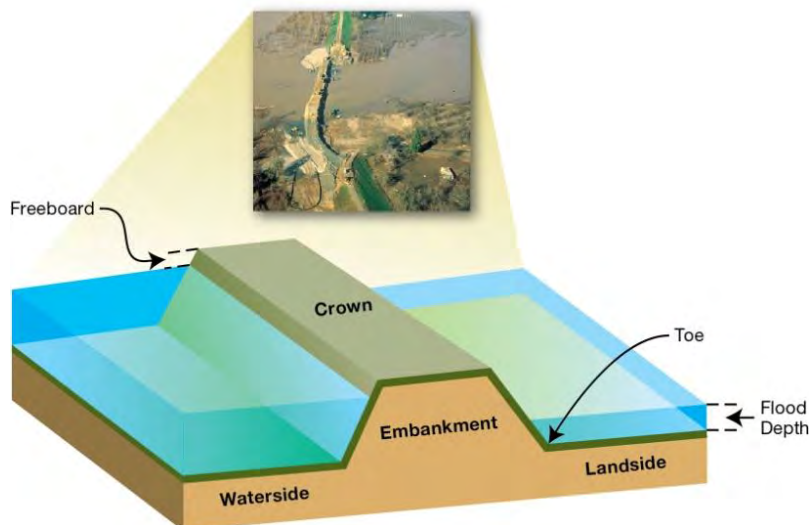
Dam failures are of particular concern because the failure of a large dam has the potential to cause more death and destruction than the failure of any other manmade structure. This is because of the destructive power of the flood wave that would be released by the sudden collapse of a large dam. Dams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

Levee Failure

FEMA defines a levee as “a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water in order to reduce the risk from temporary flooding.” Levee systems consist of levees, floodwalls, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices. Levees often have “interior drainage” systems that work in conjunction with the levees to take water from the landward side to the water side. An interior drainage system may include culverts, canals, ditches, storm sewers, and/or pumps.

Levees and floodwalls are constructed from the earth, compacted soil or artificial materials, such as concrete or steel. To protect against erosion and scouring, earthen levees can be covered with grass and gravel or hard surfaces like stone, asphalt, or concrete. Levees and floodwalls are typically built parallel to a waterway, most often a river, in order to reduce the risk of flooding to the area behind it. Figure 4.5 shows the components of a typical levee.

Figure 4.5 – Components of a Typical Levee



Source: FEMA, What is a Levee Fact Sheet, August 2011

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events. Levees reduce, not eliminate, the risk to individuals and structures behind them. A levee system failure or overtopping can create severe flooding and high water velocities. It is important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

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For both dam and levee failure events, there is generally very little warning time. A failure may result from heavy rains and flash flooding and occur within hours of the first signs of breaching. The duration of the flood will vary but may last as long as a week.

Warning Time: 4 – Less than 6 hours

Duration: 3 – Less than one week

Location

Dam Failure

The North Carolina Dam Inventory, maintained by North Carolina Department of Environmental Quality, provides a detailed inventory of all dams in the state. As of July 2018, there are 15 dams in the Albemarle Region, of which 10 are rated low hazard, 1 is rated intermediate hazard, and 4 are rated high hazard. Table 4.13 lists all dams with high hazard potential in the region. Figure 4.6 shows the location of all dams in Gates County and Figure 4.7 shows the location of all dams in Hertford County. Camden, Chowan, Pasquotank and Perquimans counties do not contain any dams.

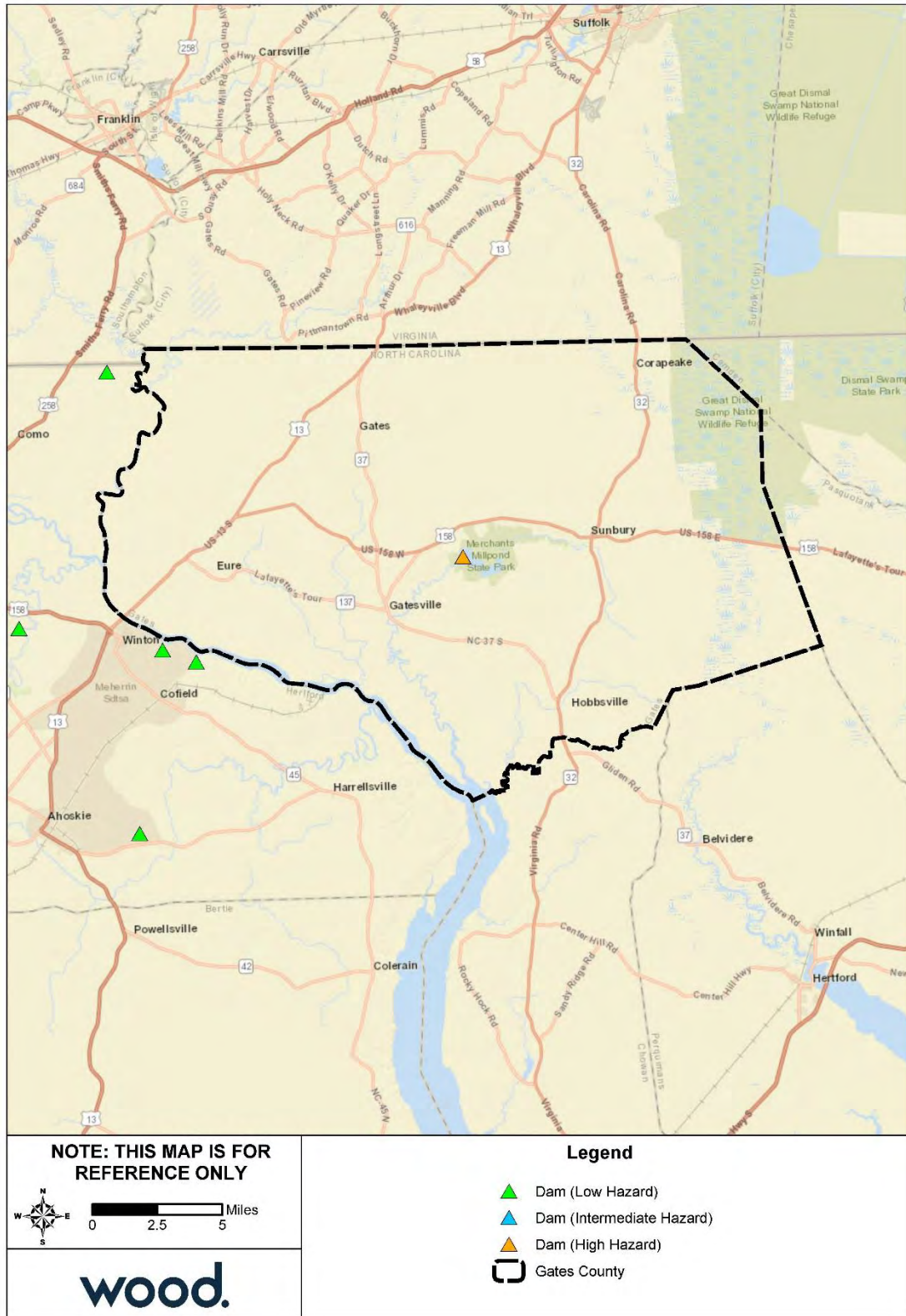
Table 4.13 – High Hazard Dams in the Albemarle Region

Dam Name	NID ID	Ownership	Max Capacity (Ac-Ft)	Nearest Downstream Location
Gates County				
Merchants Millpond Dam	NC05680	Unknown	3100	Unknown
Hertford County				
Chowan University Dam	NC03079	Private	55	Murfreesboro
Holly Hill Road Dam	NC03080	Local Gov	32	Murfreesboro
Revelles Pond Dam Upper	NC03081	Private	30	Murfreesboro

Source: North Carolina Dam Inventory

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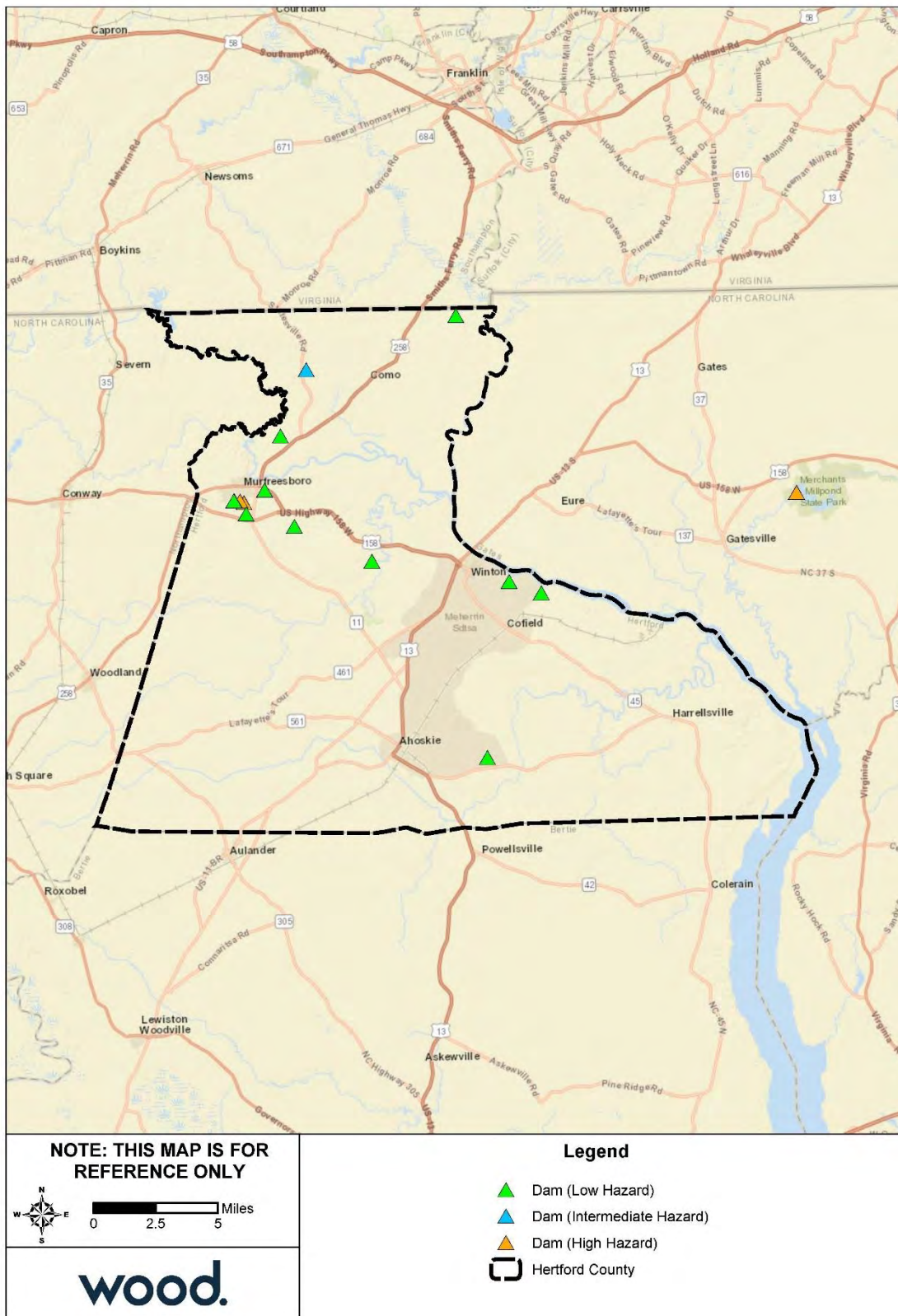
Figure 4.6 – Dam Locations in Gates County



Source: North Carolina Dam Inventory, July 2018

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Figure 4.7 – Dam Locations in Hertford County



Source: North Carolina Dam Inventory, July 2018

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Levee Failure

According to the US Army Corps of Engineers' (USACE) National Levee Database (NLD), there is one recognized levee in the Albemarle Region, located in Pasquotank County. This levee is detailed in Table 4.14 and its location is shown in Figure 4.8.

Table 4.14 – Levee in the Albemarle Region

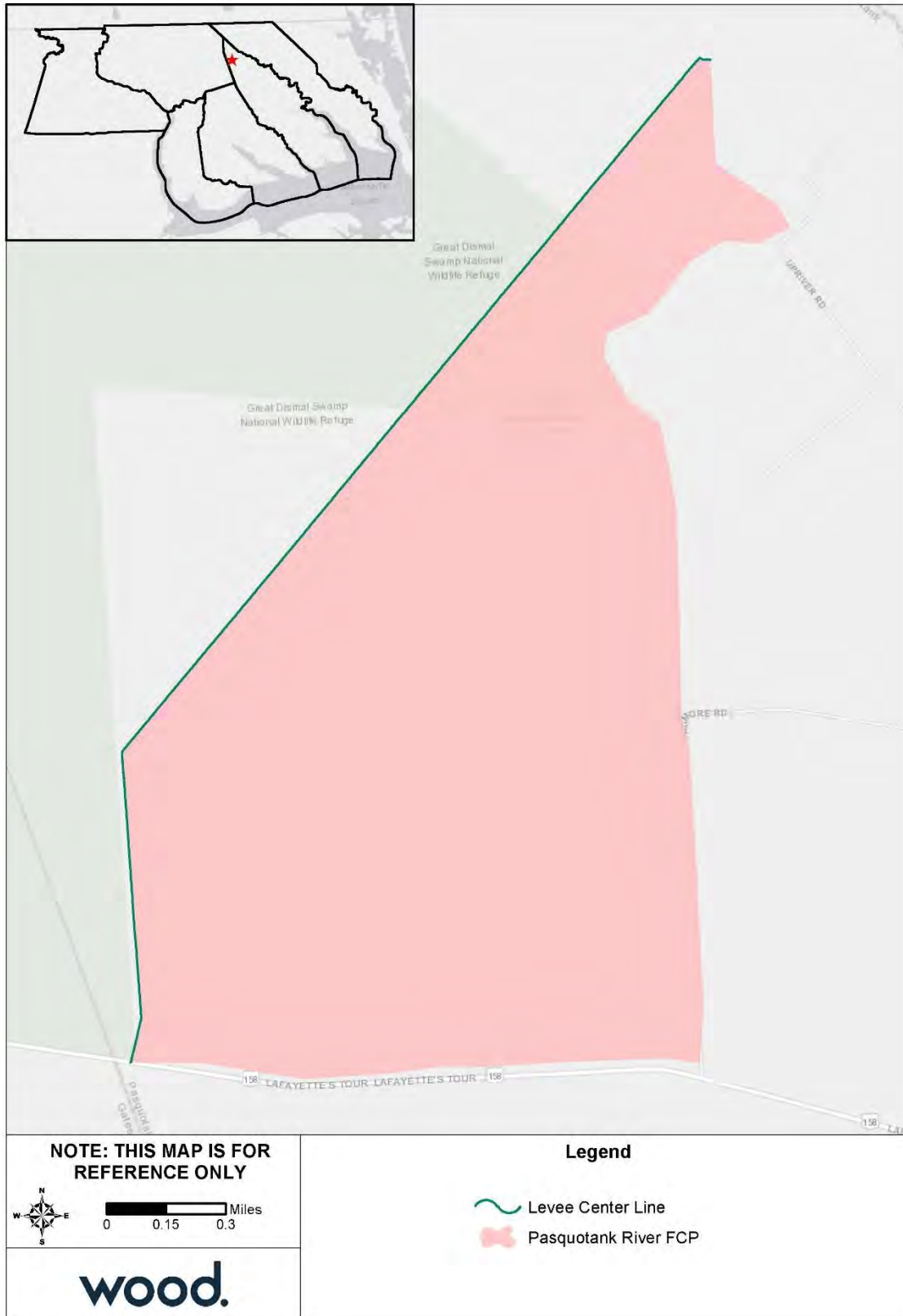
Levee Name	Year Constructed	Embankment Length (mi)	Levee Safety Action Classification	People at Risk	Structures at Risk	Property Value
Pasquotank River FCP	1959	3.09	Low	6	4	\$311,000

Source: National Levee Database

The following is a description of the Pasquotank River Flood Control Project (FCP) levee as provided by the USACE NLD:

“The essential elements of the project consisted of a low levee, with gated outlets (gravity drain pipes) at Newland Canal, Shepard Ditch, and the Local Canal. Newland Canal is located at the southern end of the Project, Local Canal at the northern end, and Shepard Ditch approximately in the middle. The levee was constructed to an elevation of 21 feet at U. S. Highway 158, and decreasing in elevation to 19 feet where it intersects the Local Canal about 2,100 feet southwest of the Pasquotank River. The levee was designed at a length of about 3.1 miles, a top width of 8 feet, and side slopes of 1 vertical to 2 horizontal. The average height is about 3.5 feet above normal ground. Excavation for the levee was obtained from a ditch along the land side of the levee between Newland Canal and Shepard Ditch and from the swamp side for the remainder of the levee's length. The ditch is located so as to provide a minimum berm of 20 feet between the toe of the levee and the ditch for use by maintenance equipment. The ditch was graded to provide drainage toward existing drainage canals and to the river. One 48-inch culvert with slide gate was installed in the levee at Newland Canal, a 36-inch culvert with slide gate at Shepard Ditch, and a 36-inch culvert with flap gate at the Local Canal.”

Figure 4.8 – Levee Locations in the Albemarle Region



Source: National Levee Database

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Extent

Dam Failure

Each state has definitions and methods to determine the hazard potential of a dam. In North Carolina, dams are regulated by the state if they are 25 feet or more in height and impound 50 acre-feet or more. Dams and impoundments smaller than that may fall under state regulation if it is determined that failure of the dam could result in loss of human life or significant damage to property. The height of a dam is from the highest point on the crest of the dam to the lowest point on the downstream toe, and the storage capacity is the volume impounded at the elevation of the highest point on the crest of the dam.

Dam Safety Program engineers determine the "hazard potential" of a dam, meaning the probable damage that would occur if the structure failed, in terms of loss of human life and economic loss or environmental damage. Dams are assigned one of three classes based on the nature of their hazard potential:

- Class A (Low Hazard) includes dams located where failure may damage uninhabited low value non-residential buildings, agricultural land, or low volume roads.
- Class B (Intermediate Hazard) includes dams located where failure may damage highways or secondary railroads, cause interruption of use or service of public utilities, cause minor damage to isolated homes, or cause minor damage to commercial and industrial buildings. Damage to these structures will be considered minor only when they are located in backwater areas not subjected to the direct path of the breach flood wave; and they will experience no more than 1.5 feet of flood rise due to breaching above the lowest ground elevation adjacent to the outside foundation walls or no more than 1.5 feet of flood rise due to breaching above the lowest floor elevation of the structure.
- Class C (High Hazard) includes dams located where failure will likely cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, primary highways, or major railroads.

Table 4.15 – Dam Hazard Classifications

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than \$30,000
Intermediate	Damage to highways, interruption of service	25 to less than 250 vehicles per day
	Economic damage	\$30,000 to less than \$200,000
	Loss of human life*	Probable loss of 1 or more human lives
High	Economic damage	More than \$200,000
	*Probable loss of human life due to breached roadway or bridge on or below the dam	250 or more vehicles per day

Source: NCDENR

Levee Failure

The USACE rates levee risk using the Levee Systems Action Classification (LSAC) which is a scale of 1 – Very High to 5 – Very Low. Definitions are provided in terms of actions to take for risk reduction, as detailed in Table 4.16 below.

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Table 4.16 – Levee Systems Action Classification (LSAC) Rating Definitions

Rating	Actions for Levee Systems and Leveed Areas in this Class
1 – Very High	Based on risk drivers, take immediate action to implement interim risk reduction measures. Increase frequency of levee monitoring, communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning systems and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as very high priority.
2 – High	Based on risk drivers, implement interim risk reduction measures. Increase frequency of levee monitoring; communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as high priority.
3 – Moderate	Based on risk drivers, implement interim risk reduction measures as appropriate. Verify risk information is current and implement routine monitoring program; assure O&M is up to date; communicate risk characteristics to the community in a timely manner; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as a priority.
4 – Low	Verify risk information is current and implement routine monitoring program and interim risk reduction measures if appropriate; assure O&M is up to date; communicate risk characteristics to the community as appropriate; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions to further reduce risk to as low as practicable.
5 – Very Low	Continue to implement routine levee monitoring program, including operation and maintenance, inspections, and monitoring of risk. Communicate risk characteristics to the community as appropriate; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and recommend purchase of flood insurance.

Source: USACE National Levee Database

The only levee in the planning area is rated Low on the LSAC scale, therefore impacts from a failure would be minor.

Failure of a dam or levee would affect only a negligible area but could cause serious property damage within the affected area.

Impact: 2 – Limited

Spatial Extent: 1 – Negligible

Historical Occurrences

No historical instances of dam failure were reported in the region’s previous hazard mitigation plan; a review of records since that plan was finalized did not turn up any additional results.

There is no record of past occurrence of levee failure, however the National Levee Database notes that the Pasquotank River FCP levee was likely overtopped during Hurricane Floyd in 1999.

Probability of Future Occurrence

Given the significant presence of high hazard dams in Gates and Hertford counties in the Albemarle Region, failure of a dam is possible. Dam failure has not occurred in the region since 1996, however historical events alone do not provide an adequate estimate of potential future occurrence. With heavy

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rain events becoming more frequent and intense, conditions conducive to dam failure may occur more frequently as well. As the next downstream community for three of the four, Murfreesboro in Hertford County has an especially high level of risk to a dam failure.

According to the national Levee Database, the annual probability of the flood event that would load the levee system to the point of overtopping is 0.05%. Therefore, failure of the levee due to overtopping is unlikely.

Probability: 1 – Unlikely

Climate Change

Studies have been conducted to investigate the impact of climate change scenarios on dam safety. The safety of dams for the future climate can be based on an evaluation of changes in design floods and the freeboard available to accommodate an increase in flood levels. The results from the studies indicate that the design floods with the corresponding outflow floods and flood water levels will increase in the future, and this increase will affect the safety of the dams in the future. Studies concluded that the total hydrological failure probability of a dam will increase in the future climate and that the extent and depth of flood waters will increase by the future dam break scenario. These changes would likely produce similar impacts on levees.

Vulnerability Assessment

Methodologies and Assumptions

Dam inundation areas were not available for the identified dams; therefore, a quantitative vulnerability assessment could not be completed. Vulnerability discussed below is based on anecdotal evidence and theoretical understanding of potential risks.

People

A person's immediate vulnerability to a dam failure is directly associated with the person's distance downstream of the dam as well as proximity to the stream carrying the floodwater from the failure. For dams that have an Emergency Action Plan (EAP), the vulnerability of loss of life for persons in their homes or on their property may be mitigated by following the EAP evacuation procedures; however, the displaced persons may still incur sheltering costs. For persons located on the river (e.g. for recreation) the vulnerability of loss of life is significant.

People are also vulnerable to the loss of the uses of the lake upstream of a dam following failure. Several uses are minor, such as aesthetics or recreational use. However, some lakes serve as drinking water supplies and their loss could disrupt the drinking water supply and present a public health problem.

The NLD estimates that 6 people are at risk to levee failure in the Region, all in Pasquotank County.

Property

Vulnerability of the built environment includes damage to the dam itself and any man-made feature located within the inundation area caused by the dam failure. Downstream of the dam, vulnerability includes potential damage to homes, personal property, commercial buildings and property, and government owned buildings and property; destruction of bridge or culvert crossings; weakening of bridge supports through scour; and damage or destruction of public or private infrastructure that cross the stream such as water and sewer lines, gas lines and power lines. Water dependent structures on the lake upstream of the dam, such as docks/piers, floating structures or water intake structures, may be damaged by the rapid reduction in water level during the failure.

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Similarly, levee failures can result in inundation and damages to buildings, personal property, and infrastructure. If a levee fails or is overtopped, the resulting flooding may be severe, as the levee then acts as a barrier, preventing drainage of the flood waters. According to NLD, there are 4 buildings at risk in leveed areas, worth an estimated \$311,000.

Environment

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

Consequence Analysis

Table 4.17 summarizes the potential negative consequences of dam failure.

Table 4.17 – Consequence Analysis – Dam and Levee Failure

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

4.5.2 Drought

Hazard Background

Drought is a deficiency in precipitation over an extended period. It is a normal, recurrent feature of climate that occurs in virtually all climate zones. The duration of a drought varies widely. There are cases when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind, and there are other cases when drought spans multiple years, or even decades. Studying the paleoclimate record is often helpful in identifying when long-lasting droughts have occurred. Common types of drought are detailed below in Table 4.18.

Table 4.18 – Drought Classifications

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

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

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

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

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

Describe local conditions pertaining to this hazard. Include descriptions of geographic boundaries, recognized districts, localized areas of concern, etc.

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The State of North Carolina has a Drought Assessment and Response Plan as an Annex to its Emergency Operations Plan. This plan provides the framework to coordinate statewide response to a drought incident.

Warning Time: 1 – More than 24 hours

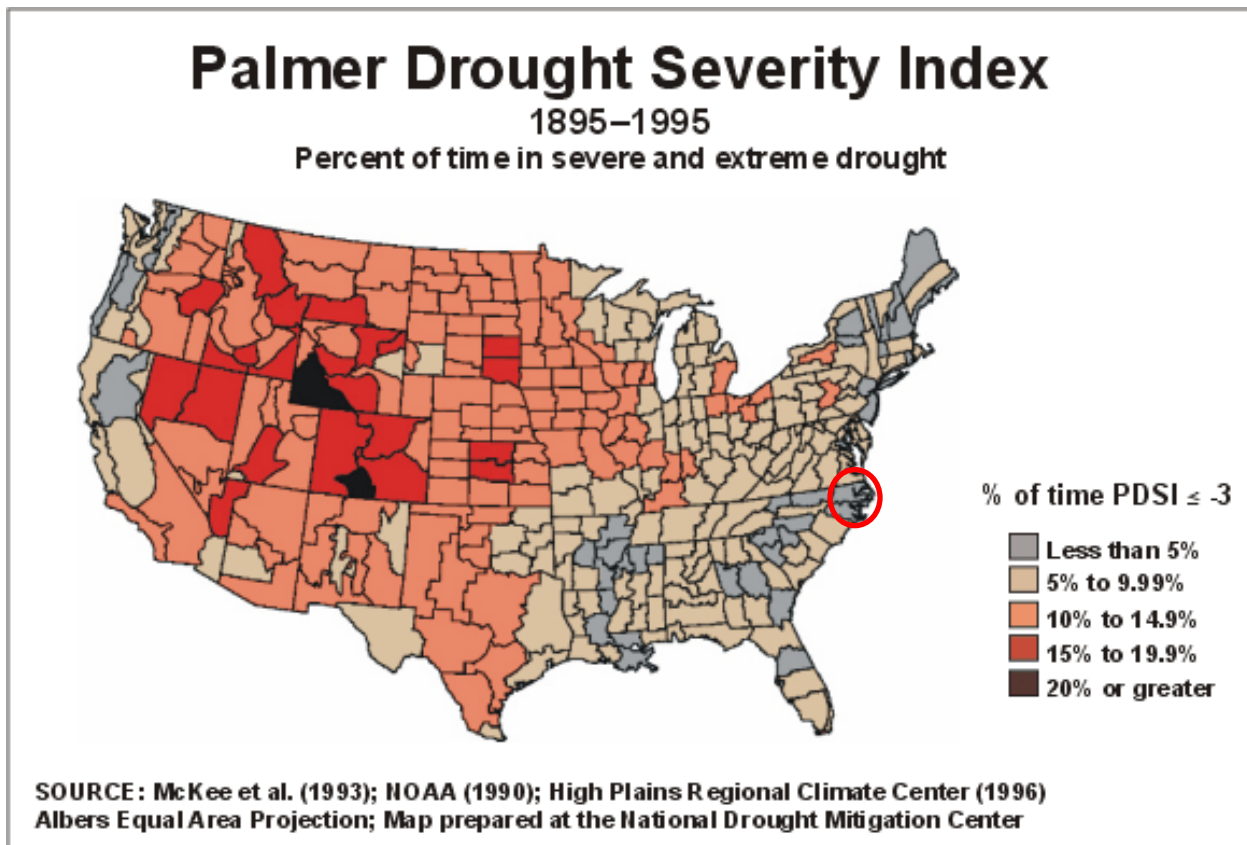
Duration: 4 – More than one week

Location

Typically the National Weather Service looks at drought and extreme heat as episodes that impact a widespread forecast “zone,” and therefore it is not common to pinpoint a specific location within a planning area that is more susceptible to these hazards than others. From this viewpoint, each county is considered uniformly at risk to drought and extreme heat. However, the most significant financial losses are likely to occur in areas that are primarily agricultural.

Figure 4.9 shows the Palmer Drought Severity Index (PDSI) summary map for the United States from 1895 to 1995. PDSI drought classifications are based on observed drought conditions and range from -0.5 (incipient dry spell) to -4.0 (extreme drought). As can be seen, the Eastern United States has historically not seen as many significant long-term droughts as the Central and Western regions of the country. Specifically, the Albemarle Region was in drought less than 5% of the identified timeframe.

Figure 4.9 – PDSI, 1895-1995 Percent of Time in Severe and Extreme Drought



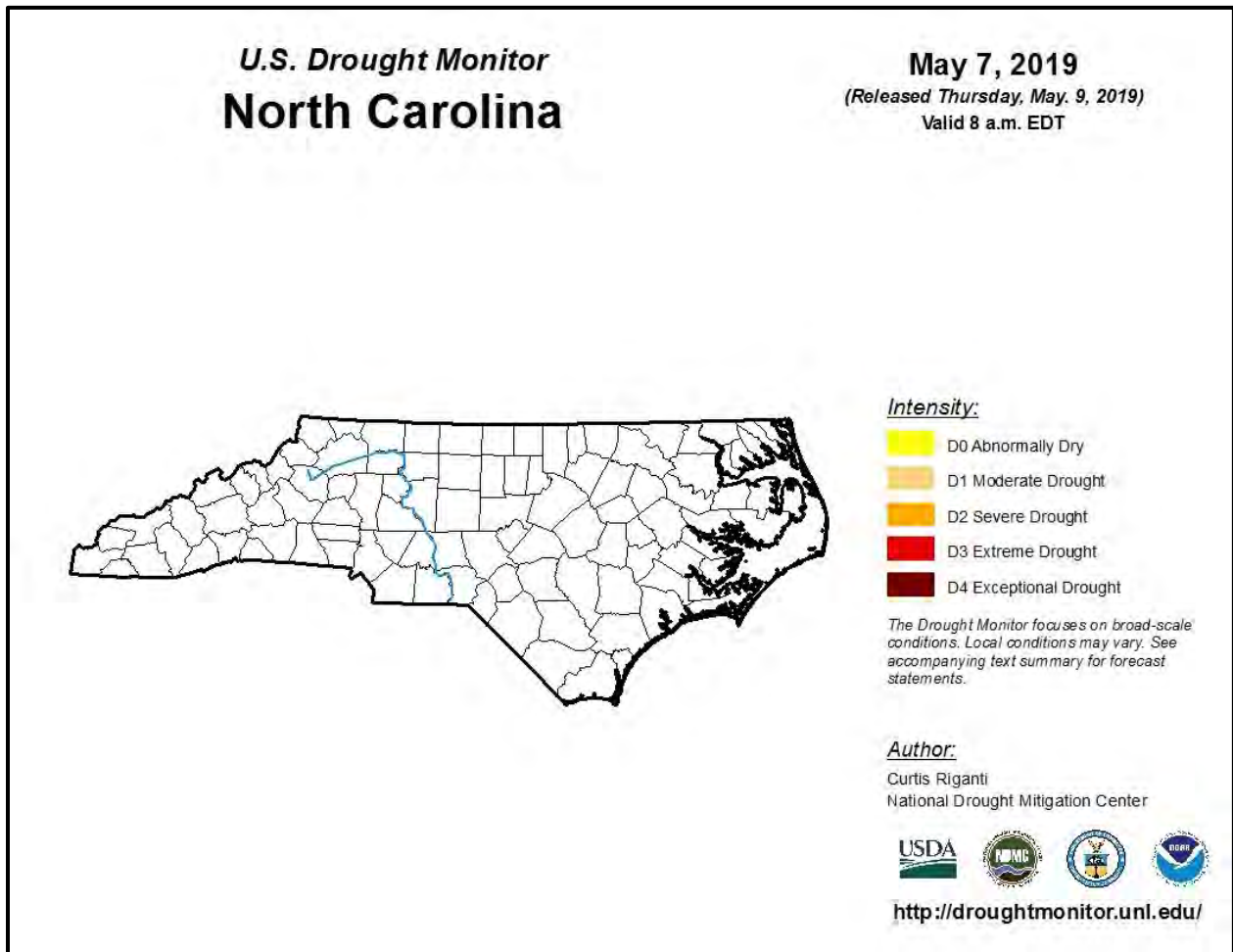
Source: United States Geological Survey; Albemarle Region noted by red circle

Figure 4.10 notes the U.S. Drought Monitor’s drought ratings for North Carolina as of May 7, 2019; as of that date, no counties in the Albemarle Region are experiencing any conditions of drought.

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Figure 4.10 – US Drought Monitor for Week of May 7, 2019



Source: U.S. Drought Monitor

Extent

Drought extent can be defined in terms of intensity, using the U.S. Drought Monitor scale. The Drought Monitor Scale measures drought episodes with input from the Palmer Drought Severity Index, the Standardized Precipitation Index, the Keetch-Byram Drought Index, soil moisture indicators, and other inputs as well as information on how drought is affecting people. Figure 4.11 details the classifications used by the U.S. Drought Monitor. A category of D2 (severe) or higher on the U.S. Drought Monitor Scale can typically result in crop or pasture losses, water shortages, and the need to institute water restrictions.

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Figure 4.11 – US Drought Monitor Classifications

Category	Description	Possible Impacts	Ranges				Objective Drought Indicator Blends (Percentiles)
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	
D0	Abnormally Dry	<ul style="list-style-type: none"> Going into drought: <ul style="list-style-type: none"> short-term dryness slowing planting, growth of crops or pastures Coming out of drought: <ul style="list-style-type: none"> some lingering water deficits pastures or crops not fully recovered 	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	<ul style="list-style-type: none"> Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested 	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	<ul style="list-style-type: none"> Crop or pasture losses likely Water shortages common Water restrictions imposed 	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	<ul style="list-style-type: none"> Major crop/pasture losses Widespread water shortages or restrictions 	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	<ul style="list-style-type: none"> Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies 	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Source: US Drought Monitor

Though most droughts experienced in the region fall into the D0 (abnormal) or D1 (moderate) category, the Albemarle Region is susceptible to any of these levels of drought.

Impact: 1 – Minor

Spatial Extent: 4 – Large

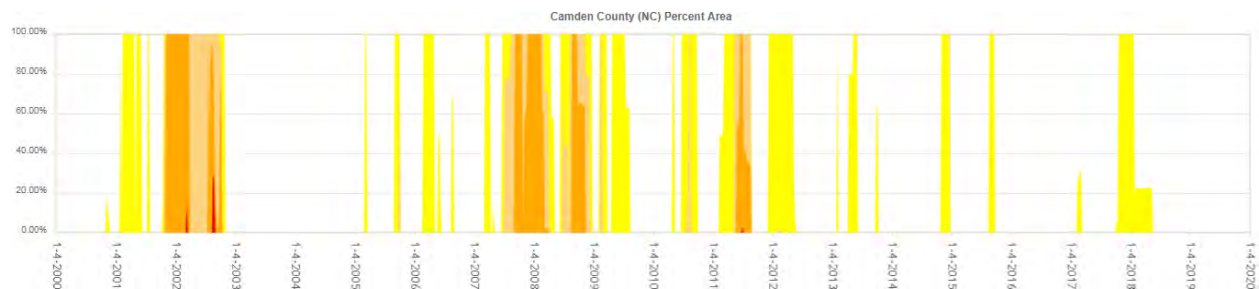
Historical Occurrences

Figure 4.12 through Figure 4.17 show historical periods where each county was considered in some level of drought condition. The color key shown in Figure 4.11 indicates the intensity of the drought.

Camden County

Between 2000 and 2018, Camden County was in some level of drought 33.3% of the time.

Figure 4.12 – US Drought Monitor Historical Trends – Camden County 2000-2018



Source: U.S. Drought Monitor

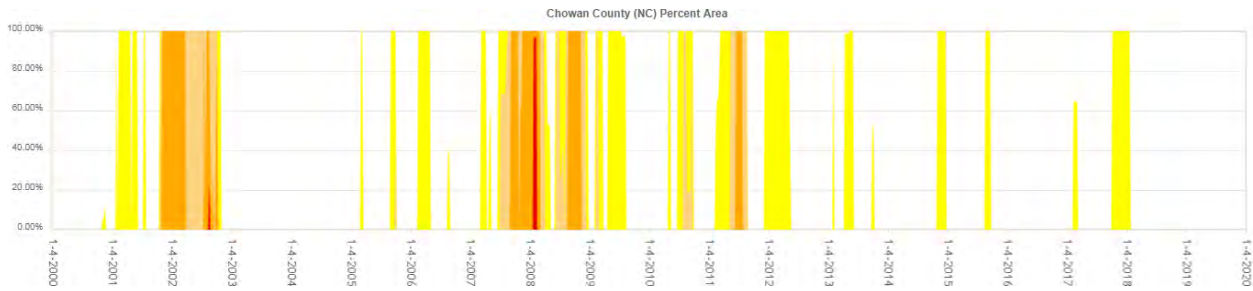
Chowan County

Between 2000 and 2018, Chowan County was in some level of drought 31.7% of the time. The County recorded five weeks in “extreme” drought during this timeframe.

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Figure 4.13 – US Drought Monitor Historical Trends – Chowan County 2000-2018

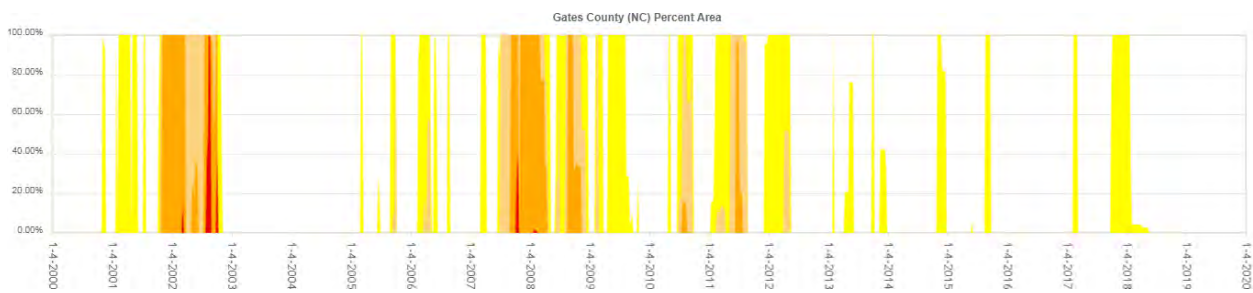


Source: U.S. Drought Monitor

Gates County

Between 2000 and 2018, Gates County was in some level of drought 35.75% of the time. The County recorded eleven weeks in “extreme” drought during this timeframe.

Figure 4.14 – US Drought Monitor Historical Trends – Gates County 2000-2018

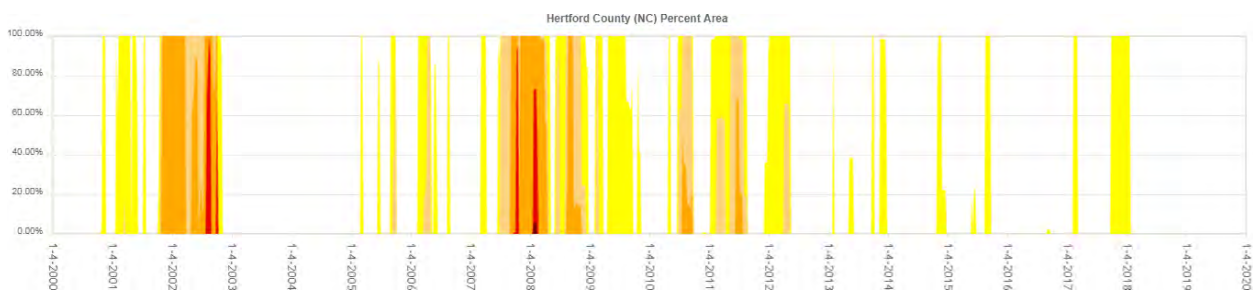


Source: U.S. Drought Monitor

Hertford County

Between 2000 and 2018, Hertford County was in some level of drought 33.6% of the time. The County recorded 14 weeks in “extreme” drought and three weeks in “exceptional” drought during this timeframe.

Figure 4.15 – US Drought Monitor Historical Trends – Hertford County 2000-2018



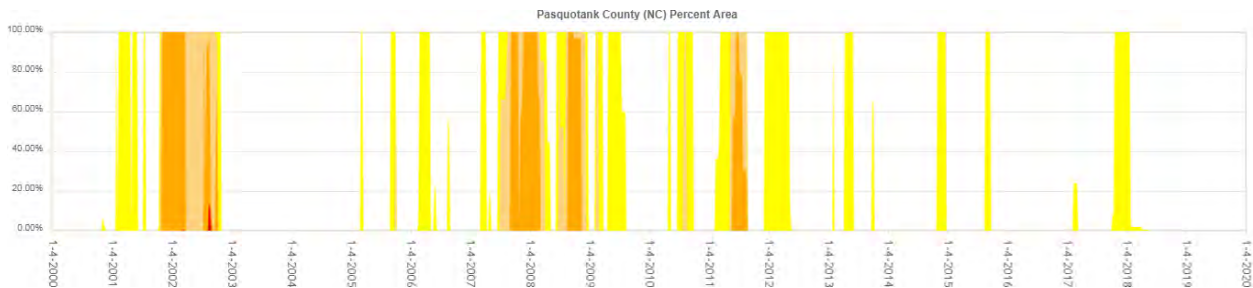
Source: U.S. Drought Monitor

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Pasquotank County

Between 2000 and 2018, Pasquotank County was in some level of drought 33.7% of the time. The County recorded three weeks in “extreme” drought during this timeframe.

Figure 4.16 – US Drought Monitor Historical Trends – Pasquotank County 2000-2018

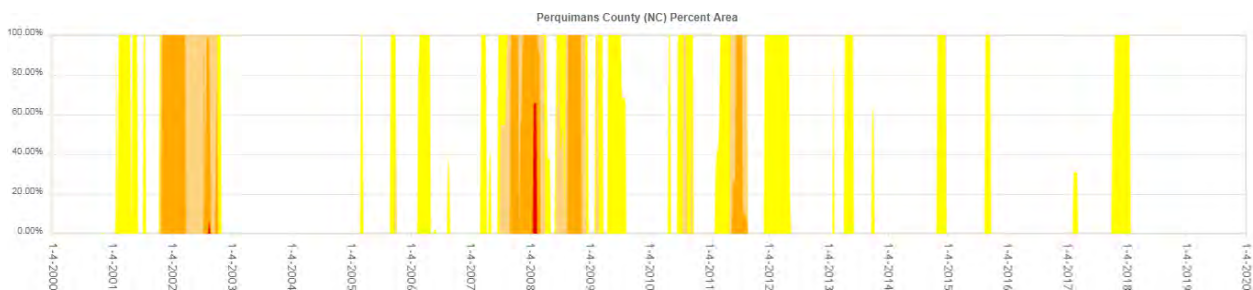


Source: U.S. Drought Monitor

Perquimans County

Between 2000 and 2018, Perquimans County was in some level of drought 31.7% of the time. The County did not record any weeks in “extreme” drought during this timeframe.

Figure 4.17 – US Drought Monitor Historical Trends – Perquimans County 2000-2018



Source: U.S. Drought Monitor

The National Drought Mitigation Center (NDMC), located at the University of Nebraska in Lincoln, provides a clearinghouse for information on the effects of drought, based on reports from media, observers, impact records, and other sources.

According to the NDMC’s Drought Impact Reporter, during the 10-year period from January 2009 through December 2018, 289 drought impacts were noted for the State of North Carolina, of which 8 were reported to affect the counties in the Albemarle Region.

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Table 4.19 summarizes the number of impacts reported by category and the years impacts were reported for each category. Note that the Drought Impact Reporter assigns multiple categories to each impact, and that the same impacts were listed for almost every county in the region, which speaks to the regional nature of drought.

Table 4.19 – Drought Impacts Reported in the Albemarle Region, January 2009 - December 2018

Category	Camden	Chowan	Gates	Hertford	Pasquotank	Perquimans	Years Reported
	Impacts						
Agriculture	2	2	2	2	3	4	2014, 2012, 2011, 2010
Fire	1	-	1	-	1	-	2011
Relief, Response & Restrictions	2	2	2	2	2	2	2012, 2010

Source: Drought Impact Reporter, <http://droughtreporter.unl.edu>

Probability of Future Occurrence

Over the 988-week period between 2000 and 2018, the Region spent an average of 333 weeks in some level of drought condition, ranging from abnormally dry to exceptional drought. This equates to a 33.7% chance of drought in any given week. Table 4.20 shows historical data by county.

Table 4.20 – Historical Weeks in Drought by County, 2000-2018

County	Weeks in Any Drought	Percent of Time Drought
Camden	331	33.5%
Chowan	315	31.9%
Gates	355	35.9%
Hertford	353	35.7%
Pasquotank	332	33.6%
Perquimans	312	31.6%

Source: US Drought Monitor

Probability: 3 – Likely

Climate Change

The Fourth National Climate Assessment reports that average and extreme temperatures are increasing across the country and average annual precipitation is decreasing in the Southeast. Heavy precipitation events are becoming more frequent, meaning that there will likely be an increase in the average number of consecutive dry days. As temperature is projected to continue rising, evaporation rates are expected to increase, resulting in decreased surface soil moisture levels. Together, these factors suggest that drought will increase in intensity and duration in the Southeast.

Vulnerability Assessment

Methodologies and Assumptions

Vulnerability to drought in the counties in the Albemarle region is based on historical occurrences of drought in the planning area and generalized concerns regarding potential drought consequences. Agricultural vulnerability was estimated using data from the 2017 Census of Agriculture and a review of past claims related to drought.

People

Drought can affect people’s physical and mental health. For those economically dependent on a reliable water supply, drought may cause anxiety or depression about economic losses, reduced incomes, and other employment impacts. Conflicts may arise over water shortages. People may be forced to pay more for water, food, and utilities affected by increased water costs.

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Drought may also cause health problems due to poorer water quality from lower water levels. If accompanied by extreme heat, drought can also result in higher incidents of heat stroke and even loss of human life.

Property

Drought is unlikely to cause damages to the built environment. However, in areas with shrinking and expansive soils, drought may lead to structural damages. Drought may cause severe property loss for the agricultural industry in terms of crop and livestock losses. The USDA's Risk Management Agency (RMA) maintains a database of all paid crop insurance claims. Between 2007-2017, the sum of claims paid for crop damage as a result of drought in the counties of the Albemarle Region was \$26,457,313, or an average of \$2,405,210 in losses per year. Table 4.21 summarizes the regional crop losses due to drought reported in the RMA system.

Table 4.21 – Crop Losses Resulting from Drought, 2007-2017

Year	Determined Acres	Indemnity Amount
2007	37,499.60	\$4,205,220
2008	39,686.72	\$4,919,667
2009	3,030.24	\$272,255
2010	30,066.75	\$4,144,699
2011	52,424.78	\$9,891,274
2012	2,267.54	\$594,965
2013	2,193.11	\$307,028
2014	1,016.96	\$147,837.30
2015	6,327.07	\$788,656.18
2016	5,724.70	\$1,118,459.03
2017	533.66	\$67,252.50
Total	180,771.13	\$26,457,313.01

Source: USDA Risk Management Agency

Table 4.22 summarizes county-specific data on indemnity amounts, as well as average payout amounts per year. Hertford County by far suffered the greatest impacts agriculturally from drought, with over \$10 million in payouts over the 11-year timespan.

Table 4.22 – County-Specific Total Crop Losses Resulting from Drought, 2007-2017

County	Determined Acres	Indemnity Amount	Average Annual Indemnity
Camden	9,838.78	1,140,979	\$103,725
Chowan	15,000.08	1,665,346	\$151,395
Gates	27,768.69	\$3,902,268	\$354,752
Hertford	56,059.52	\$10,227,293	\$929,754
Pasquotank	40,387.88	\$5,699,409	\$518,128
Perquimans	31,716.18	\$3,822,018	\$347,456
Total	180,771.13	\$26,457,313	\$2,405,210

Source: USDA Risk Management Agency

Environment

Plants and animals depend on water, just as people do. Drought can shrink food supplies and damage habitats. Sometimes this damage is only temporary, and other times it is irreversible. Drought can also impact water quality, as shrinking surface water bodies experience higher pollutant and algal concentrations but have less capacity to attenuate those pollutants due to decreased volume.

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Drought conditions can also provide a substantial increase in wildfire risk. As plants and trees wither and die from a lack of precipitation, increased insect infestations, and diseases—all of which are associated with drought—they become fuel for wildfires. Long periods of drought can equate to more wildfires and more intense wildfires, which affect the economy, the environment, and society in many ways such as by destroying neighborhoods, crops, and habitats. If climate change projections for long-term drought paired with intense rain events are accurate, these conditions can also increase risk of flash flooding.

Specific to the Albemarle Region, the National Drought Mitigation Center listed impacts in the Region including water conservation, increased fire risk, and wildlife and agriculture life cycle impacts occurring between January 2009 and December 2018.

Consequence Analysis

Droughts could potentially have the following consequences in the Albemarle Region.

Table 4.23 – Consequence Analysis - Drought

Category	Consequences
Public	Can cause anxiety or depression about economic losses, conflicts over water shortages, reduced incomes, fewer recreational activities, higher incidents of heat stroke, and fatality.
Responders	Impacts to responders are unlikely. Exceptional drought conditions may impact the amount of water immediately available to respond to wildfires.
Continuity of Operations (including Continued Delivery of Services)	Drought would have minimal impacts on continuity of operations due to the relatively long warning time that would allow for plans to be made to maintain continuity of operations.
Property, Facilities and Infrastructure	Drought has the potential to affect water supply for residential, commercial, institutional, industrial, and government-owned areas. Drought can reduce water supply in wells and reservoirs. Utilities may be forced to increase rates.
Environment	Environmental impacts include strain on local plant and wildlife; increased probability of erosion and wildfire.
Economic Condition of the Jurisdiction	Farmers may face crop losses or increased livestock costs. Businesses that depend on farming may experience secondary impacts. Extreme drought has the potential to impact local businesses in landscaping, recreation and tourism, and public utilities.
Public Confidence in the Jurisdiction's Governance	When drought conditions persist with no relief, local or State governments must often institute water restrictions, which may impact public confidence.

4.5.3 Earthquake

Hazard Background

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

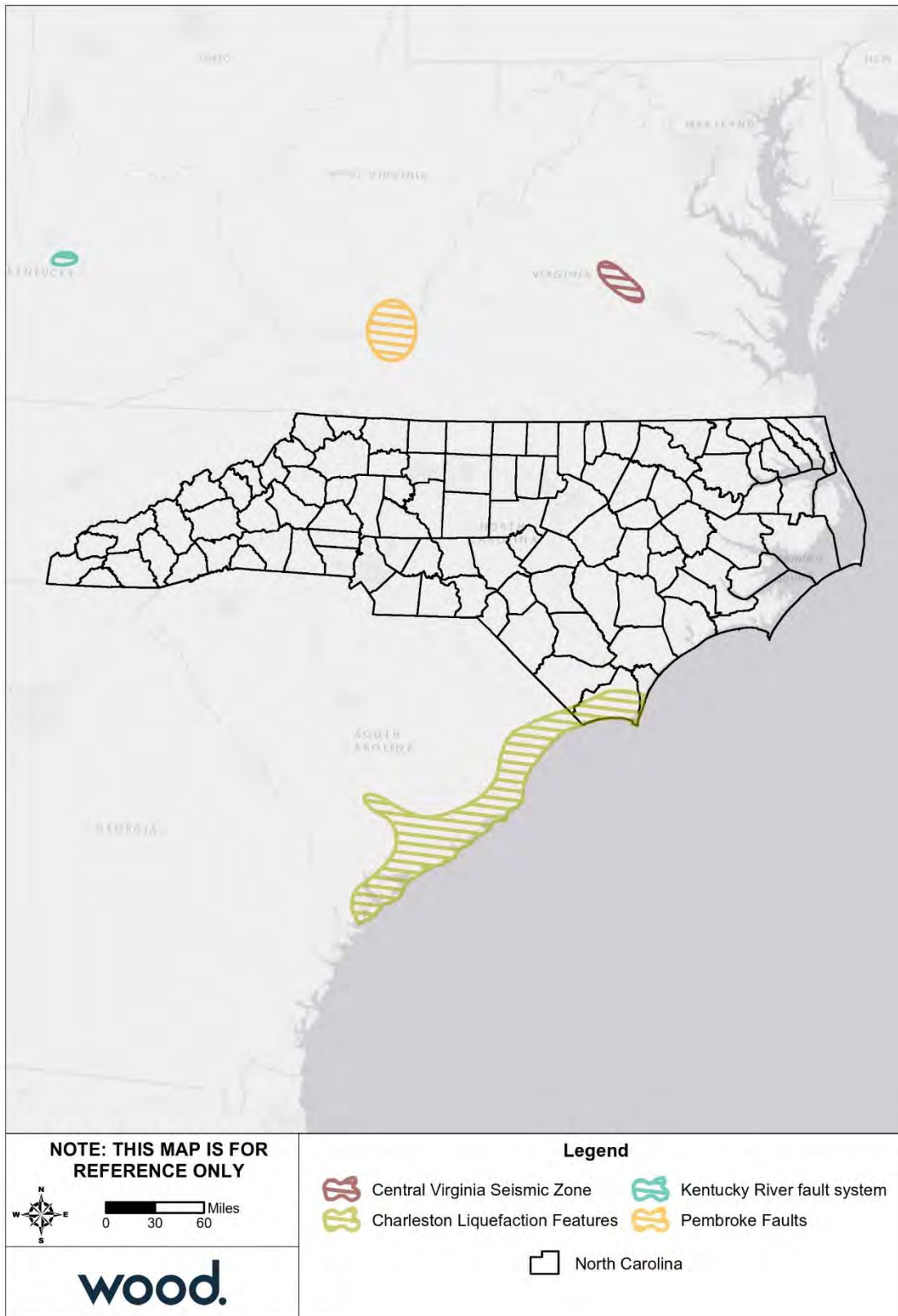
Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

Location

Figure 4.18 reflects the Quaternary fault lines that present an earthquake hazard for the planning area based on data from the USGS Earthquake Hazards Program.

Figure 4.18 – US Quaternary Faults



Source: USGS Earthquake Hazards Program

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

Extent

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. A detailed description of the Richter Scale is given in Table 4.24. Although the Richter scale is usually used by the news media when reporting the intensity of earthquakes and is the scale most familiar to the public, the scale currently used by the scientific community in the United States is called the Modified Mercalli Intensity (MMI) scale. The MMI scale is an arbitrary ranking based on observed effects. Table 4.25 shows descriptions for levels of earthquake intensity on the MMI scale compared to the Richter scale. Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4.24 – Richter Scale

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

Source: FEMA

Table 4.25 – Comparison of Richter Scale and Modified Mercalli Intensity (MMI) Scale

MMI	Richter Scale	Felt Intensity
I	0 – 1.9	Not felt. Marginal and long period effects of large earthquakes.
II	2.0 – 2.9	Felt by persons at rest, on upper floors, or favorably placed.
III	3.0 – 3.9	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV	4.0 – 4.3	Hanging objects swing. Vibration like passing of heavy trucks. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink the upper range of IV, wooden walls and frame creak.
V	4.4 – 4.8	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Pendulum clocks stop, start.
VI	4.9 – 5.4	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Books, etc., fall off shelves. Pictures fall off walls. Furniture moved. Weak plaster and masonry D cracked. Small bells ring. Trees, bushes shaken.
VII	5.5 – 6.1	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Waves on ponds. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
VIII	6.2 – 6.5	Steering of motor cars is affected. Damage to masonry C; partial collapse. Some damage to masonry B. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory

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MMI	Richter Scale	Felt Intensity
		stacks, monuments, towers, elevated tanks. Frame houses moved on foundations. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
IX	6.6 – 6.9	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluvial areas sand and mud ejected, earthquake fountains, sand craters.
X	7.0 – 7.3	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
XI	7.4 – 8.1	Rails bent greatly. Underground pipelines completely out of service.
XII	> 8.1	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown in the air.

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

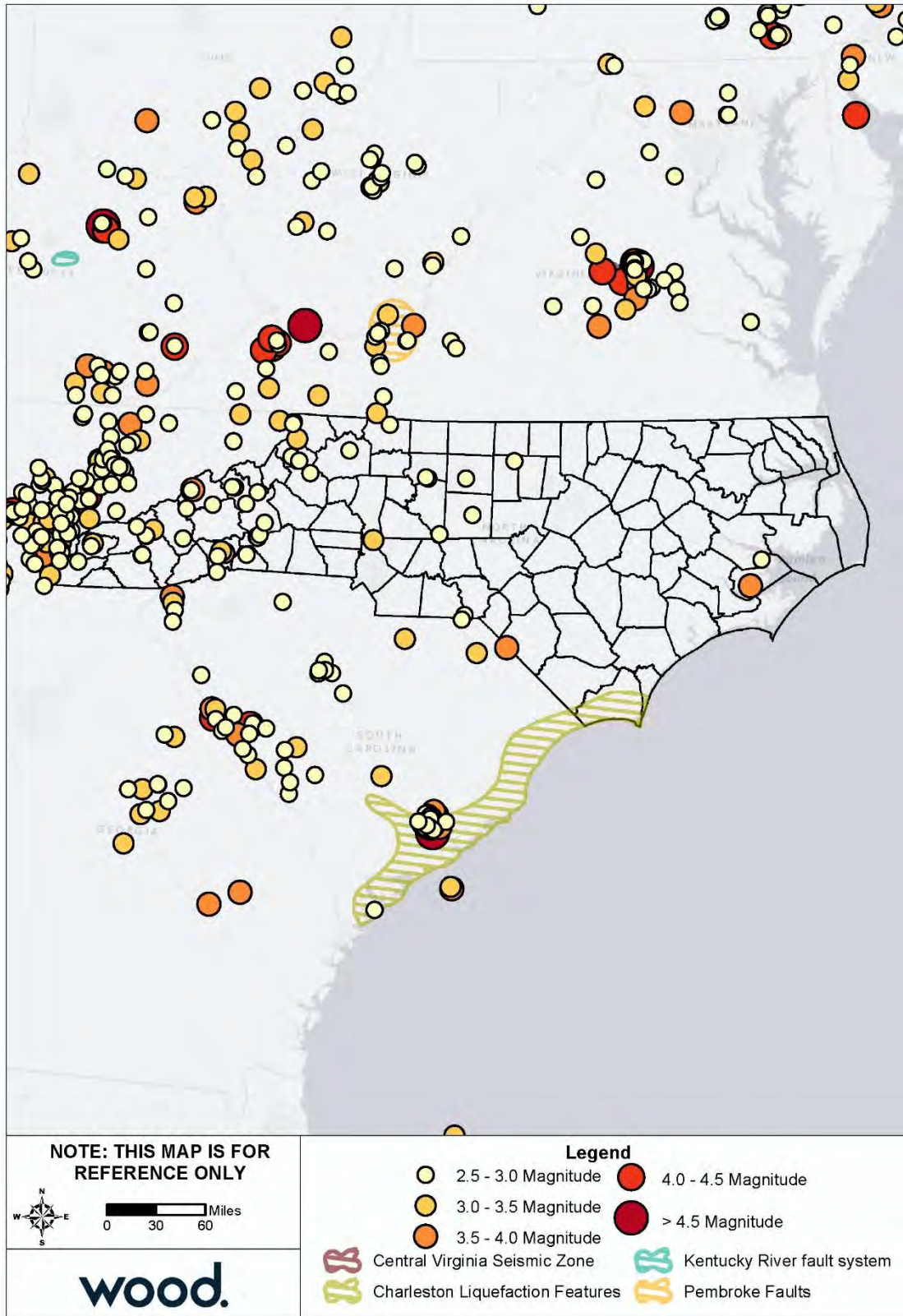
Impact: 1 – Minor

Spatial Extent: 4 – Large

Historical Occurrences

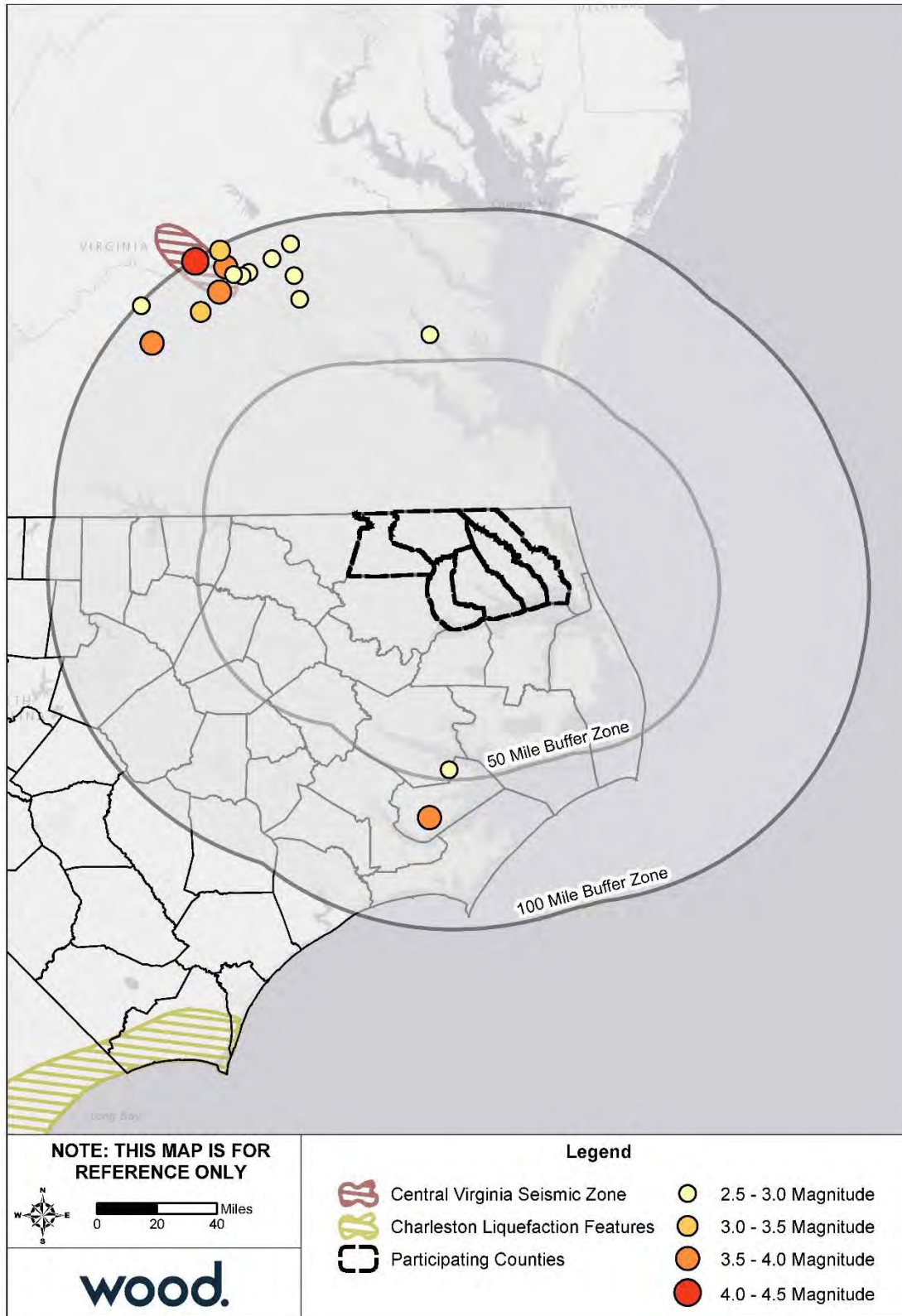
The USGS Earthquake Hazards Program maintains a database of all historical earthquakes of a magnitude 2.5 and greater. These events are illustrated in the following pages. Figure 4.19 shows historical earthquakes by magnitude in relation to North Carolina and the Quaternary Faults identified by USGS. This includes events from 1973 to 2019. Figure 4.20 provides a more detailed view of earthquakes that have occurred within 50 and 100 miles of the Albemarle Region.

Figure 4.19 – Historical Earthquakes by Magnitude, 1973-2019



Source: USGS Earthquakes Hazard Program

Figure 4.20 – Historical Earthquakes, Distance from Albemarle Region, 1973-2019



Source: USGS Earthquakes Hazard Program

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Figure 4.19 documents all earthquakes that have occurred within North Carolina; however, given the long distances across which earthquake impacts can be felt, these events do not encompass all earthquakes that have affected North Carolina. The USGS Earthquake Hazards Program compiles data on a variety of earthquake metrics, including felt impact. According to USGS records, there have been five earthquakes with a felt impact in North Carolina since 1989; none of these events caused impacts in the Albemarle Region.

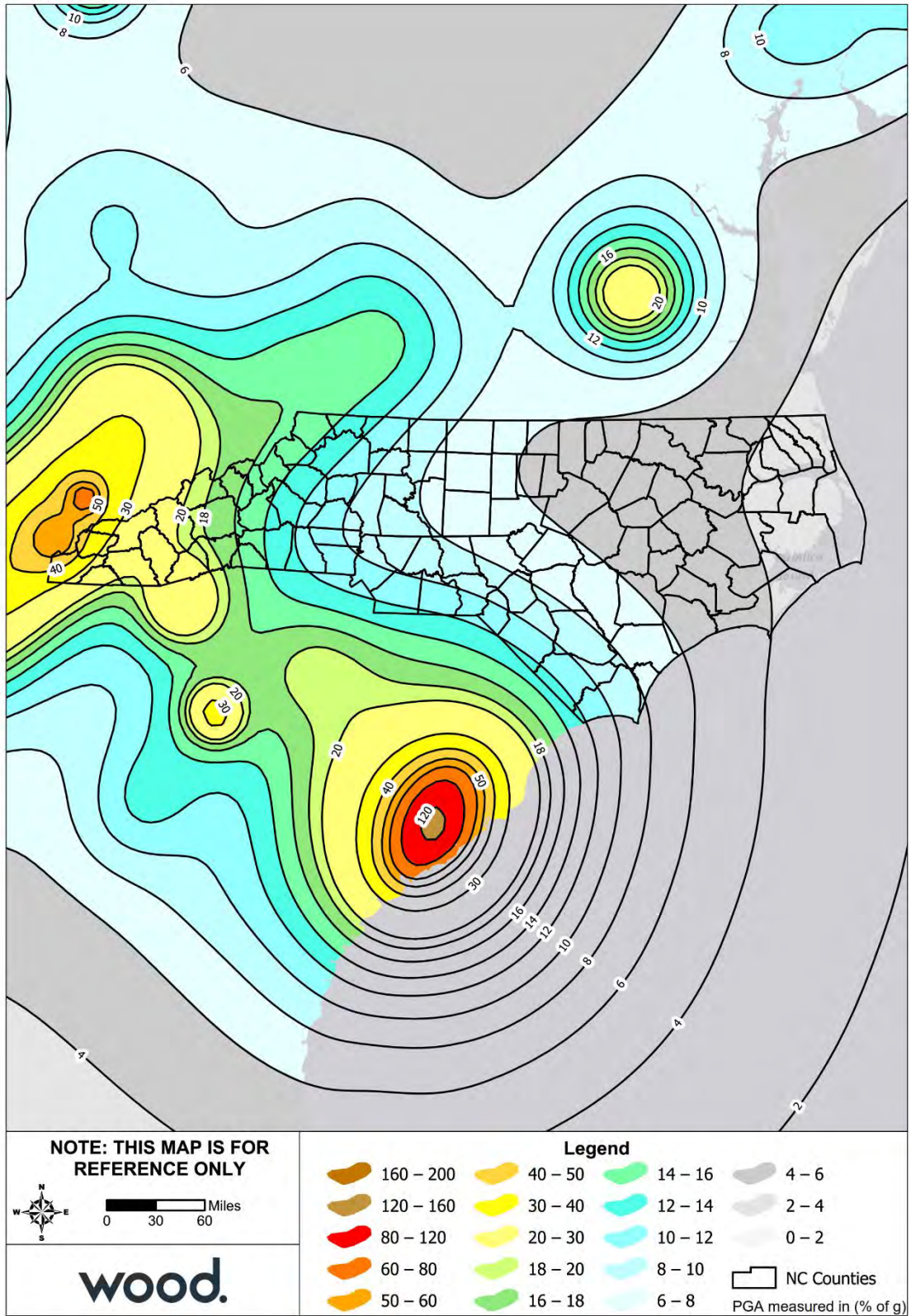
Probability of Future Occurrence

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

Figure 4.21 reflects the seismic hazard for Albemarle Region based on the national USGS map of peak acceleration with two percent probability of exceedance in 50 years. In developing Figure 4.21, the ground motions being considered at a given location are those from all future possible earthquake magnitudes at all possible distances from that location. The ground motion coming from a particular magnitude and distance is assigned an annual probability equal to the annual probability of occurrence of the causative magnitude and distance. The method assumes a reasonable future catalog of earthquakes, based upon historical earthquake locations and geological information on the recurrence rate of fault ruptures. When all the possible earthquakes and magnitudes have been considered, a ground motion value is determined such that the annual rate of its being exceeded has a certain value.

Therefore, for the given probability of exceedance, two percent, the locations shaken more frequently will have larger ground motions. The Albemarle Region is located primarily within the light gray zones, though the majority of Hertford County is in the dark gray zone; this represents a 2% chance that in 50 years, the region will see 2% - 6% g, which is a low peak acceleration.

Figure 4.21 – Seismic Hazard Information for North Carolina



Source: USGS Earthquake Hazards Program

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Based on this data, it can be reasonably assumed that an earthquake event affecting the Region is unlikely.

Probability: 1 – Unlikely

Climate Change

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

Vulnerability Assessment

Methodologies and Assumptions

Population and property at risk to flooding was estimated using data from the NCEM IRISK database, which was compiled in NCEM’s Risk Management Tool.

People

Earthquake events in the counties of the Albemarle Region are unlikely to produce more than mild ground shaking; therefore, injury or death is unlikely. Objects falling from shelves generally pose the greatest threat to safety.

Table 4.26 and Table 4.27 detail the population estimated to be at risk from a 250-year earthquake and a 500-year earthquake, respectively, according to the NCEM IRISK database.

Table 4.26 – Estimated Population Impacted by 250-Year Earthquake

Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Camden	9,954	0	0%	1,280	0	0%	593	0	0%
Chowan	9,056	0	0%	1,780	0	0%	538	0	0%
Edenton	5,743	0	0%	1,128	0	0%	341	0	0%
Gates	11,902	0	0%	1,788	0	0%	679	0	0%
Gatesville	287	0	0%	43	0	0%	16	0	0%
Hertford	13,318	0	0%	2,105	0	0%	764	0	0%
Ahoskie	5,625	0	0%	889	0	0%	323	0	0%
Como	91	0	0%	14	0	0%	5	0	0%
Harrellsville	106	0	0%	17	0	0%	6	0	0%
Murfreesboro	4,348	0	0%	687	0	0%	249	0	0%
Winton	759	0	0%	120	0	0%	44	0	0%
Cofield	413	0	0%	65	0	0%	24	0	0%
Pasquotank	20,040	0	0%	2,718	0	0%	1,328	0	0%
Elizabeth City	20,614	0	0%	2,795	0	0%	1,366	0	0%
Perquimans	10,361	0	0%	2,223	0	0%	574	0	0%
Hertford	2,406	0	0%	516	0	0%	133	0	0%

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Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Winfall	688	0	0%	148	0	0%	38	0	0%
Total	115,711	0	0%	18,316	0	0%	7,021	0	0%

Source: NCEM Risk Management Tool

Table 4.27 – Estimated Population Impacted by 500-Year Earthquake

Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Camden	9,954	2,015	20.2%	1,280	259	20.2%	593	120	20.2%
Chowan	9,056	4,766	52.6%	1,780	937	52.6%	538	283	52.6%
Edenton	5,743	1,281	22.3%	1,128	252	22.3%	341	76	22.3%
Gates	11,902	8,492	71.3%	1,788	1,276	71.4%	679	484	71.3%
Gatesville	287	287	100%	43	43	100%	16	16	100%
Hertford	13,318	13,318	100%	2,105	2,105	100%	764	764	100%
Ahoskie	5,625	5,625	100%	889	889	100%	323	323	100%
Como	91	91	100%	14	14	100%	5	5	100%
Harrellsville	106	106	100%	17	17	100%	6	6	100%
Murfreesboro	4,348	4,348	100%	687	687	100%	249	249	100%
Winton	759	759	100%	120	120	100%	44	44	100%
Cofield	413	413	100%	65	65	100%	24	24	100%
Pasquotank	20,040	6,903	34.4%	2,718	936	34.4%	1,328	457	34.4%
Elizabeth City	20,614	5,069	24.6%	2,795	687	24.6%	1,366	336	24.6%
Perquimans	10,361	3,888	37.5%	2,223	834	37.5%	574	215	37.5%
Hertford	2,406	714	29.7%	516	153	29.7%	133	39	29.3%
Winfall	688	172	25%	148	37	25%	38	9	23.7%
Total	115,711	58,247	50%	18,316	9,311	51%	7,021	3,450	49%

Source: NCEM Risk Management Tool

Property

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

Earthquakes can also cause damages to infrastructure, resulting in secondary hazards. Damages to dams or levees could cause failures and subsequent flooding. Fires can be started by broken gas lines and power lines. Fires can be a serious problem, especially if the water lines that feed the fire hydrants have been damaged as well.

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There are no records of the Albemarle Region being impacted by an earthquake with more than a low intensity, so damage to the built environment is unlikely.

Table 4.28 and Table 4.29 detail the estimated buildings impacted from varying magnitudes of earthquake events.

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Table 4.28 – Estimated Buildings Impacted by 250-Year Earthquake Event

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	0	0.00%	\$0	0	0.00%	\$0	0	0.00%	\$0	0	0%	\$0
Chowan	6,314	0	0.00%	\$0	29	0.50%	\$110	2	0%	\$2	31	0.50%	\$112
Edenton	2,976	0	0.00%	\$0	15	0.50%	\$357	0	0.00%	\$0	15	0.50%	\$357
Gates	6,637	0	0.00%	\$0	35	0.50%	\$447	0	0%	\$0	35	0.50%	\$447
Gatesville	204	0	0%	\$0	2	1.00%	\$12	3	2%	\$16	5	2.50%	\$28
Hertford	8,307	0	0.00%	\$0	41	1%	\$1,610	13	0%	\$143	54	0.70%	\$1,753
Ahoskie	2,744	0	0.00%	\$0	42	2%	\$581	8	0%	\$78	50	1.80%	\$659
Como	91	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Harrellsville	100	0	0%	\$0	0	0%	\$0	1	1%	\$2	1	1%	\$2
Murfreesboro	2,275	0	0.00%	\$0	32	1%	\$512	10	0%	\$31	42	1.80%	\$543
Winton	479	0	0%	\$0	10	2%	\$859	5	1%	\$193	15	3%	\$1,052
Cofield	287	0	0%	\$0	23	8%	\$370	0	0%	\$0	23	8%	\$370
Pasquotank	10,460	0	0.00%	\$0	7	0.10%	\$57	0	0%	\$0	7	0.10%	\$57
Elizabeth City	8,713	0	0.00%	\$0	24	0.30%	\$103	0	0%	\$0	24	0%	\$103
Perquimans	6,255	0	0%	\$0	1	0.00%	\$21	0	0%	\$0	1	0.00%	\$21
Hertford	1,224	0	0.00%	\$0	0	0.00%	\$0	0	0%	\$0	0	0.00%	\$0
Winfall	419	0	0.00%	\$0	0	0.00%	\$0	0	0%	\$0	0	0.00%	\$0
Total	62,884	0	0.0%	\$0	261	0.4%	\$5,039	42	0.1%	\$465	303	0.5%	\$5,504

Source: NCEM Risk Management Tool

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Table 4.29 – Estimated Buildings Impacted by 500-Year Earthquake Event

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	931	17.20%	\$3,355	631	11.70%	\$3,649	144	2.70%	\$9,721	1,706	32%	\$16,726
Chowan	6,314	2,724	43.10%	\$12,991	1,049	16.60%	\$28,038	70	1%	\$13,607	3,843	60.90%	\$54,637
Edenton	2,976	531	17.80%	\$9,462	404	13.60%	\$41,063	104	3.50%	\$17,755	1,039	34.90%	\$68,281
Gates	6,637	3,326	50.10%	\$16,180	1,814	27.30%	\$39,135	145	2%	\$21,935	5,285	79.60%	\$77,250
Gatesville	204	132	65%	\$642	44	21.60%	\$2,500	28	14%	\$4,313	204	100.00%	\$7,455
Hertford	8,307	6,618	79.70%	\$34,451	1,519	18%	\$53,036	126	2%	\$23,767	8,263	99.50%	\$111,254
Ahoskie	2,744	2,313	84.30%	\$16,845	313	11%	\$58,535	102	4%	\$12,806	2,728	99.40%	\$88,185
Como	91	62	68%	\$232	25	28%	\$530	3	3%	\$210	90	99%	\$972
Harrellsville	100	85	85%	\$232	8	8%	\$193	6	6%	\$386	99	99%	\$812
Murfreesboro	2,275	2,009	88.30%	\$13,318	183	8%	\$17,747	76	3%	\$21,191	2,268	99.70%	\$52,256
Winton	479	399	83%	\$2,455	33	7%	\$16,088	43	9%	\$9,255	475	99%	\$27,798
Cofield	287	233	81%	\$778	47	16%	\$7,151	3	1%	\$138	283	99%	\$8,067
Pasquotank	10,460	3,124	29.90%	\$15,307	1,123	10.70%	\$46,427	183	2%	\$28,617	4,430	42.40%	\$90,351
Elizabeth City	8,713	1,807	20.70%	\$13,287	914	10.50%	\$58,306	243	3%	\$23,739	2,964	34%	\$95,332
Perquimans	6,255	2,186	35%	\$15,728	188	3.00%	\$13,473	127	2%	\$19,565	2,501	40.00%	\$48,766
Hertford	1,224	296	24.20%	\$3,936	133	10.90%	\$8,987	61	5%	\$8,707	490	40.00%	\$21,630
Winfall	419	88	21.00%	\$609	31	7.40%	\$1,296	25	6%	\$2,564	144	34.40%	\$4,470
Total	62,884	26,864	42.7%	\$159,808	8,459	13.5%	\$396,154	1,489	2.4%	\$218,276	36,812	58.5%	\$774,242

Source: NCEM Risk Management Tool

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Environment

An earthquake is unlikely to cause substantial impacts to the natural environment in the Region. Impacts to the built environment (e.g. ruptured gas line) could damage the surrounding environment. However, this type damage is unlikely based on historical occurrences.

Consequence Analysis

Table 4.30 summarizes the potential negative consequences of earthquake.

Table 4.30 – Consequence Analysis - Earthquake

Category	Consequences
Public	Impact expected to be severe for people who are unprotected or unable to take shelter; moderate to light impacts are expected for those who are protected.
Responders	Responders may be required to enter unstable structures or compromised infrastructure. Adverse impacts are expected to be severe for unprotected personnel and moderate to light for protected personnel.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel in the area of the incident may require relocation of operations and lines of succession execution. Disruption of lines of communication and destruction of facilities may extensively postpone delivery of services.
Property, Facilities and Infrastructure	Damage to facilities and infrastructure in the area of the incident may be extensive for facilities, people, infrastructure, and HazMat.
Environment	May cause extensive damage, creating denial or delays in the use of some areas. Remediation may be needed.
Economic Condition of the Jurisdiction	Local economy and finances expected to be adversely affected, possibly for an extended period of time.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective.

4.5.4 Erosion

Hazard Background

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

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

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

Warning Time: 1 – More than 24 hours

Duration: 1 – Less than 6 hours

Location

Erosion can occur along any shoreline in the region. While erosion is likely to be more frequent and severe along the Atlantic coast, erosion of the estuarine shoreline can also occur. Per an NC Sea Grant report on estuarine erosion, “erosion is ubiquitous and can be locally severe with man areas showing recession far in excess of the average for North Carolina estuaries.”

Historical Occurrences

Though it can be exacerbated by major storms, erosion is an ongoing occurrence. Pasquotank and Camden Counties have primarily low-bank shorelines for which erosion is typically very severe. High-bank shorelines are more common in Chowan and Perquimans Counties for which erosion rates are high.

Extent

The magnitude of erosion can be measured as a rate of change from a measured previous condition. As part of their Digital Shoreline Analysis System version 4.3, USGS has developed short and long-term linear regression rate calculations as a metric for shoreline change, measured in meters per year.

Impact: 1 – Minor

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Spatial Extent: 1 – Negligible

Probability of Future Occurrence

Erosion and accretion are natural processes that are likely to continue to occur. The likelihood of significant instances of erosion will likely be tied to the occurrence of hurricane, tropical storm, and nor'easter events. Based on the likely probability of these storm events, erosion can be considered likely to occur as well.

Probability: 3 – Likely

Climate Change

As discussed under Climate Change in Section 4.5.6 and Section 4.5.7, climate change is expected to make heavy rain events and tropical storms and hurricanes more frequent and intense. As a result, the erosion typically caused by these storms can be expected to occur more frequently. Coastal erosion is also expected to increase as a result of rising seas. A 2018 study found that globally, between 1984 and 2015 erosion outweighed accretion. However, the study could not conclude the degree to which erosion during this period is attributed to climate changes or increased coastal development. Nonetheless, increases in erosion have been observed and are expected to continue.

Vulnerability Assessment

People

Erosion is unlikely to have any direct impact on the health or safety of individuals. However, it may cause indirect harm by weakening structures and by changing landscapes in ways that increase risk of other hazard impacts. For example, streambank erosion can cause sedimentation that decreases the stream's capacity and forces floodwaters to overtop the banks.

Property

Property damage due to erosion typically only results in conjunction with large storm events which also bring wind and water damages. These events can cause scour and weaken foundations, which may undermine affected buildings' structural integrity.

Environment

Erosion can change the shape and characteristics of coastal shorelines and riverine floodplains. Eroded material may clog waterways and decrease drainage capacity. Erosion can also negatively impact water quality by increasing sediment loads in waterways.

Consequence Analysis

Table 4.31 summarizes the potential negative consequences of erosion.

Table 4.31 – Consequence Analysis – Erosion

Category	Consequences
Public	Erosion is unlikely to impact public health and safety.
Responders	Erosion is unlikely to require immediate response or rescue operations.
Continuity of Operations (including Continued Delivery of Services)	Coastal erosion is unlikely to impact public continuity of operations.
Property, Facilities and Infrastructure	Erosion can result in property damage if it is severe enough or if scour occurs that undermines the integrity of structural foundations.

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Category	Consequences
Environment	Erosion can increase sediment loads in waterbodies and change riverine and coastal topography.
Economic Condition of the Jurisdiction	Severe erosion can negatively impact tourist economies. Dredging projects to counter sedimentation buildup from erosion are costly.
Public Confidence in the Jurisdiction's Governance	Coastal erosion is unlikely to impact public confidence.

4.5.5 Extreme Heat

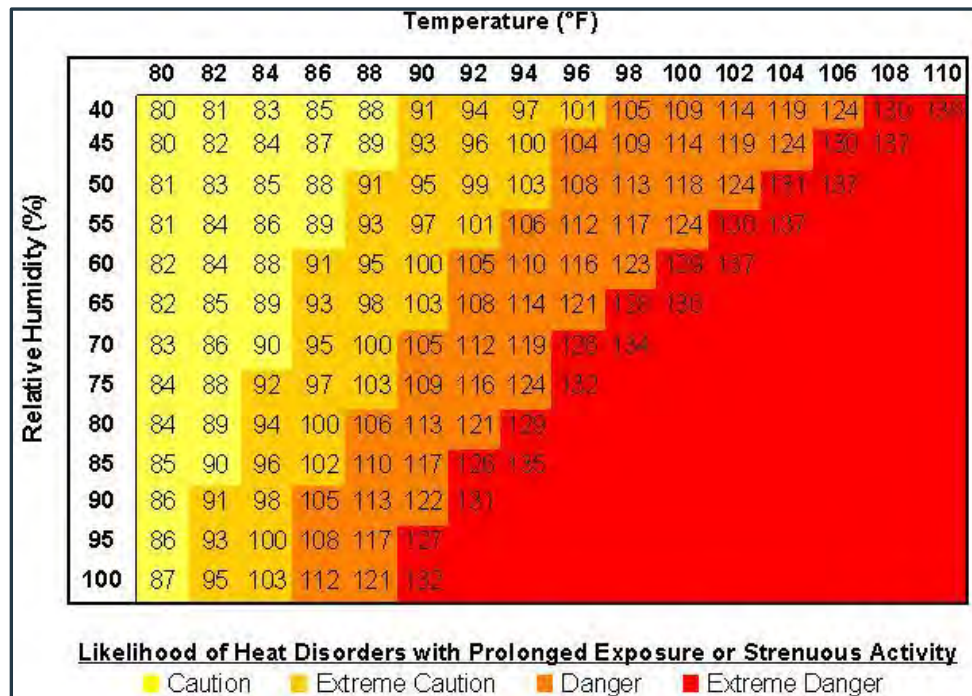
Hazard Background

Per information provided by FEMA, in most of the United States extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. In extreme heat, evaporation is slowed and the body must work extra hard to maintain a normal temperature, which can lead to death by overwork of the body. Extreme heat often results in the highest annual number of deaths among all weather-related disasters. Per Ready.gov:

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

Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index Chart in Figure 4.22 uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Figure 4.22 – Heat Index Chart



Source: National Weather Service (NWS) http://www.nws.noaa.gov/os/heat/heat_index.shtml

Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a heat index that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

During these conditions, the human body has difficulties cooling through the normal method of the evaporation of perspiration. Health risks rise when a person is over exposed to heat.

The most dangerous place to be during an extreme heat incident is in a permanent home, with little or no air conditioning. Those at greatest risk for heat-related illness include people 65 years of age and older, young children, people with chronic health problems such as heart disease, people who are obese, people who are socially isolated, and people who are on certain medications, such as tranquilizers, antidepressants, sleeping pills, or drugs for Parkinson’s disease. However, even young and healthy

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individuals are susceptible if they participate in strenuous physical activities during hot weather or are not acclimated to hot weather. Table 4.32 lists typical symptoms and health impacts of exposure to extreme heat.

Table 4.32 – Typical Health Impacts of Extreme Heat

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

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

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

Impacts of extreme heat are not only focused on human health, as prolonged heat exposure can have devastating impacts on infrastructure as well. Prolonged high heat exposure increases the risk of pavement deterioration, as well as railroad warping or buckling. High heat also puts a strain on energy systems and consumption, as air conditioners are run at a higher rate and for longer; extreme heat can also reduce transmission capacity over electric systems.

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than one week

Location

Historically, extreme heat is a regional hazard. The entire planning area is susceptible to high temperatures and incidents of extreme heat and indeed the vast majority of the planning area would suffer some level of impact from the same event. In extreme heat incidents recorded in 2011 and 2012, all six counties in the region experienced its impacts concurrently.

Extent

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

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

The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in the Albemarle Region is 107 degrees Fahrenheit in Elizabeth City, Pasquotank County in July 1942. The entire planning area is susceptible to high temperatures and extreme heat.

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Table 4.33 – Maximum Temperatures Recorded by County

County	Maximum Temperature Recorded	Location	Date of Record
Camden County	No weather stations with data in this county		
Chowan County	105° F	Edenton	July 18, 1942
Gates County	No weather stations with data in this county		
Hertford County	105° F	Murfreesboro	July 11, 1993
Pasquotank County	107° F	Elizabeth City	July 18, 1942
Perquimans County	No weather stations with data in this county		

Source: North Carolina Climate Office

Impact: 1 – Minor

Spatial Extent: 4 – Large

Historical Occurrences

According to the National Oceanic and Atmospheric Administration (NOAA), 2017 was North Carolina’s hottest year on record; that record stretches back 123 years to 1895.

The NCEI reports 13 heat incidents across the Albemarle Region between 1998 and 2018; these incidents caused one fatality, no injuries, and no property or crop damage. The narratives included for these incidents indicate that hot and humid conditions with high temperatures and heat index values between 105 and 109 degrees resulted in the death of a 73-year-old male in Chowan County in July 2016.

Probability of Future Occurrence

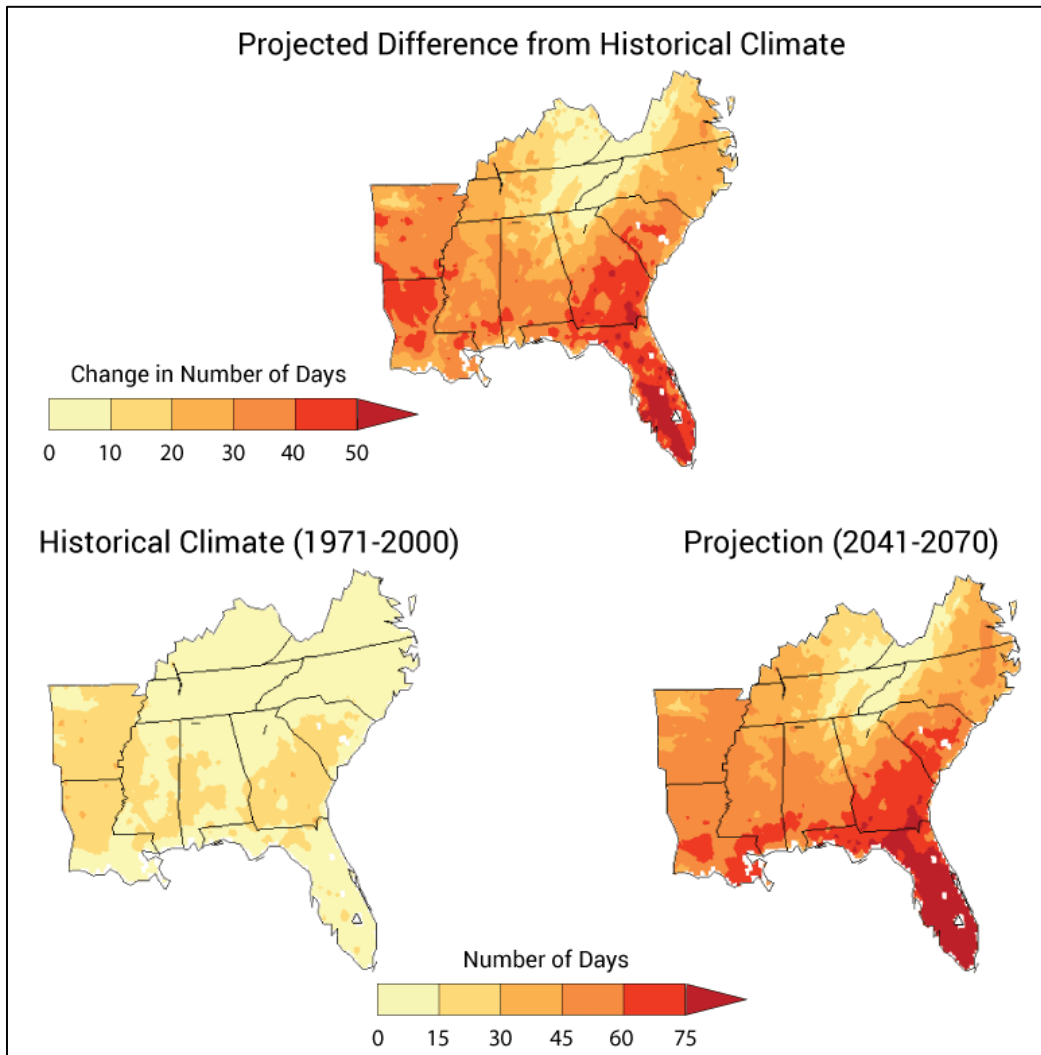
Data was gathered from the North Carolina State Climate Office’s Climate Thresholds Tool using the Edenton, NC weather station as an approximation for the counties in the Albemarle Region. Based on 125 years of available data, the Region averages 2.875 days per year with a high temperature above 100°F. In both 1933 and 1942, there were eight days with recorded temperatures above this threshold.

Probability: 4 – Highly Likely

Climate Change

Research shows that average temperatures will continue to rise in the Southeast United States and globally, directly affecting the region in North Carolina. Per the Fourth National Climate Assessment, “extreme temperatures are projected to increase even more than average temperatures. Cold waves are projected to become less intense and heat waves more intense.” The number of days over 95°F is expected to increase by between 20 and 30 days annually, as shown in Figure 4.23.

Figure 4.23 – Projected Change in Number of Days Over 95°F



Source: NOAA NCDC from 2014 National Climate Assessment

Vulnerability Assessment

Methodologies and Assumptions

No data is available to assess the vulnerability of people or property in the planning area to extreme heat.

People

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

Property

Extreme heat is unlikely to cause significant damages to the built environment. However, road surfaces can be damaged as asphalt softens, and concrete sections may buckle under expansion caused by heat. Train rails may also distort or buckle under the stress of heat induced expansion. Power transmission lines may sag from expansion and if contact is made with vegetation the line may short out causing power

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outages. Additional power demand for cooling also increases power line temperature adding to heat impacts.

Extreme heat can also cause significant agricultural losses. Between 2007-2017, the sum of claims paid for crop damage due to heat in the Albemarle Region was \$1,545,578.35, impacting 5,414.16 acres and causing an average of \$140,507 in losses each year. The most impactful year by indemnity was 2010, when wheat, cotton, corn, peanuts, soybeans, flue cured tobacco, cabbage and potato crops were all damaged by heat, though Camden County did not receive any indemnities during the year.

Table 4.34 summarizes the crop losses due to drought in reported in the RMA system.

Table 4.34 – Regional Crop Losses Resulting from Heat, 2007-2017

Year	Determined Acres	Indemnity Amount
2007	40.54	\$7,254.00
2008	74.94	\$2,034.00
2009	52.34	\$21,341.00
2010	1,247.01	\$459,621.00
2011	677.84	\$41,431.00
2012	749.90	\$135,032.00
2013	-	-
2014	90.82	\$12,383.65
2015	1,517.15	\$302,537.90
2016	722.74	\$367,452.05
2017	241.18	\$196,491.75
Total	5,414.46	\$1,545,578.35

Source: USDA Risk Management Agency

Environment

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

Consequence Analysis

Table 4.35 summarizes the potential negative consequences of extreme heat.

Table 4.35 – Consequence Analysis – Extreme Heat

Category	Consequences
Public	Extreme heat may cause illness and/or death.
Responders	Consequences may be greater for responders if their work requires exertion and/or wearing heavy protective gear.
Continuity of Operations (including Continued Delivery of Services)	Continuity of operations is not expected to be impacted by extreme heat because warning time for these events is long.
Property, Facilities and Infrastructure	Minor impacts may occur, including possible damages to road surfaces and power lines.
Environment	Environmental impacts include strain on local plant and wildlife, including potential for illness or death.
Economic Condition of the Jurisdiction	Farmers may face crop losses or increased livestock costs.
Public Confidence in the Jurisdiction's Governance	Extreme heat is unlikely to impact public confidence.

Albemarle Region

Regional Hazard Mitigation Plan
2020

4.5.6 Flood

Hazard Background

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

Sources and Types of Flooding

Flooding within the Albemarle Region can be attributed to three main sources as noted below.

Riverine Flooding: During heavy rainfall events, the primary riverine flooding sources in the Albemarle Region are as follows, per each county's effective Flood Insurance Study:

- ▶ **Camden County:** Joyce Creek and tributaries, Areneuse Creek, Dismal Swamp Canal, Mill Dam Creek and tributaries, Run Swamp Canal, Sawyers Creek and tributaries, and Pasquotank River.
- ▶ **Chowan County:** Pembroke Creek and tributaries, Filberts Creek, Queen Anne Creek and tributaries, Rockyhock Creek and tributaries, Burnt Mill Creek, and Goodwin Mill Creek
- ▶ **Gates County:** Acorn Hill Millpond, Bennetts Creek and tributaries, Blackwater River, Beaverdam Creek and tributaries, Buckland Mill Branch and tributaries, Catherine Creek, Chowan River, Cole Creek and tributaries, Corapeake Swamp and tributaries, Cypress Swamp, Duke Swamp and tributaries, Ellis Swamp and tributaries, Flat Branch, Folly Swamp and tributaries, Goodman Swamp and tributaries, Goose Creek tributaries, Gum Branch, Hackley Swamp and tributaries, Harrell Swamp, Jady Branch, Jernigan Branch, Licking Branch, Middle Swamp, Mill Branch, Mill Swamp and tributaries, Perquimans River, Raynor Swamp and tributaries, Sarem Creek, Somerton Creek, Taylor Mill Pond, Taylor Swamp and tributaries, Trotman Creek and tributaries, Walton Pond, and Warwick Creek.
- ▶ **Hertford County:** Ahoskie Creek and tributaries, Chowan River and tributaries, Long Branch and tributaries, Mill Branch and tributaries, Meherrin River tributaries, Wiccacon River and tributaries, and other streams.
- ▶ **Pasquotank County:** Knobbs Creek, Knobbs Creek Tributary, and Little River
- ▶ **Perquimans County:** Little and Perquimans Rivers

These rivers and their tributaries are susceptible to overflowing their banks during and following excessive precipitation events. Though less common, riverine flood events (such as the "1%-annual-chance flood") will cause significantly more damage and economic disruption for the area than incidences of localized stormwater flooding.

Coastal Flooding: All lands bordering the coast along the Atlantic Ocean and in low-lying coastal plains are susceptible to tidal effects and flooding. Coastal land such as sand bars, barrier islands and deltas provide a buffer zone to help protect human life and real property relative to the sea much as flood plains provide a buffer zone along rivers and other bodies of water. Coastal floods usually occur because of abnormally high tides or tidal waves, storm surge and heavy rains in combination with high tides, and tropical storms and hurricanes.

Wind-driven surge generated in the Atlantic Ocean and pushed into Albemarle Sound and other waters is a primary source of flooding in the Region. The areas beyond the Sound that are susceptible to surge flooding are summarized from each county's FIS as follows:

- ▶ **Camden County:** North River, Pasquotank River, Sawyers Creek
- ▶ **Chowan County:** Chowan River, Pembroke Creek, Trotman Creek

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- ▶ **Gates County:** Chowan River
- ▶ **Pasquotank County:** Charles Creek, Knobbs Creek, Knobbs Creek Tributary, Little River, and Pasquotank River
- ▶ **Perquimans County:** Yeopim River and the downstream portions of Perquimans and Little Rivers

Several of the waterbodies vulnerable to coastal flooding are also susceptible to riverine flooding, indicating the potential for compounding risk when hurricane and tropical storm events bring both coastal surge and heavy rainfall.

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

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

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns.

Localized flooding may be caused by the following issues:

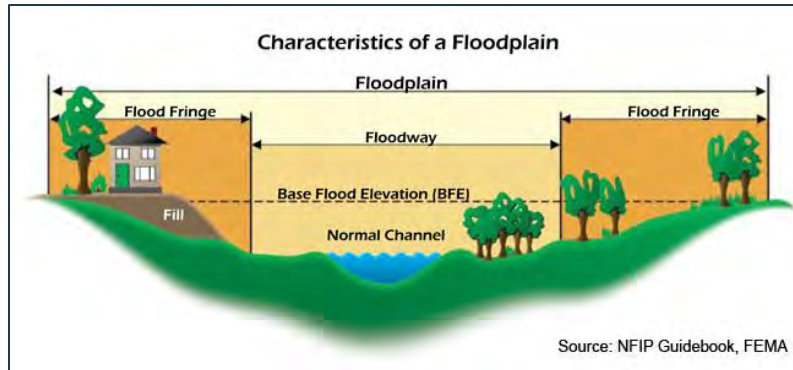
- ▶ **Inadequate Capacity** – An undersized/under capacity pipe system can cause water to back-up behind a structure which can lead to areas of ponded water and/or overtopping of banks.
- ▶ **Clogged Inlets** – Debris covering the asphalt apron and the top of grate at catch basin inlets may contribute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

Flooding and Floodplains

In the case of riverine flooding, the area adjacent to a channel is the floodplain, as shown in **Figure 4.24**. A floodplain is flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but which do not experience a

strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited that gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the bed of the stream.

Figure 4.24 – Characteristics of a Floodplain



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

The 100-year flood, which is the minimum standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. Participation in the NFIP requires adoption and enforcement of a local floodplain management ordinance which is intended to prevent unsafe development in the floodplain, thereby reducing future flood damages. Participation in the NFIP allows for the federal government to make flood insurance available within the community as a financial protection against flood losses. Since floods have an annual probability of occurrence, have a known magnitude, depth and velocity for each event, and in most cases, have a map indicating where they will likely occur, they are in many ways often the most predictable and manageable hazard.

Warning Time: 3 – 6 to 12 hours

Duration: 3 – Less than one week

Location

Areas at risk of flooding occur throughout the planning area. Figure 4.25 through Figure 4.30 reflect the effective mapped flood insurance zones for the counties in the Albemarle Region.

Figure 4.25 – FEMA Flood Hazard Areas in Camden County

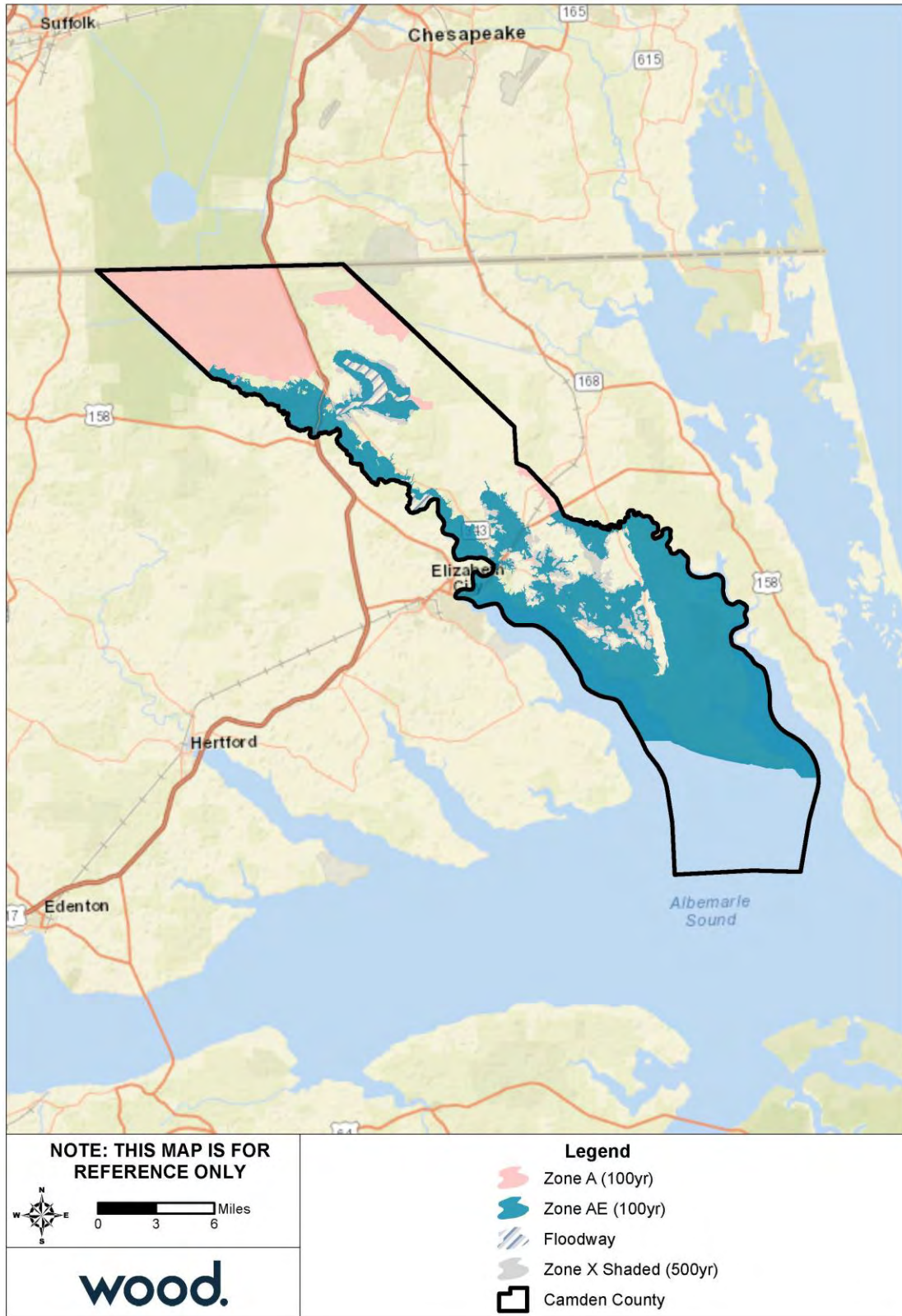
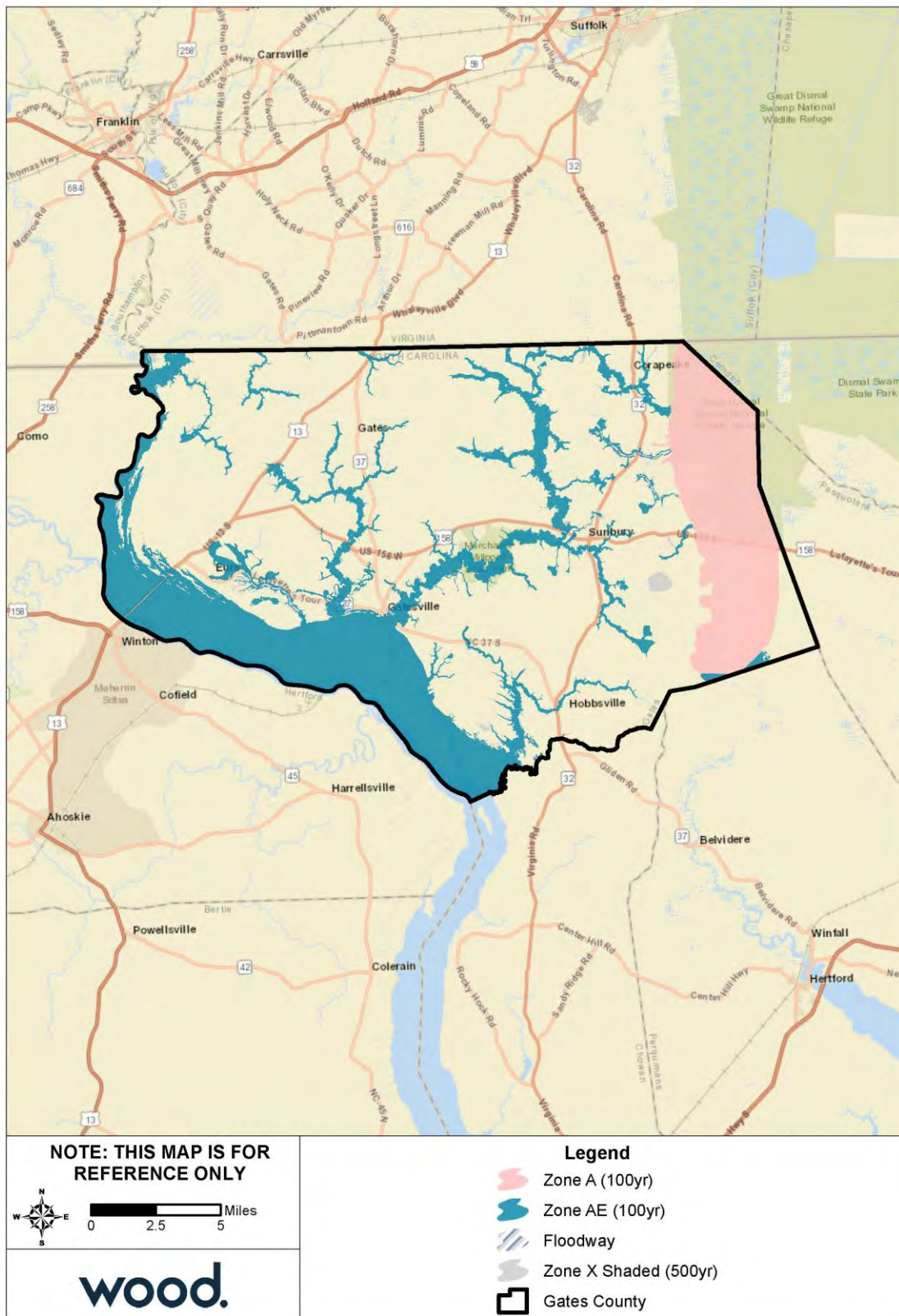


Figure 4.26 – FEMA Flood Hazard Areas in Chowan County



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Figure 4.27 – FEMA Flood Hazard Areas in Gates County



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Figure 4.28 – FEMA Flood Hazard Areas in Hertford County

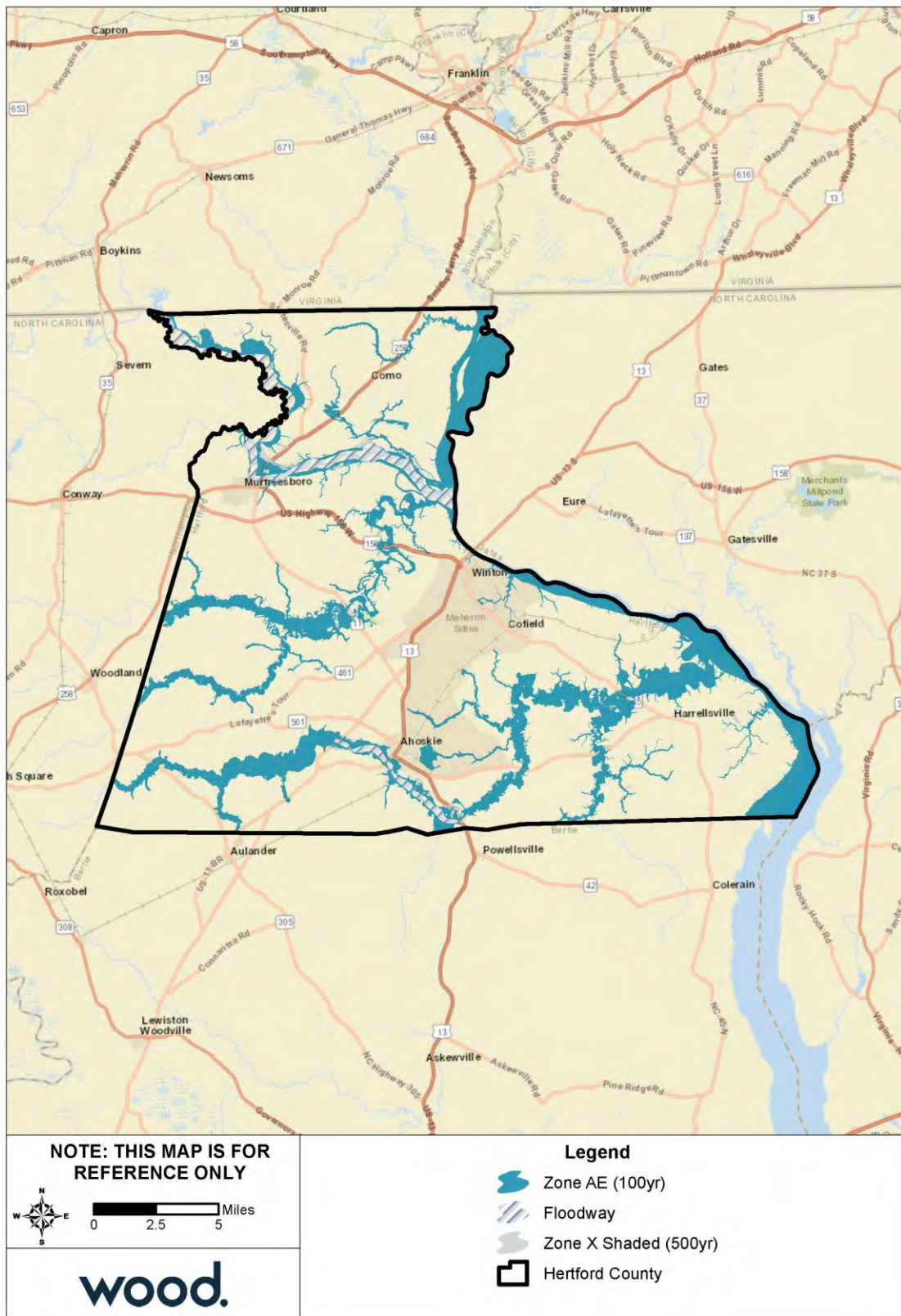
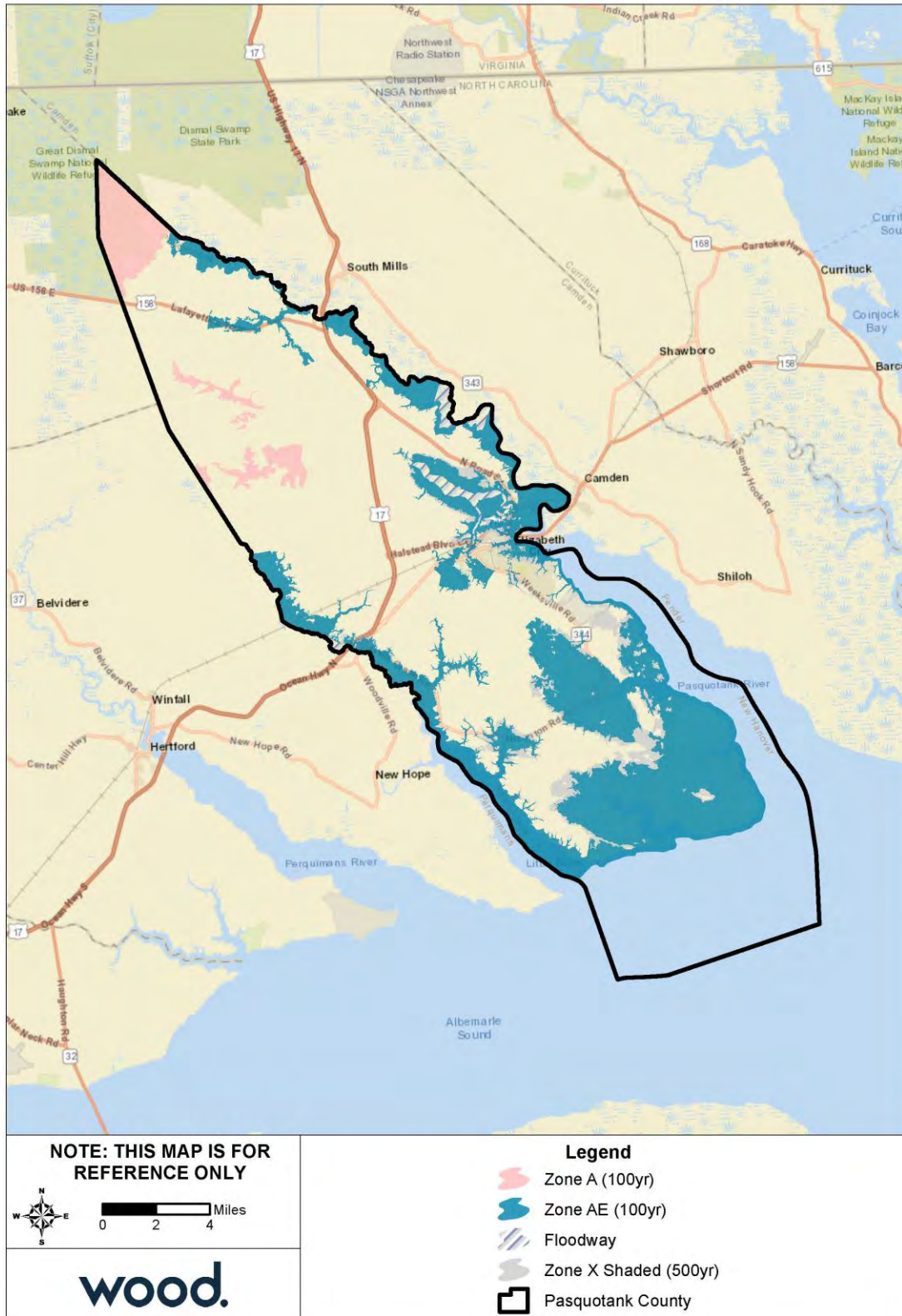
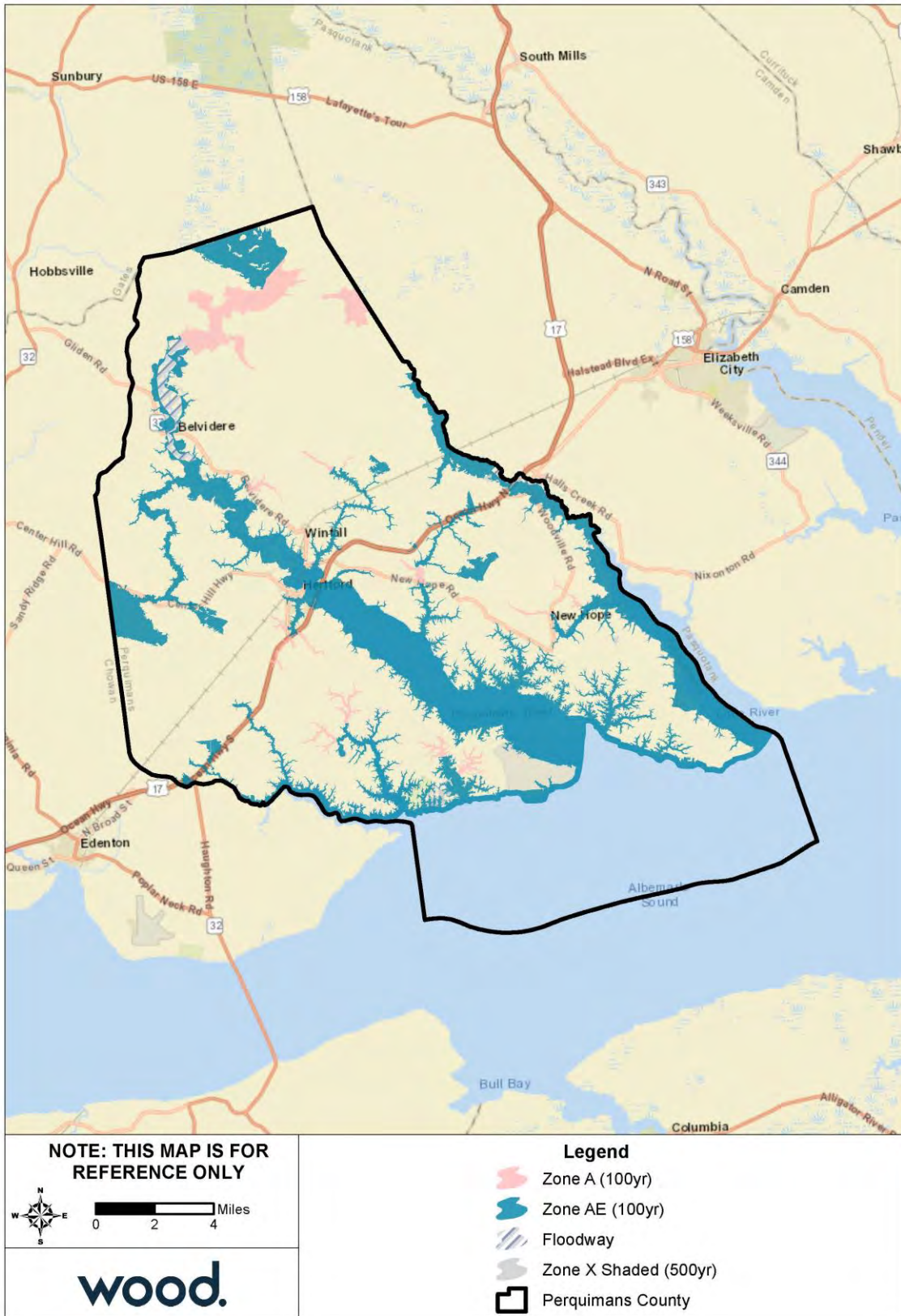


Figure 4.29 – FEMA Flood Hazard Areas in Pasquotank County



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Figure 4.30 – FEMA Flood Hazard Areas in Perquimans County



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Historical Occurrences

Table 4.36 details the historical occurrences of flooding identified from 2008 through 2017 by the NCEI Storm Events database. It should be noted that only those historical occurrences listed in the NCEI database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

Table 4.36 – NCEI Records of Flooding, 2007-2018

County	Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
Pasquotank	Symonds Creek	4/21/2008	Flash Flood	0	0	0	0
Pasquotank	Elizabeth City	7/6/2008	Flash Flood	0	0	\$5,000	0
Camden	Lambs Corner	7/6/2008	Flash Flood	0	0	\$5,000	0
Hertford	Union	6/16/2010	Flash Flood	0	0	0	0
Hertford	Murfreesboro	9/29/2010	Flash Flood	0	0	0	0
Hertford	Ahoskie	9/29/2010	Flash Flood	0	0	0	0
Gates	Gatesville	9/29/2010	Flash Flood	0	0	0	0
Pasquotank	Okisko	9/30/2010	Flash Flood	0	0	0	0
Hertford	Ahoskie	9/30/2010	Flash Flood	0	0	0	0
Camden	South Mills	8/27/2011	Flood	0	0	0	0
Chowan	Edenton	8/27/2011	Flood	0	0	0	0
Perquimans	Belvidere	8/27/2011	Flood	0	0	0	0
Gates	Savages Crossroads	8/27/2011	Flood	0	0	0	0
Hertford	Ahoskie	8/27/2011	Flood	0	0	0	0
Pasquotank	(Ecg)Elizabeth City	8/27/2011	Flood	0	0	0	0
Camden	Camden	10/29/2012	Flood	0	0	0	0
Gates	Corapeake	6/13/2014	Flash Flood	0	0	\$0	0
Camden	Johnsons Corner	7/11/2015	Flood	0	0	\$0	0
Camden	Shiloh	7/11/2015	Flood	0	0	\$0	0
Pasquotank	Weeksville	7/11/2015	Flood	0	0	\$0	0
Perquimans	Nicanor	9/21/2016	Flood	0	0	\$0	0
Chowan	Edenton	9/21/2016	Flood	0	0	\$0	0
Gates	Vivian	9/21/2016	Flood	0	0	\$0	0
Hertford	Murfreesboro	9/21/2016	Flood	0	0	\$0	0
Pasquotank	Weeksville	9/21/2016	Flood	0	0	\$0	0
Camden	South Mills	9/21/2016	Flood	0	0	\$0	0
Hertford	Ahoskie Tri Co Arpt	10/8/2016	Flood	0	0	\$250,000	0
Gates	Hobbsville	10/8/2016	Flood	0	0	\$500,000	0
Camden	South Mills	10/8/2016	Flood	0	0	\$500,000	0
Perquimans	Bethel	10/8/2016	Flood	0	0	\$200,000	0
Pasquotank	Lynchs Corner	10/8/2016	Flood	0	0	\$250,000	0
Chowan	Edenton	10/8/2016	Flood	0	0	\$500,000	0
Pasquotank	Weeksville	10/8/2016	Flash Flood	0	0	\$0	0

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County	Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
Perquimans	Bethel	10/8/2016	Flash Flood	0	0	\$0	0
Camden	Camden	10/8/2016	Flash Flood	0	0	\$0	0
Chowan	Edenton	10/8/2016	Flash Flood	0	0	\$0	0
Gates	Corapeake	10/8/2016	Flash Flood	1	0	\$0	0
Hertford	Ahoskie	10/8/2016	Flash Flood	0	0	\$0	0
Camden	South Mills	7/24/2018	Flood	0	0	\$0	0
Pasquotank	Elizabeth City	7/24/2018	Flood	0	0	\$0	0
Perquimans	Hertford	7/24/2018	Flood	0	0	\$0	0
Pasquotank	Symonds Creek	4/21/2008	Flash Flood	0	0	\$0	0
Pasquotank	Elizabeth City	7/6/2008	Flash Flood	0	0	\$5,000	0
Camden	Lambs Corner	7/6/2008	Flash Flood	0	0	\$5,000	0
Hertford	Union	6/16/2010	Flash Flood	0	0	\$0	0
Hertford	Murfreesboro	9/29/2010	Flash Flood	0	0	\$0	0
Hertford	Ahoskie	9/29/2010	Flash Flood	0	0	\$0	0
Gates	Gatesville	9/29/2010	Flash Flood	0	0	\$0	0
Pasquotank	Okisko	9/30/2010	Flash Flood	0	0	\$0	0
Hertford	Ahoskie	9/30/2010	Flash Flood	0	0	\$0	0
Camden	South Mills	8/27/2011	Flood	0	0	\$0	0
Chowan	Edenton	8/27/2011	Flood	0	0	\$0	0
Perquimans	Belvidere	8/27/2011	Flood	0	0	\$0	0
Gates	Savages Crossroads	8/27/2011	Flood	0	0	\$0	0
			Totals	1	0	\$2,210,000	\$0

Source: NCEI

According to NCEI, 41 recorded flood events affected the planning area from 2007 to 2018, causing an estimated \$2,210,000 in property damage, no crop damage, one death and no injuries.

Table 4.37 provides a summary of this historical information by participating county. It is important to note that many of the events attributed to each county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

Table 4.37 – Summary of Historical Flood Occurrences by Participating Jurisdiction, 2008-2017

Jurisdiction	Event Count	Deaths	Injuries	Property Damage	Crop Damage
Camden	13	0	0	\$505,000	\$0
Chowan	7	0	0	\$500,000	\$0
Gates	14	0	0	\$640,000	\$5,900,000
Hertford	16	1	0	\$7,250,000	\$12,500,000
Pasquotank	14	0	0	\$255,000	\$0
Perquimans	9	0	0	\$200,000	\$0
Total	73	1	0	\$9,350,000	\$18,400,000

Source: NCEI

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The following historical flood elevations are reported in NCEI records for the region, and illustrate the potential for flooding and flash flooding across the region:

September 1999 – Very heavy rain from Hurricane Floyd fell on soils saturated by previous weeks of heavy rain produced widespread flooding and flash flooding across northeast North Carolina, from the Roanoke River eastward to the sea. Rainfall amounts ranged from near six inches in southeast Gates County to as much as 18 inches in southwest Bertie County. Numerous roads were washed out due to flooding, and a number of high water rescues occurred. Fortunately, only one person perished due to the flash flooding. The flooding impacted Gates, Camden, Chowan, Herford, Pasquotank and Perquimans counties in the region. Enormous structural/housing and agriculture/crop losses were recorded during this incident, including \$8.34 million in property damage and \$38.7 million in crop damage.

July 2008 – Heavy rains from thunderstorms produced flash flooding across portions of northeast North Carolina. Five to six inches of water covered business Route 17 north of Elizabeth City in Pasquotank County. Old Highway 17 was also flooded, and numerous vehicles were pulled off the road in several feet of water. A rain gauge in Lamb’s Corner in Camden County reported seven inches of rain in three hours, and several roads closed due to high water. The NCEI reported \$10,000 in property damages and no crop damages in the Camden and Pasquotank counties due to this storm.

October 2016 – The combination of a cold front moving through the region and post-tropical Cyclone Matthew tracking northeast of the North Carolina coast produced heavy rain which caused flooding across much of the northeast region of the state. The rain caused an extended period of significant flooding across the Albemarle Region. Numerous roads were impassable or closed for several days, and many homes and business were impacted. NCEI recorded \$2.2 million in property damages and no crop damages caused by this incident.

Extent

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

Regulated floodplains are illustrated on inundation maps called Flood Insurance Rate Maps (FIRMs). It is the official map for a community on which FEMA has delineated both the Special Flood Hazard Areas (SFHAs) and the risk premium zones applicable to the community. SFHAs represent the areas subject to inundation by the 100-year flood event. Structures located within the SFHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Flood prone areas were identified within the Albemarle Region using the Effective FIRMs, dated May 2, 2006. Table 4.38 summarizes the flood insurance zones identified by the DFIRMs.

Table 4.38 – Mapped Flood Insurance Zones within the Albemarle Region

Zone	Description
AE	AE Zones, also within the 100-year flood limits, are defined with BFEs that reflect the combined influence of stillwater flood elevations and wave effects less than 3 feet. The AE Zone generally extends from the landward VE zone limit to the limits of the 100-year flood from coastal sources, or until it reaches the confluence with riverine flood sources. The AE Zones also depict the SFHA due to riverine flood sources, but instead of being subdivided into separate zones of differing BFEs with possible wave effects added, they represent the flood profile determined by hydrologic and hydraulic investigations and have no wave effects. The Coastal AE Zone is differentiated from the AE Zone by the Limit of Moderate Wave Action (LiMWA) and includes areas susceptible to wave action between 1.5 to 3 feet.

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Zone	Description
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
0.2% Annual Chance (shaded Zone X)	Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (Zone X (shaded) is used on new and revised maps in place of Zone B.)
Zone X (unshaded)	Minimal risk areas outside the 1-percent and .2-percent-annual-chance floodplains. No BFEs or base flood depths are shown within these zones. Zone X (unshaded) is used on new and revised maps in place of Zone C.

Source: FEMA

Approximately 30% of the Region falls within the SFHA. Table 4.39 summarizes acreage of the Region's total area by flood zone on the effective flood maps.

Table 4.39 – Flood Zone Acreage in the Albemarle Region

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Camden							
Unincorporated County	32,143	79,702	7,385	79,354	0	198,584	56.3%
Chowan							
Unincorporated County	164	47,189	1,644	88,129	8,837	145,963	32.4%
Edenton	0	571	54	2,937	0	3,562	16.0%
Gates							
Unincorporated County	22,829	48,560	1,311	148,334	0	221,034	32.3%
Gatesville	0	14	0	244	0	258	5.4%
Hertford							
Unincorporated County	0	45,531	1,214	174,879	0	221,624	20.5%
Ahoskie	0	246	38	2,499	0	2,783	8.8%
Cofield	0	17	68	1,924	0	2,009	0.8%
Como	0	54	0	2,015	0	2,069	2.6%
Harrellsville	0	0	0	185	0	185	0.0%
Murfreesboro	0	109	54	1302	0	1,465	7.4%
Winton	0	39	0	507	0	546	7.1%
Pasquotank							
Unincorporated County	7,343	46,888	5,582	115,925	2,738	178,476	30.4%
Elizabeth City	2	2,681	752	4,421	0	7,856	34.2%
Perquimans							
Unincorporated County	4,743	39,419	2,079	143,584	19,237	209,062	21.1%
Hertford	25	368	42	1,405	0	1,840	21.4%
Winfall	0	298	32	1,135	0	1,465	20.3%

Source: FEMA Effective DFIRMs; GIS analysis

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

Figure 4.31 through Figure 4.36 show flood depths by county in the Albemarle Region.

Figure 4.31 – Flood Depth, 100-Year Floodplain, Camden County

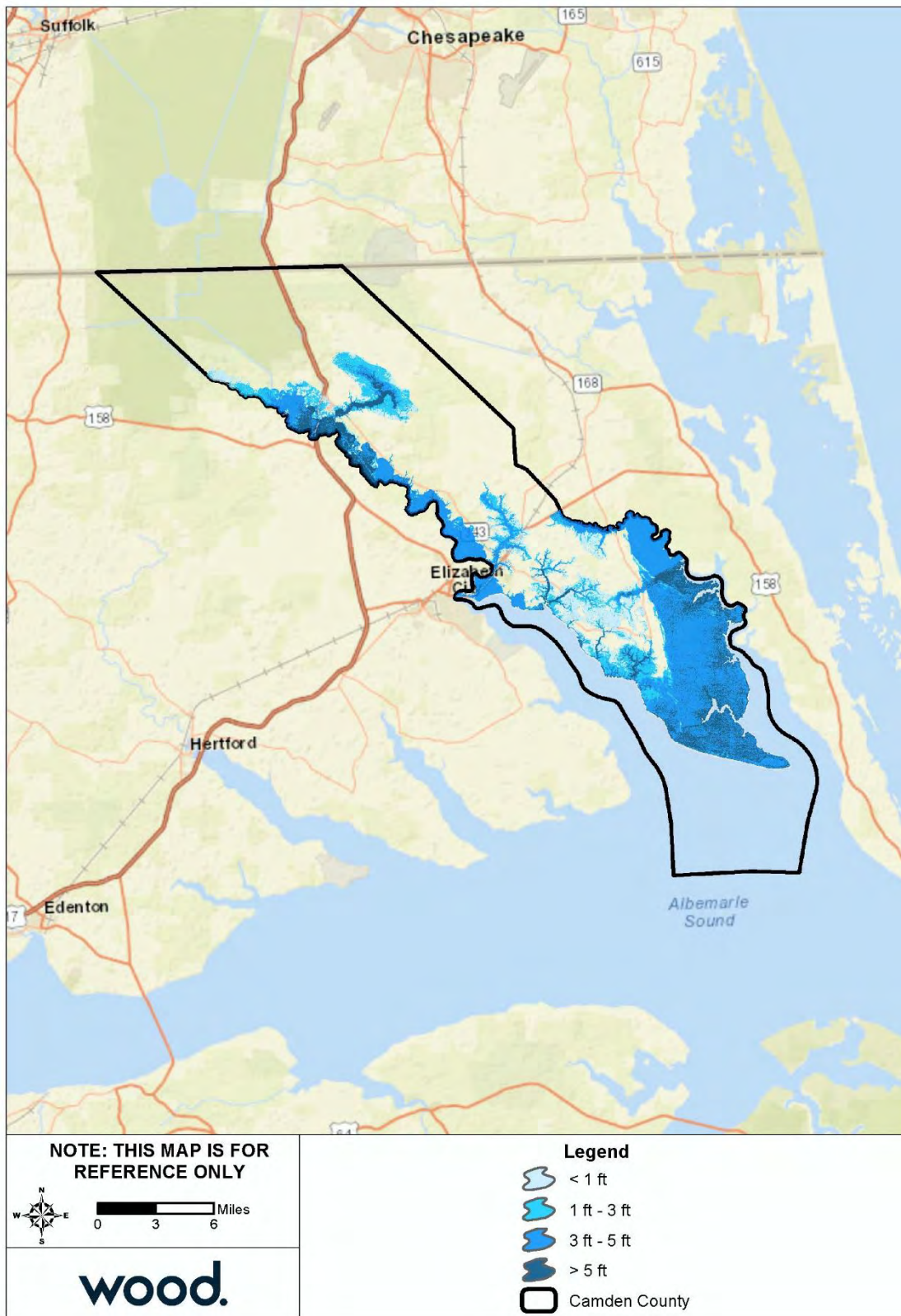
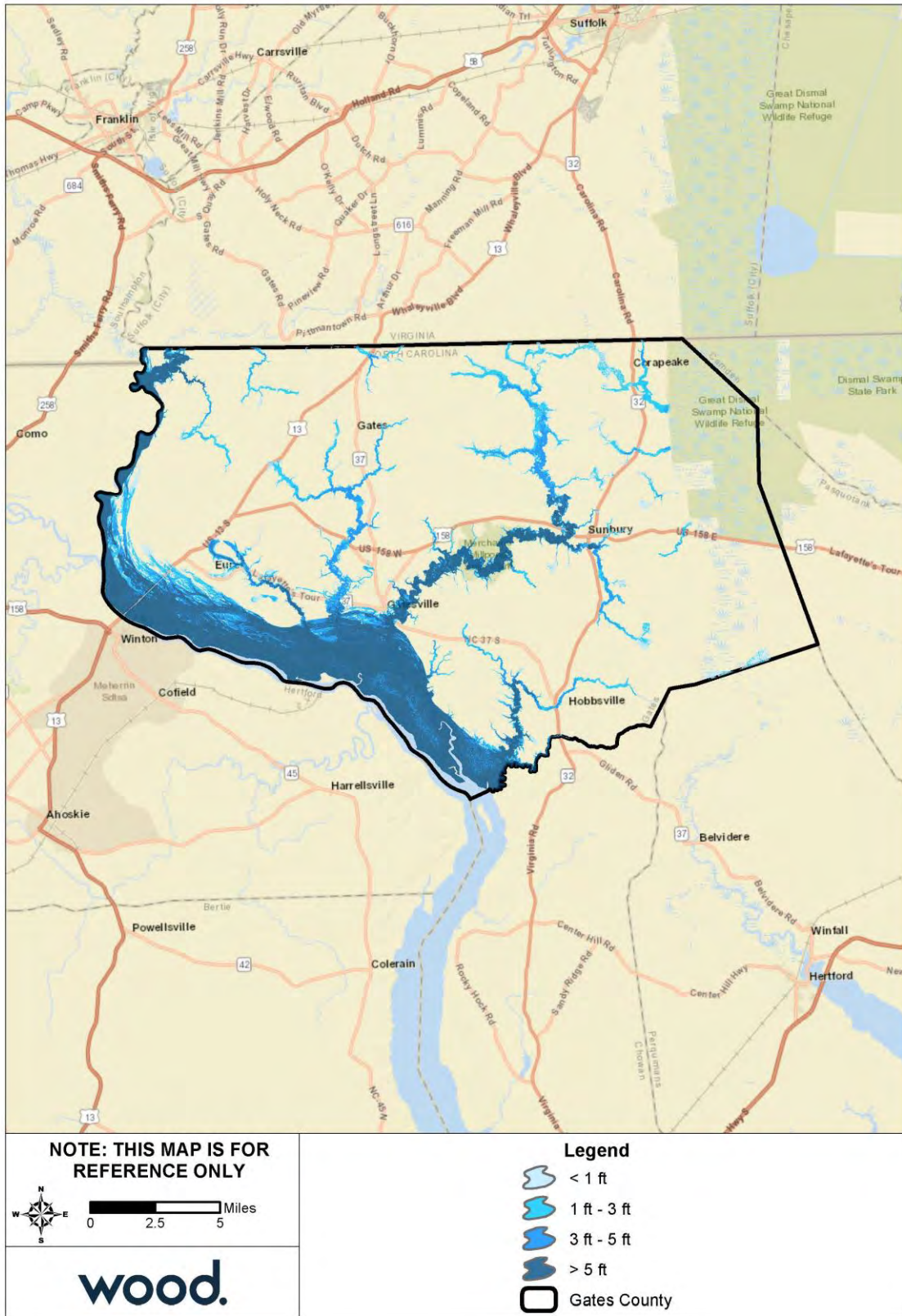


Figure 4.32 – Flood Depth, 100-Year Floodplain, Chowan County



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Figure 4.33 – Flood Depth, 100-Year Floodplain, Gates County



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Figure 4.34 – Flood Depth, 100-Year Floodplain, Hertford County

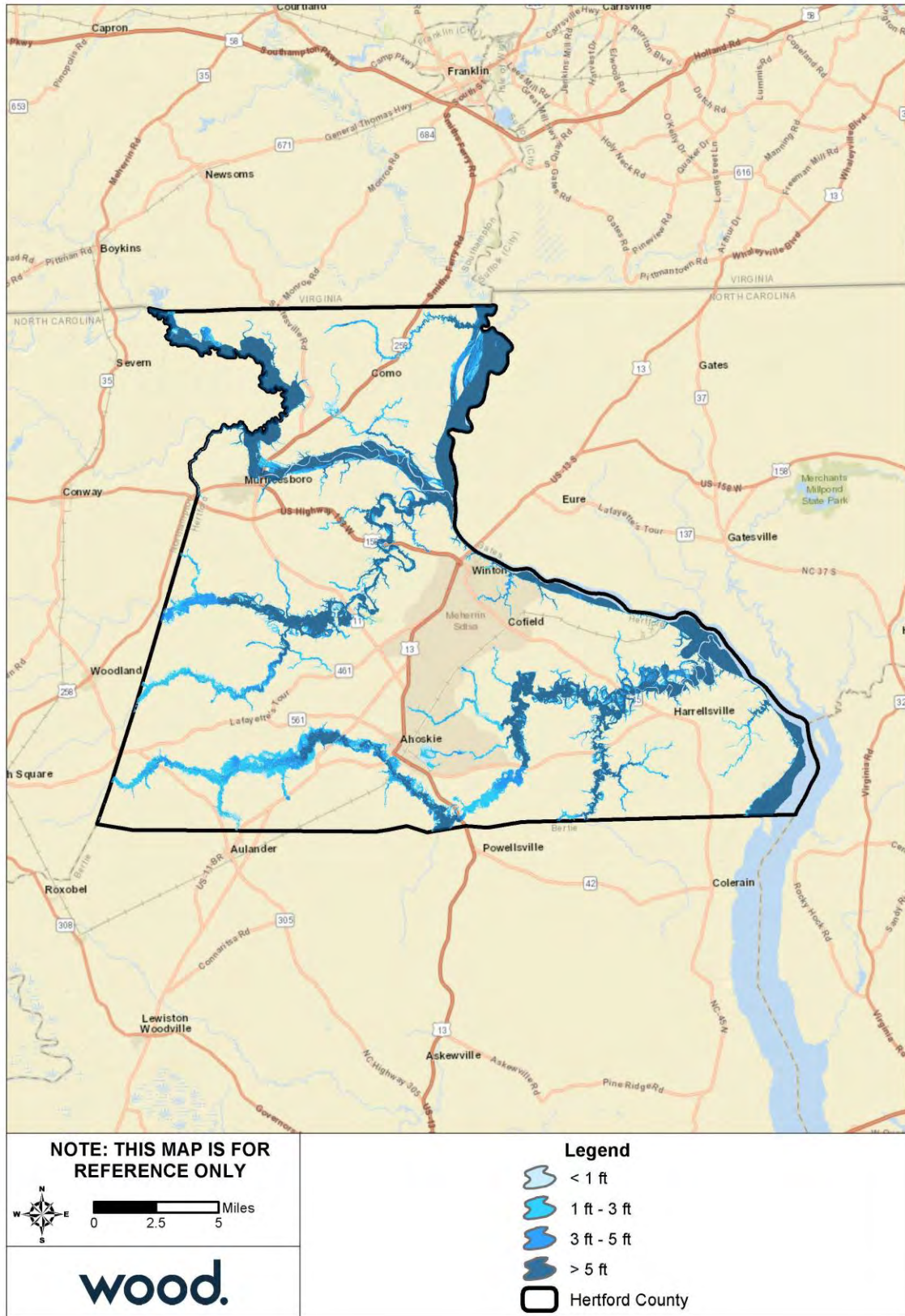


Figure 4.35 – Flood Depth, 100-Year Floodplain, Pasquotank County

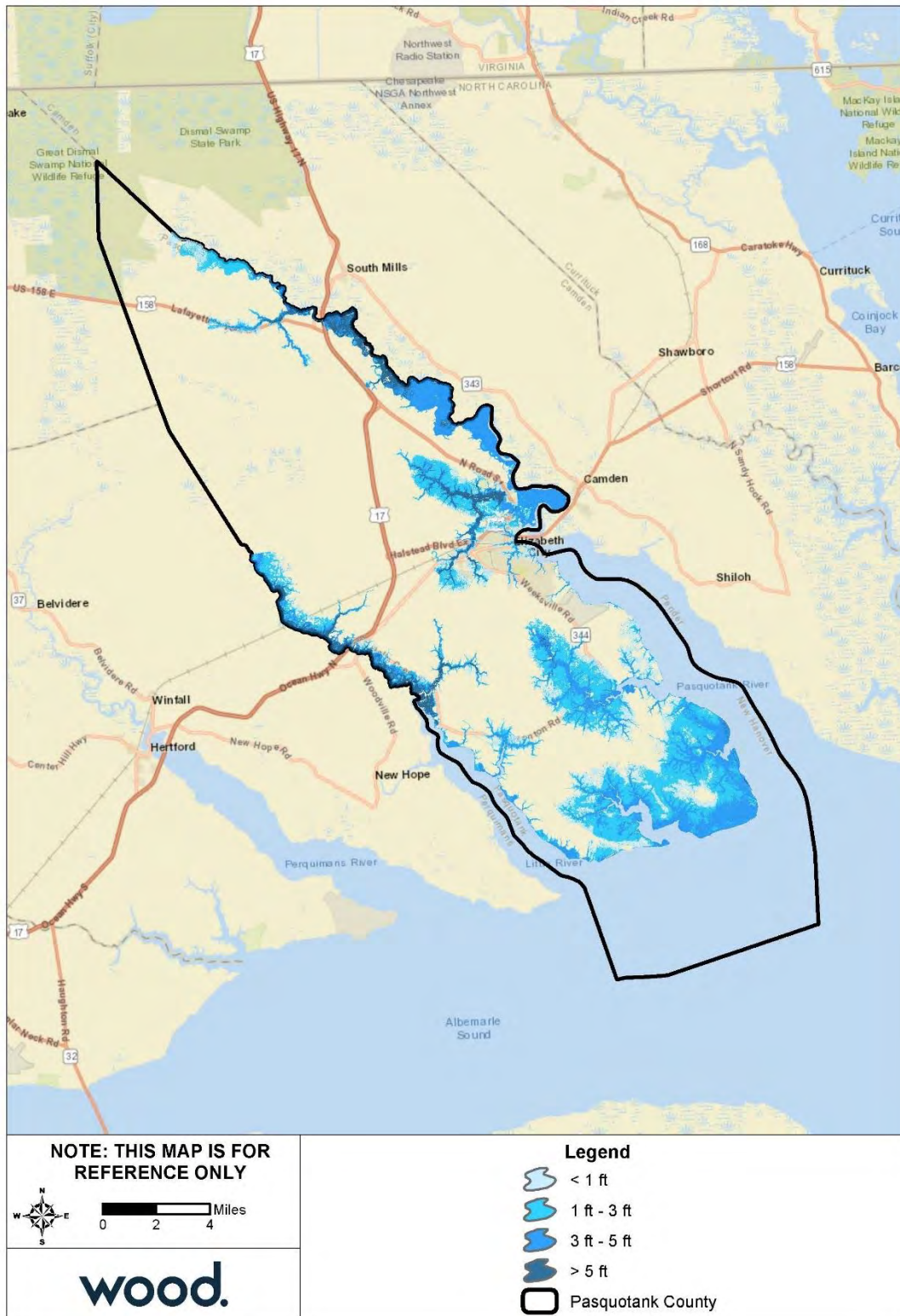


Figure 4.36 – Flood Depth, 100-Year Floodplain, Perquimans County



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Impact: 3 – Critical

Spatial Extent: 3 – Moderate

Probability of Future Occurrence

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

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

While exposure to flood hazards vary across jurisdictions, with the exception of Harrellsville all jurisdictions have at least some area of land in FEMA flood hazard areas, therefore the likelihood of flooding is considered possible (between 10% and 50% annual probability) for all jurisdictions.

Probability: 2 – Possible

Climate Change

According to the 2018 North Carolina Hazard Mitigation Plan, changing climate and weather patterns, environmental conditions, and urban and rural development may affect the frequency and intensity of flooding. The increased likelihood of extreme precipitation events due to climate change will result in greater risks of flash flooding and impacts from stormwater runoff. The plan notes that even though there may be less precipitation overall in the long term leading to more frequent drought events, the rainfall that does occur will likely be more intense, and flooding impacts may intensify as a result.

Vulnerability Assessment

Methodologies and Assumptions

Population and property at risk to flooding was estimated using data from the NCEM IRISK database, which was compiled in NCEM’s Risk Management Tool.

As a subset of the building vulnerability analysis, exposure of pre-FIRM structures was also estimated. Table 4.40 below provides the NFIP entry date for each participating jurisdiction, which was used to determine which buildings were constructed pre-FIRM. Pre-FIRM structures were built prior to the adoption of flood protection building standards and are therefore assumed to be at greater risk to the flood hazard.

Table 4.40 – NFIP Entry Dates

Jurisdiction	NFIP Entry Date
Camden County	
Camden County (Unincorporated Area)	12/04/85
City of Elizabeth City	04/03/78
Chowan County	
Chowan County (Unincorporated Area)	07/03/85
Town of Edenton	09/15/77
Gates County	
Gates County (Unincorporated Area)	07/16/91
Town of Gatesville	05/13/77

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Jurisdiction	NFIP Entry Date
Hertford County	
Hertford County (Unincorporated Area)	11/01/99
Town of Ahoskie	05/01/87
Town of Como	08/03/09
Town of Harrellsville	08/03/09
Town of Murfreesboro	06/01/87
Town of Winton	07/01/87
Village of Cofield	08/03/09
City of Elizabeth City	04/03/78
Pasquotank County	
Pasquotank County (Unincorporated Area)	12/04/85
Perquimans County	
Perquimans County (Unincorporated Area)	07/03/85
Town of Hertford	07/03/85
Town of Winfall	07/03/85

Source: Federal Emergency Management Agency Community Status Book Report: Communities Participating in the National Flood Program, August 2013

If the NFIP entry date for a given community is between January and June, buildings constructed the same year as the entry date are considered post-FIRM (e.g., if the NFIP entry date is 02/01/1991, buildings constructed in 1990 and before are pre-FIRM. Buildings constructed from 1991 to the present are post-FIRM.). If the NFIP entry date is between July and December, then the following year applies for the year built cut-off (e.g., if the NFIP entry date is 12/18/2007, buildings constructed in the year 2007 and before are pre-FIRM, 2008 and newer are post-FIRM).

Effective FEMA DFIRM data was used to identify flood hazard areas. Flood zones used in the analysis consist of Zone AE (1-percent-annual-chance flood), Zone AE Floodway, and the 0.2-percent-annual-chance flood hazard area.

People

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

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

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

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

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

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

Floods can also result in fatalities. Individuals face particularly high risk when driving through flooded streets. According to NCEI records, there has been one death in the Albemarle Region caused by flash flooding in Corapeake in Gates County.

Table 4.41 details the population at risk from the 1% annual chance flood event, according to data from the NCEM IRISK database. Note that development and population growth have occurred since the original analysis for the IRISK dataset was performed, therefore actual population at risk is likely higher.

Table 4.41 – Population Impacted by the 100 Year Flood Event

Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Camden	9,954	3,066	30.8%	1,280	394	30.8%	593	183	30.9%
Chowan	9,056	390	4.3%	1,780	77	4.3%	538	23	4.3%
Edenton	5,743	299	5.2%	1,128	59	5.2%	341	18	5.3%
Gates	11,902	360	3%	1,788	54	3%	679	21	3.1%
Gatesville	287	0	0%	43	0	0%	16	0	0%
Hertford	13,318	390	2.9%	2,105	62	2.9%	764	22	2.9%
Ahoskie	5,625	124	2.2%	889	20	2.2%	323	7	2.2%
Como	91	0	0%	14	0	0%	5	0	0%
Harrellsville	106	0	0%	17	0	0%	6	0	0%
Murfreesboro	4,348	112	2.6%	687	18	2.6%	249	6	2.4%
Winton	759	0	0%	120	0	0%	44	0	0%
Cofield	413	0	0%	65	0	0%	24	0	0%
Pasquotank	20,040	4,683	23.4%	2,718	635	23.4%	1,328	310	23.3%
Elizabeth City	20,614	7,063	34.3%	2,795	958	34.3%	1,366	468	34.3%
Perquimans	10,361	1,230	11.9%	2,223	264	11.9%	574	68	11.8%
Hertford	2,406	107	4.4%	516	23	4.5%	133	6	4.5%
Winfall	688	15	2.2%	148	3	2%	38	1	2.6%
Total	115,711	17,839	15.4%	18,316	2,567	14.0%	7,021	1,133	16.1%

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Property

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

Table 4.42 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings across all jurisdictions, by sector and flood event. Vulnerability of CIKR as well as High Potential Loss Properties, where applicable, can be found by jurisdiction in each community's annex to this plan.

Table 4.43 details the property at risk from the 1% annual chance flood event, according to data from the NCEM IRISK database. As with population vulnerability data, actual property at risk is likely higher due to development that has occurred since the original analysis for the IRISK dataset was performed.

Table 4.42 – Critical Infrastructure and Key Resources Buildings at Risk to 100-Year Flood by Sector

Sector	Number of Buildings at Risk	Estimated Damages
Banking and Finance	1	\$2,050
Commercial Facilities	80	\$479,066
Communications	1	\$2,774
Critical Manufacturing	48	\$226,339
Defense Industrial Base	1	\$3,535
Food and Agriculture	60	\$116,878
Government Facilities	6	\$39,139
Healthcare and Public Health	8	\$84,687
Transportation Systems	16	\$316,446
Total	221	\$1,270,914

Source: NCEM Risk Management Tool

The damage estimates for the 100-year flood event total \$29,723,708, which equates to a loss ratio of less than 1 percent. The loss ratio is the damage estimate divided by the total potential exposure (i.e., total value of all buildings in the planning area), displayed as a percentage of value at risk. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from an event.

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Table 4.43 – Buildings Impacted by the 100-Year Flood Event

County	All Buildings	Number of Pre-FIRM Buildings at Risk		Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	758	14%	1,417	26.2%	\$5,575,176	39	0.7%	\$140,462	3	0.1%	\$24,846	1,459	27%	\$5,740,484
Chowan	6,314	79	1.3%	223	3.5%	\$1,274,566	10	0.2%	\$79,166	0	0%	\$0	233	3.7%	\$1,353,732
Edenton	2,976	48	1.6%	129	4.3%	\$998,703	9	0.3%	\$59,764	3	0.1%	\$32,617	141	4.7%	\$1,091,084
Gates	6,637	30	0.5%	141	2.1%	\$1,670,407	5	0.1%	\$7,285	0	0%	\$0	146	2.2%	\$1,677,692
Gatesville	204	0	0%	0	0%	\$0	3	1.5%	\$7,499	0	0%	\$0	3	1.5%	\$7,499
Hertford	8,307	160	1.9%	194	2.3%	\$2,609,619	4	0%	\$84,433	0	0%	\$0	198	2.4%	\$2,694,052
Ahoskie	2,744	46	1.7%	51	1.9%	\$405,375	1	0%	\$8,475	0	0%	\$0	52	1.9%	\$413,850
Como	91	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Harrellsville	100	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Murfreesboro	2,275	23	1%	52	2.3%	\$317,057	1	0%	\$204,202	0	0%	\$0	53	2.3%	\$521,259
Winton	479	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Cofield	287	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Pasquotank	10,460	1,030	9.8%	2,128	20.3%	\$7,604,808	31	0.3%	\$29,121	4	0%	\$22,275	2,163	20.7%	\$7,656,204
Elizabeth City	8,713	1,728	19.8%	2,558	29.4%	\$5,482,156	58	0.7%	\$293,560	2	0%	\$21,502	2,618	30%	\$5,797,217
Perquimans	6,255	328	5.2%	691	11%	\$2,358,863	7	0.1%	\$59,797	0	0%	\$0	698	11.2%	\$2,418,659
Hertford	1,224	40	3.3%	45	3.7%	\$290,187	2	0.2%	\$5,731	0	0%	\$0	47	3.8%	\$295,918
Winfall	419	9	2.1%	8	1.9%	\$29,528	2	0.5%	\$26,529	0	0%	\$0	10	2.4%	\$56,058
Total	62,884	4,279	6.8%	7,637	12.1%	\$28,616,445	172	0.3%	\$1,006,024	12	0.0%	\$101,240	7,821	12.4%	\$29,723,708

Source: NCEM Risk Management Tool

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Repetitive Loss Analysis

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

According to March 2019 NFIP records, there are a total of 143 repetitive loss properties within the Albemarle Region, of which 67.8 percent are insured. As of each property's first claim, 124 properties were residential and 19 were nonresidential. Of all properties on the list, 31 were located outside the SFHA at the time of their first claim.

There are seven properties on the list classified as severe repetitive loss properties. A severe repetitive loss property is classified as such if it has four or more separate claim payments of more than \$5,000 each (including building and contents payments) or two or more separate claim payments (building only) where the total of the payments exceeds the current value of the property.

Table 4.44 summarizes repetitive loss properties by jurisdiction as identified by FEMA through the NFIP. Jurisdictions without any repetitive losses are not listed in the table.

Table 4.44 – Repetitive Loss Properties by Jurisdiction

Jurisdiction	Total RL Properties	Total Number of Losses	Percent Insured	Total Amount of Claims Payments	Average Claim Paid	Count of SRL Properties
Camden						
Unincorporated Camden County	23	60	87%	\$1,046,165.37	\$18,967.81	0
Chowan						
Unincorporated Chowan County	10	21	70%	\$413,106.26	\$19,603.11	0
Edenton	26	62	88%	\$2,468,355.63	\$41,628.84	1
Gates						
Unincorporated Gates County	3	9	100%	\$220,692.06	\$73,564.02	0
Hertford						
Unincorporated Hertford County	10	24	50%	\$566,362.80	\$22,924.98	1
Ahoskie	12	32	17%	\$1,982,103.34	\$69,925.15	1
Pasquotank						
Unincorporated Pasquotank County	21	58	62%	\$561,411.46	\$10,050.42	1
Elizabeth City	32	81	69%	\$2,417,770.25	\$27,254.00	3
Perquimans						
Unincorporated Perquimans County	4	10	25%	\$114,442.49	\$10,663.89	0
Hertford	2	5	50%	\$47,246.76	\$9,357.79	0
Total Region	143	362	68%	\$9,837,656.42	\$30,394.00	7

Source: FEMA/ISO

Note: RL = Repetitive Loss; SRL = Severe Repetitive Loss

Environment

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

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

Consequence Analysis

Table 4.45 summarizes the potential detrimental consequences of flood.

Table 4.45 – Consequence Analysis - Flood

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

4.5.7 Hurricane and Tropical Storm

Hazard Background

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

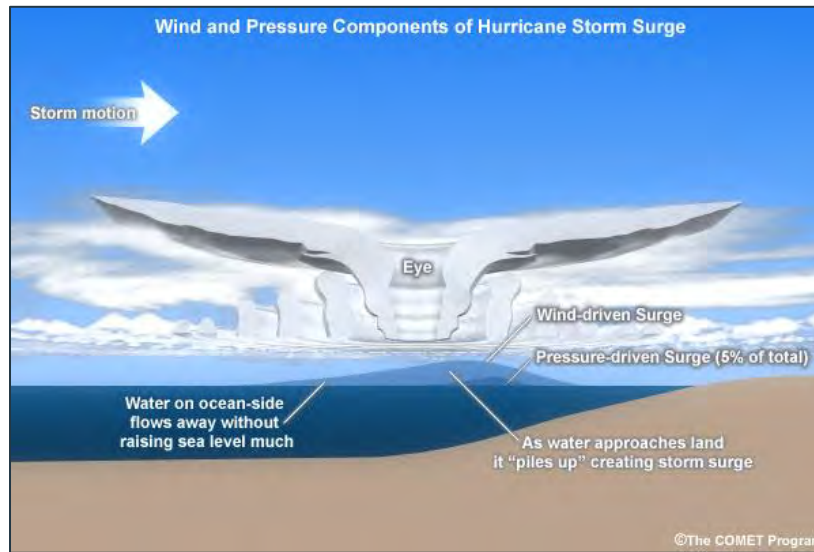
The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of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

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricanes are given a classification based on the Saffir-Simpson Scale; this scale is reproduced in Table 4.46.

The greatest potential for loss of life related to a hurricane is from the storm surge. Storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm as shown in Figure 4.37. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level to heights impacting roads, homes and other critical infrastructure. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides.

The maximum potential storm surge for a location depends on several different factors. Storm surge is a very complex phenomenon because it is sensitive to the slightest changes in storm intensity, forward speed, size (radius of maximum winds-RMW), angle of approach to the coast, central pressure (minimal contribution in comparison to the wind), and the shape and characteristics of coastal features such as bays and estuaries. Other factors which can impact storm surge are the width and slope of the continental shelf and the depth of the ocean bottom. A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. Much of the North Carolina coast has a narrow continental shelf, with mile-deep waters generally only 20-30 miles off the coast.

Figure 4.37 – Components of Hurricane Storm Surge



Source: NOAA/The COMET Program

Damage during hurricanes may also result from inland flooding from associated heavy rainfall. For example, Hurricane Floyd, which made landfall as a Category 2 storm, caused the worst inland flooding disaster in North Carolina's history. Rainfall amounts exceeded 20 inches in certain locales and 67 counties sustained damages.

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

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

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than 1 week

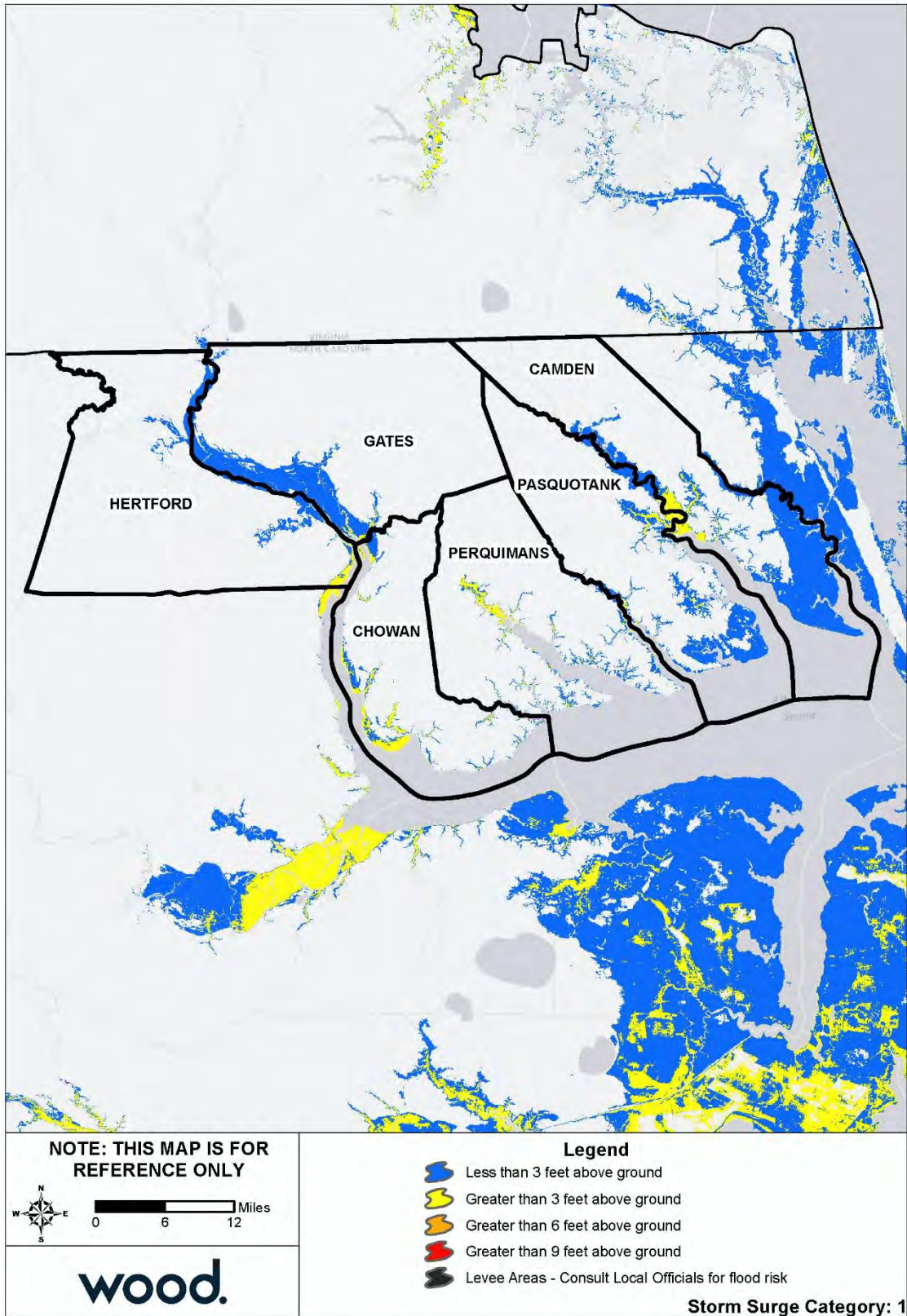
Location

Hurricanes and tropical storms can occur anywhere within the planning area. While coastal areas are most vulnerable to hurricanes, their wind and rain impacts can be felt hundreds of miles inland. Storm surge impacts are more limited, affecting areas along coastal and estuarine shorelines and reaching further inland depending on the height of the surge. Figure 4.38 through Figure 4.42 show the estimated extent of surge by storm category according to NOAA SLOSH data. As shown in these maps, Camden, Pasquotank, and Perquimans Counties are most vulnerable to storm surge impacts.

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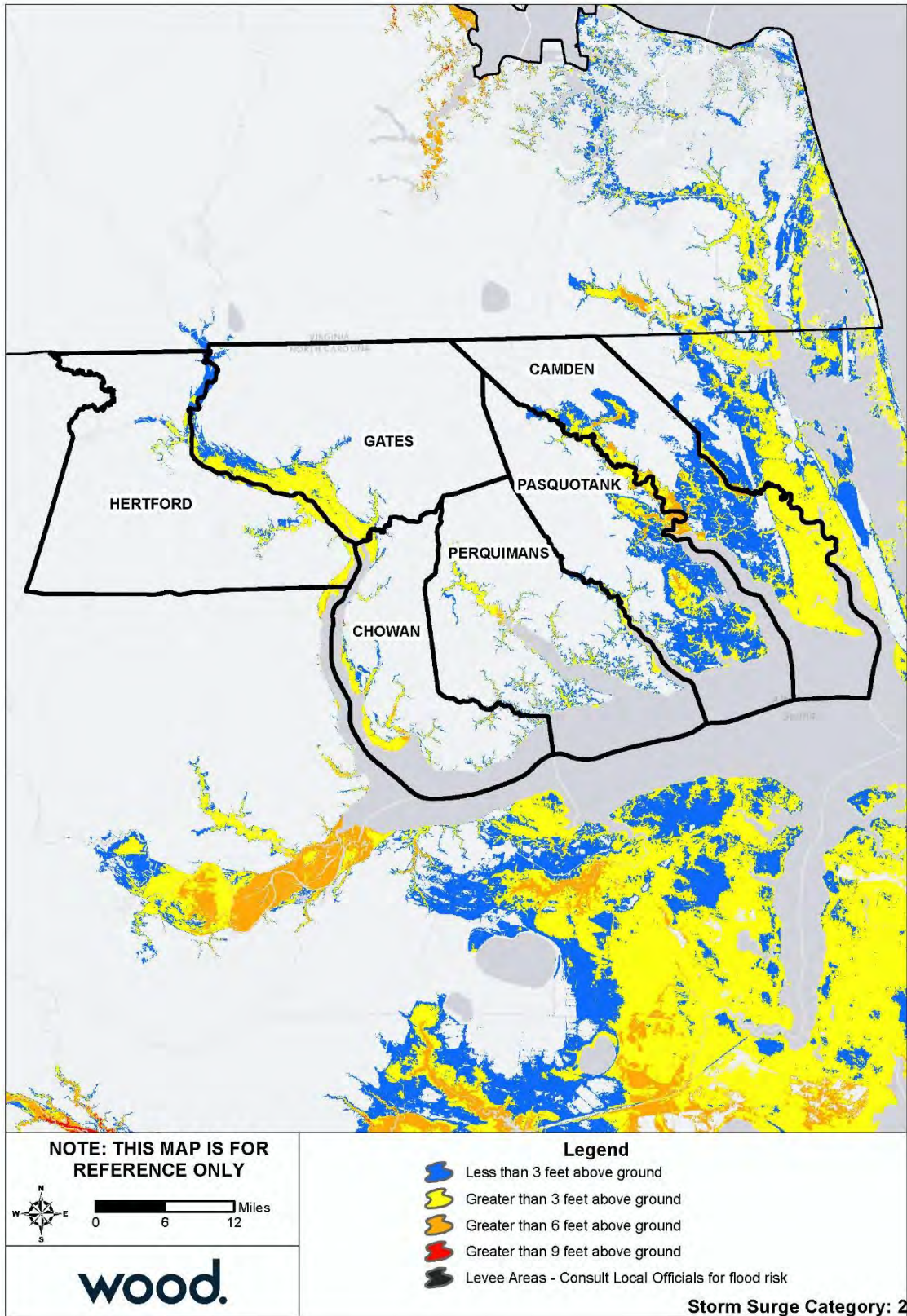
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Figure 4.38 – Category 1 Storm Surge Inundation



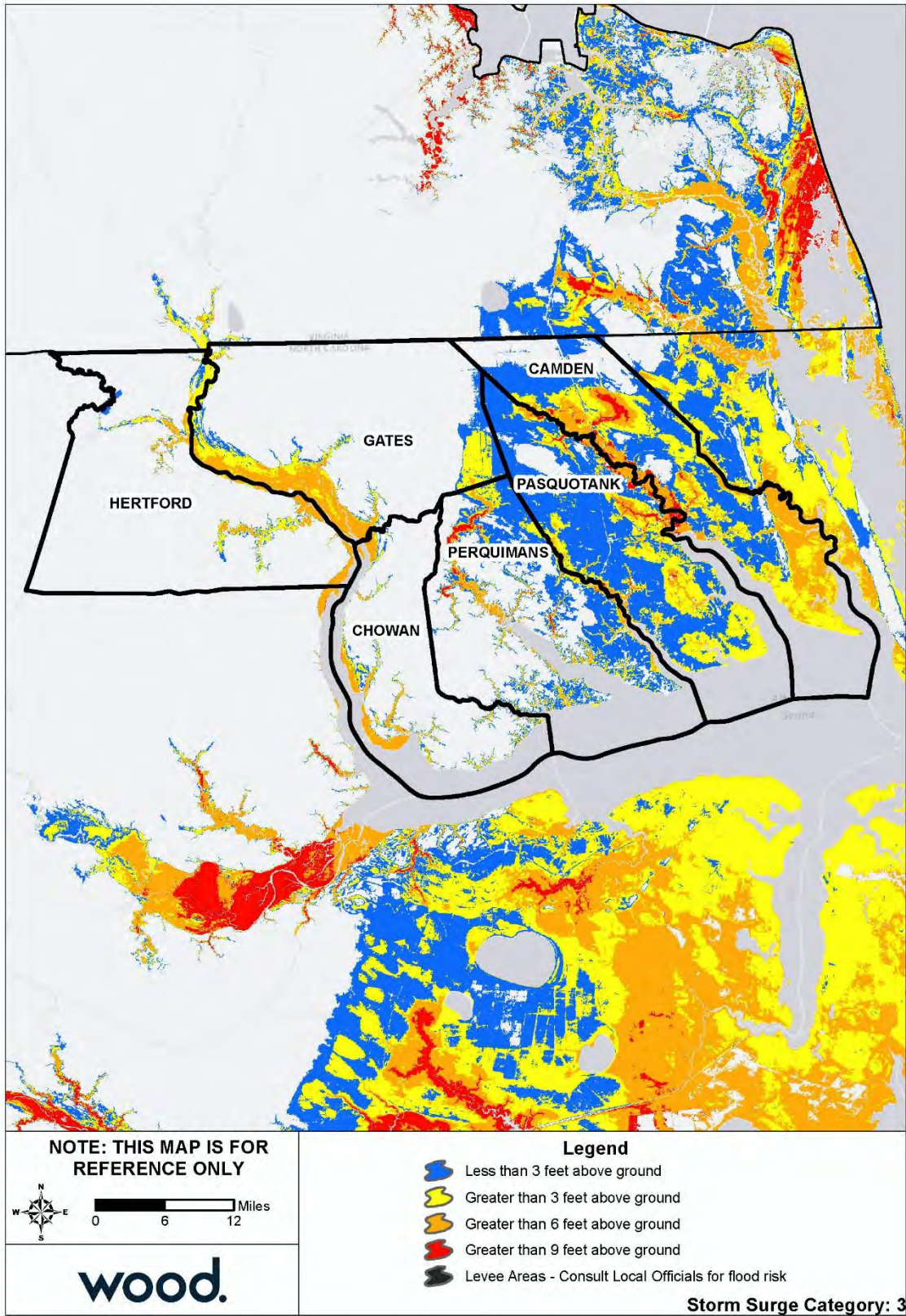
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.39 – Category 2 Storm Surge Inundation



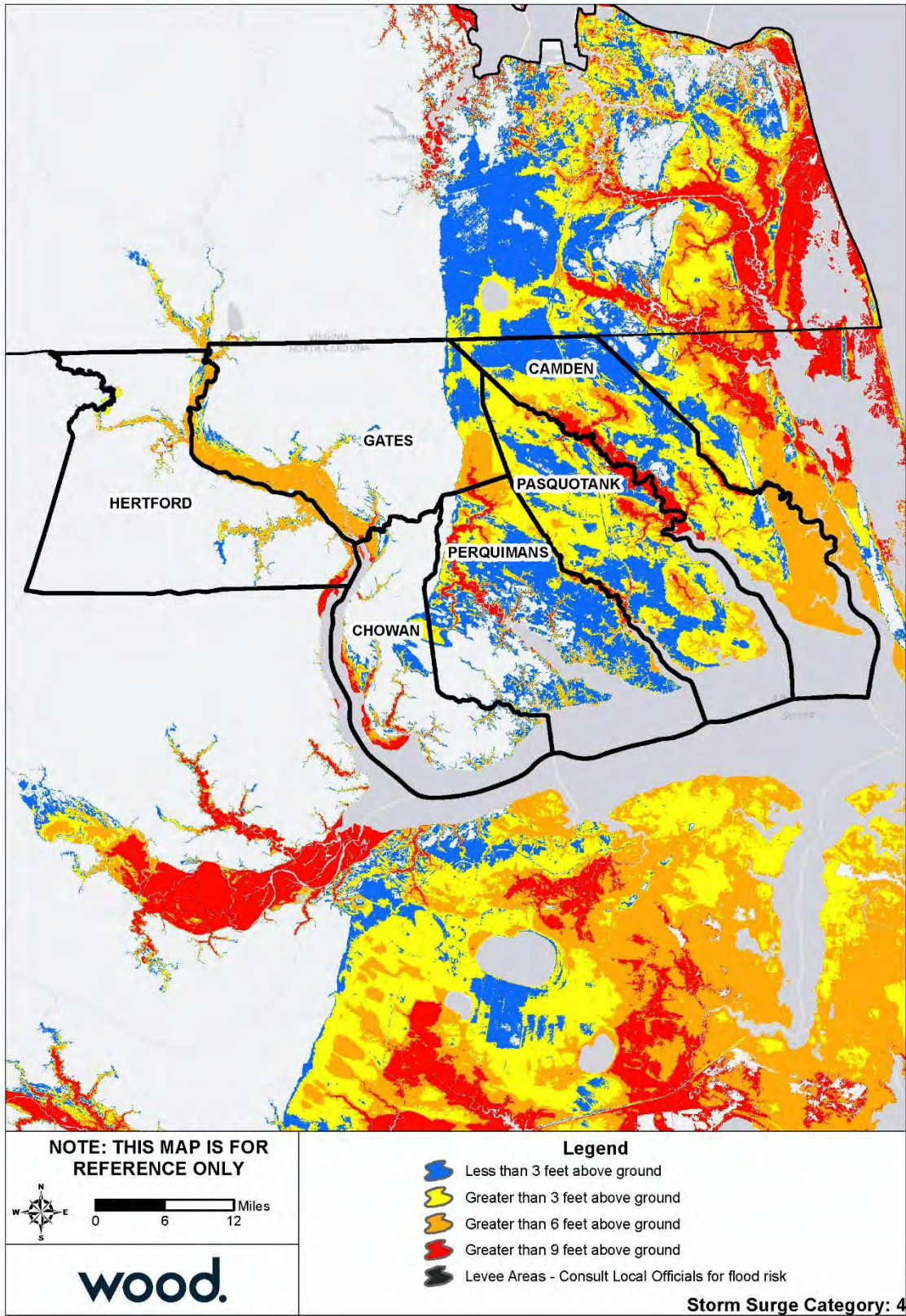
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.40 – Category 3 Storm Surge Inundation



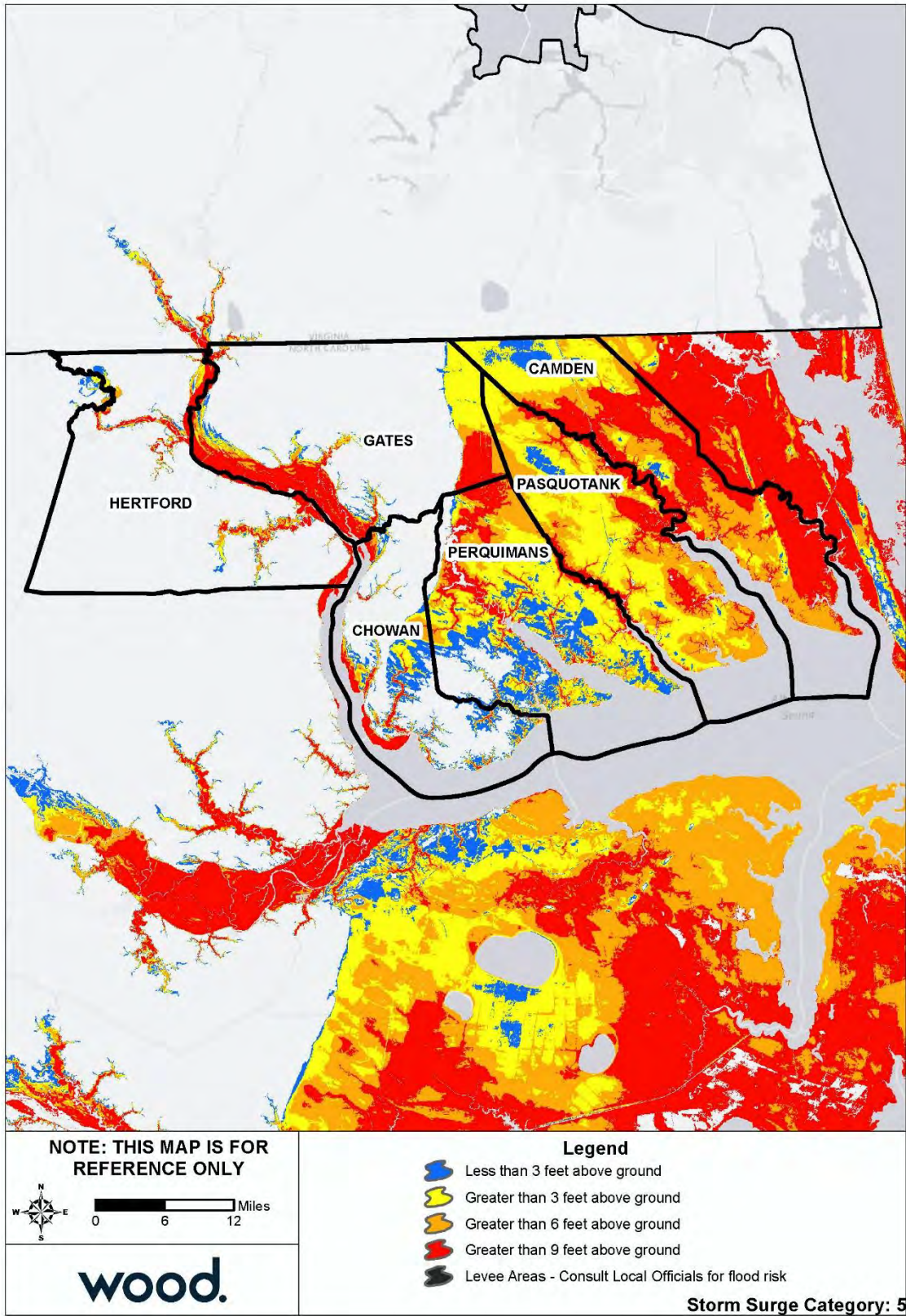
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.41 – Category 4 Storm Surge Inundation



Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.42 – Category 5 Storm Surge Inundation



Source: NOAA National Storm Surge Hazard Maps – Version 2

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Extent

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (Table 4.46), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

Table 4.46 – Saffir-Simpson Scale






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

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as “major” hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. Table 4.47 describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

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Table 4.47 – Hurricane Damage Classifications

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

Source: National Hurricane Center; Federal Emergency Management Agency

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

Impact: 4 – Catastrophic

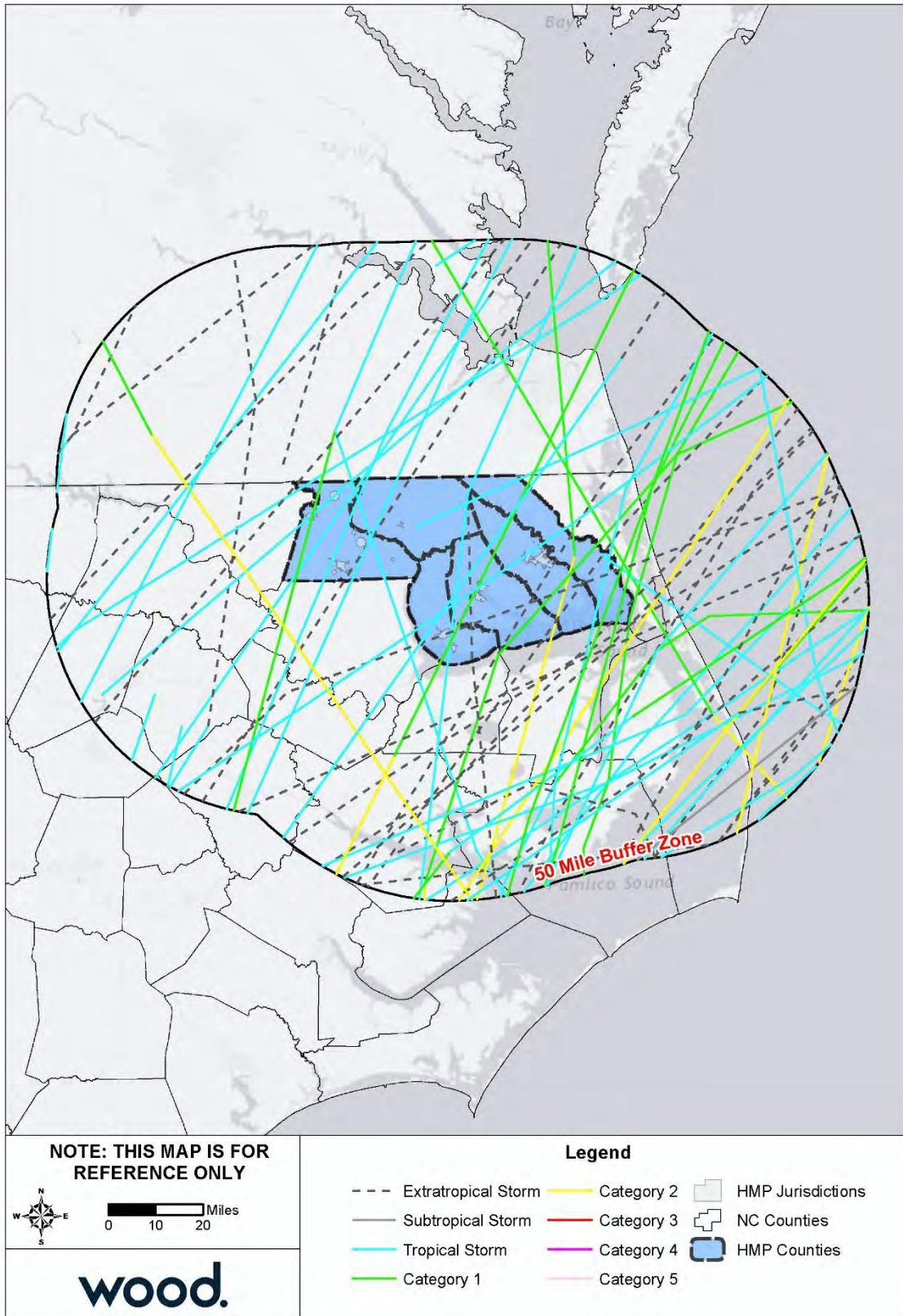
Spatial Extent: 4 – Large

Historical Occurrences

According to the Office of Coastal Management’s Tropical Cyclone Storm Segments data, which is a subset of the International Best Track Archive for Climate Stewardship (IBTrACS) dataset, 97 hurricanes and tropical storms have passed within 50 miles of the Albemarle Region since 1900. These storm tracks are shown in Figure 4.43.

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Figure 4.43 – Hurricane/Tropical Storm Tracks within 50 miles of the Albemarle Region, 1900-2016



Source: NOAA Office of Coastal Management

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The above map of storms is not an exhaustive list of hurricanes that have affected the Albemarle Region. Several storms have passed further than 50 miles away from the Region yet had strong enough wind or rain impacts to cause impacts. NCEI records hurricane and tropical storm events across the region by county and zone; therefore, one event that impacts all six counties in the region is recorded six times. During the 20-year period from 1998 through 2017, NCEI records 46 hurricane and tropical storm reports across 10 separate days. These events are summarized in Table 4.48 by storm. Where property damage estimates were broken out by type, NCEI reports only the value of wind-related damages. Damage estimates provided here are summed where appropriate to reflect the total reported damages per event. Event narratives following this table provide a fuller scope of the impacts from selected events.

Table 4.48 – Recorded Hurricanes and Typhoons in the Albemarle Region, 1998-2017

County	Date	Storm	Fatalities	Injuries	Property Damage	Crop Damage
Ca, Ch, Pa, Pe	8/26/1998	Hurricane Bonnie	0	0	\$2,000,000	\$0
Ca, Ch, Pa, Pe	9/1/1999	Hurricane Dennis	0	0	\$5,000	\$0
Ca, Ch, Pa, Pe	9/15/1999	Hurricane Floyd	0	0	\$42,500,000	\$42,500,000
Ca, Ch, Pa, Pe	10/17/1999	Hurricane Irene	0	0	\$5,000	\$0
Ca, Ch, G, H, Pa, Pe	9/18/2003	Hurricane Isabel	1	0	\$15,999,000	\$0
Ca, Ch, Pa, Pe	8/14/2004	Tropical Storm Charley	0	0	\$0	\$0
Ca, Ch, Pa, Pe	9/6/2008	Tropical Storm Hanna	0	0	\$5,000	\$0
Ca, Ch, G, H, Pa, Pe	8/27/2011	Hurricane Irene	0	0	\$500,000	\$16,000,000
Ca, Ch, Pa, Pe	7/4/2014	Hurricane Arthur	0	0	\$0	\$0
Ca, Ch, G, H, Pa, Pe	9/2/2016	Tropical Storm Hermine	0	0	\$0	\$0
Total			1	0	\$61,014,000	\$58,500,000

Source: NCEI

*County code: Ca = Camden, Ch = Chowan, G = Gates, H = Hertford, Pa = Pasquotank, Pe = Perquimans

August 26-28th, 1998 – Hurricane Bonnie moved along the coast of northeast North Carolina on August 27th. Very strong winds and heavy rains associated with Bonnie's spiral bands hammered northeast North Carolina Thursday afternoon into early Friday morning. The highest sustained wind speed recorded at the Elizabeth City Coast Guard Station (ECG) was 59 mph with gusts to 73 mph. The Currituck county EOC reported a gust to 93 mph. Numerous trees and power lines blown down resulted in scattered property damage and widespread power outages. A 12 year old girl was killed when a large tree fell on her home. Coastal Pasquotank and Camden counties in North Carolina experienced approximately a 6 foot surge in the Albemarle Sound flooding coastal sections of those counties including the business district of downtown Elizabeth City. Chowan county experienced a 5 to 6 foot surge from the Albemarle Sound causing some flooding in Edenton. Currituck county reported only minor flooding from the Currituck Sound. Rainfall amounts generally ranged from 1 to 3 inches and caused some street flooding. The lowest sea level pressure recorded at the Elizabeth City Coast Guard Station (ECG) was 995.7 mb.

September 1-5th, 1999 – Hurricane and Tropical Storm Dennis produced one of the most prolonged periods of tropical cyclone related conditions across northeast North Carolina, from August 30th through September 5th. The highest sustained wind speed recorded at the Elizabeth City Coast Guard Station (ECG) was 39 mph with gusts to 52 mph. A few trees and power lines were blown down across northeast North Carolina resulting in scattered power outages. Pasquotank, Camden and Chowan counties experienced approximately a 2 to 3 foot surge in the Albemarle Sound with some flooding in coastal sections of those counties. Also, a number of roads were flooded in Camden County, and the fire department was inundated for a time. Rainfall amounts generally ranged from 5 to 7 inches across northeast North Carolina

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and caused some street flooding. The lowest sea level pressure recorded at the Elizabeth City Coast Guard Station (ECG) was 1003.8 mb.

September 15th-16th, 1999 – Hurricane Floyd was a Category 1 hurricane as it crossed the Wakefield WFO county warning area. Sustained tropical storm force winds with gusts to near hurricane force occurred over the northwest quadrant of the storm over interior portions of northeast North Carolina and along the coastal waters of the Wakefield marine area. The center of the storm crossed the county warning area along an Elizabeth City to Currituck county to Sandbridge Virginia Beach axis. The highest sustained wind speed recorded at the Elizabeth City Coast Guard Station (ECG) was 39 mph with gusts to 64 mph. Two confirmed tornadoes occurred in association with Floyd, both in northeast North Carolina. There were approximately several thousand persons evacuated and housed in several shelters from coastal jurisdictions. Hundreds of trees and power lines were blown down across northeast North Carolina, resulting in widespread power outages. Coastal Pasquotank and Camden counties experienced approximately a 5 to 6 foot surge in the Albemarle Sound, flooding coastal sections of those counties including the business district of downtown Elizabeth City. Chowan county experienced a 5 to 6 foot surge from the Albemarle Sound causing some flooding in Edenton. The lowest sea level pressure recorded at the Elizabeth City Coast Guard Station (ECG) was 968.5 mb.

October 17-18th, 1999 – Hurricane Irene was an intensifying Category 1 hurricane at the time of closest approach to the Wakefield county warning area during the overnight hours of Monday October 18th. Irene was the third tropical system of the 1999 hurricane season to affect the Wakefield county warning area, and brought another round of very heavy rain into northeast North Carolina. The very heavy rainfall, locally up to 5 to 9 inches, resulted in widespread street flooding and small stream and tributary flooding in portions of northeast North Carolina. The highest sustained wind speed recorded at the Elizabeth City Coast Guard Station (ECG) was 30 mph with gusts to 38 mph. A storm surge of approximately 2 to 3 feet was observed in the Albemarle Sound, with minor flooding in coastal sections of those counties. The lowest sea level pressure recorded at the Elizabeth City Coast Guard Station (ECG) was 995.1 mb.

September 18-19th, 2003 – Hurricane Isabel was a Category 1 hurricane as it crossed the Wakefield WFO county warning area. Sustained tropical storm force winds with frequent gusts to hurricane force occurred over coastal northeast North Carolina. Isabel made landfall near Ocracoke Inlet in North Carolina, tracked northwest into central Virginia just west of Richmond, then continued northward into western Pennsylvania. The highest sustained wind speed recorded was 73 mph at Duck (DUCN7). Other sustained wind speed was 59 mph at Elizabeth City (ECG). The highest gusts recorded were 97 mph at Elizabeth City (from Clemson University observation site in Elizabeth City), 92 mph at Duck (DUCN7), and 74 mph at Elizabeth City (ECG). Mandatory evacuations were ordered for parts of Currituck county, with approximately several thousand persons evacuated and housed in numerous shelters across coastal northeast North Carolina. The unusually large wind field uprooted many thousands of trees, downed many power lines, damaged hundreds of houses, and snapped thousands of telephone poles and cross arms. Hundreds of roads, including major highways, were blocked by fallen trees. Local power companies reported many thousands of customers were without power. Duck water levels peaked at 7.8 feet MLLW before data was lost. On the Albemarle Sound, storm surge values around 7 feet occurred at Edenton, with a surge around 5 feet observed on the Pasquotank River in Elizabeth City. The lowest sea level pressure recorded was 984 mb at Duck (DUCN7) and Duck (Army Coe Field Research Facility). Isabel will be remembered for the greatest wind and storm surge in the region since Hazel in 1954, and the 1933 Chesapeake-Potomac Hurricane. Also, Isabel will be remembered for the extensive power outages in northeast North Carolina, and permanent change to the landscape from all the fallen trees and storm surge. Rainfall amounts ranged from 2 to 5 inches across coastal northeast North Carolina. Inland flooding due to heavy rainfall occurred over parts of coastal northeast North Carolina. Significant beach erosion

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occurred across outer banks Currituck county. Eight deaths can be directly attributed to Isabel in the Wakefield area of responsibility, with 1 in North Carolina. There were more than 15 deaths indirectly attributed to the storm.

August 27-28th, 2003 – Hurricane Irene moving northward over the outer banks of North Carolina and just off the Virginia coast produced tropical storm force winds across portions of northeast North Carolina from early Saturday morning, August 27th into Sunday morning, August 28th. Tropical storm force winds knocked down several trees and power lines, with heavy rains also causing significant crop damage. Storm total rainfall generally ranged from eight to fourteen inches.

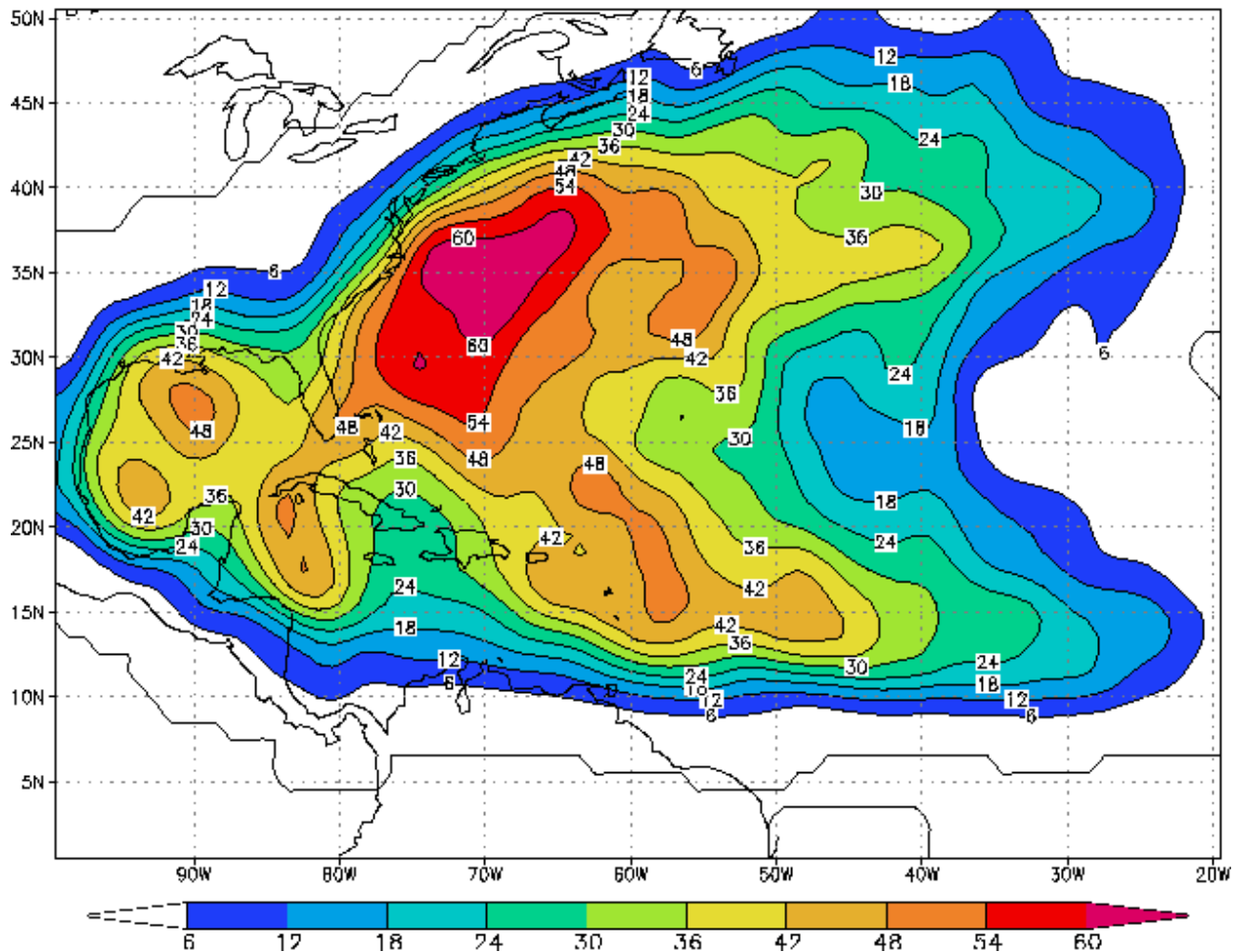
Probability of Future Occurrence

Probability: 3 – Likely

In the 20-year period from 1998 through 2017, 10 hurricanes and tropical storms have impacted the Albemarle Region, which equates to a 50 percent annual probability of hurricane winds impacting the planning area in any given year. This probability does not account for impacts from hurricane rains, which may also be severe. The probability of a hurricane or tropical storm impacting the Albemarle Region is likely.

Figure 4.44 shows, for any particular location, the chance of a hurricane or tropical storm affecting the area sometime during the Atlantic hurricane season. The figure was created by the National Oceanic and Atmospheric Administration's (NOAA) Hurricane Research Division, using data from 1944 to 1999. The figure shows the number of times a storm or hurricane was located within approximately 100 miles (165 kilometers) of a given spot in the Atlantic basin.

Figure 4.44 – Empirical Probability of a Named Hurricane or Tropical Storm



Source: National Oceanic and Atmospheric Administration, Hurricane Research Division

On average, North Carolina experiences a hurricane approximately once every two years. Substantial hurricane damage is typically most likely to be expected in the easternmost counties of the state; however, hurricane and tropical storm-force winds have significantly impacted areas far inland.

Climate Change

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

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

Albemarle Region

Regional Hazard Mitigation Plan
2020

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Vulnerability Assessment

Methodologies and Assumptions

Property at risk to hurricanes was estimated using data from the NCEM IRISK database, which was compiled in NCEM's Risk Management Tool. The vulnerability data displayed below is for wind-related damages. Hurricanes may also cause substantial damages from heavy rains and subsequent flooding, which is addressed in Section 4.5.6 Flood.

People

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

Property

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

Hurricanes and tropical storms can also cause agricultural damages. For the counties in the Albemarle Region, USDA RMA reports losses of \$35,134 from 2007-2017 due to hurricanes and tropical depressions, all recorded in 2012 in Pasquotank County; the damage was recorded to the county's cabbage crop. This equates to an average annual loss of \$3,194.

Table 4.49 through Table 4.53 detail the estimated building damages from varying magnitudes of hurricane events.

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Table 4.49 – Estimated Buildings Impacted by 25-Year Hurricane Wind Event

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.40%	\$2,073,313	638	11.80%	\$38,699	159	2.90%	\$37,811	5,353	99%	\$2,149,823
Chowan	6,314	5,149	81.50%	\$1,797,019	1,052	16.70%	\$161,687	79	1%	\$36,855	6,280	99.50%	\$1,995,561
Edenton	2,976	2,452	82.40%	\$1,142,542	416	14.00%	\$290,524	106	3.60%	\$95,839	2,974	99.90%	\$1,528,904
Gates	6,637	4,648	70.00%	\$1,407,288	1,816	27.40%	\$227,798	157	2%	\$267,657	6,621	99.80%	\$1,902,743
Gatesville	204	132	65%	\$67,582	44	21.60%	\$46,585	28	14%	\$16,575	204	100.00%	\$130,741
Hertford	8,307	6,596	79.40%	\$813,536	1,519	18%	\$256,596	126	2%	\$144,174	8,241	99.20%	\$1,214,306
Ahoskie	2,744	2,313	84.30%	\$466,187	313	11%	\$102,808	102	4%	\$28,923	2,728	99.40%	\$597,919
Como	91	62	68%	\$2,888	25	28%	\$175	3	3%	\$971	90	99%	\$4,034
Harrellsville	100	85	85%	\$21,280	8	8%	\$192	6	6%	\$338	99	99%	\$21,809
Murfreesboro	2,275	2,003	88.00%	\$154,756	183	8%	\$11,015	76	3%	\$10,233	2,262	99.40%	\$176,004
Winton	479	398	83%	\$25,205	33	7%	\$6,909	43	9%	\$12,646	474	99%	\$44,759
Cofield	287	233	81%	\$34,990	47	16%	\$4,812	3	1%	\$123	283	99%	\$39,925
Pasquotank	10,460	9,020	86.20%	\$4,230,483	1,138	10.90%	\$845,228	202	2%	\$347,207	10,360	99.00%	\$5,422,918
Elizabeth City	8,713	7,354	84.40%	\$2,559,086	951	10.90%	\$894,347	293	3%	\$504,168	8,598	99%	\$3,957,602
Perquimans	6,255	5,680	91%	\$3,055,773	284	4.50%	\$882,736	134	2%	\$355,732	6,098	97.50%	\$4,294,240
Hertford	1,224	965	78.80%	\$434,786	137	11.20%	\$68,006	74	6%	\$222,677	1,176	96.10%	\$725,469
Winfall	419	344	82.10%	\$207,873	32	7.60%	\$53,791	30	7%	\$99,037	406	96.90%	\$360,701
Total	62,884	51,990	82.7%	\$18,494,587	8,636	13.7%	\$3,891,908	1,621	2.6%	\$2,180,966	62,247	99.0%	\$24,567,458

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Table 4.50 – Estimated Buildings Impacted by 50-Year Hurricane Wind Event

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.40%	\$7,076,556	638	11.80%	\$159,810	159	2.90%	\$179,996	5,353	99%	\$7,416,363
Chowan	6,314	5,149	81.50%	\$4,482,189	1,052	16.70%	\$629,593	79	1%	\$142,670	6,280	99.50%	\$5,254,451
Edenton	2,976	2,452	82.40%	\$2,924,145	416	14.00%	\$1,105,614	106	3.60%	\$353,957	2,974	99.90%	\$4,383,717
Gates	6,637	4,662	70.20%	\$4,125,926	1,816	27.40%	\$717,675	157	2%	\$822,813	6,635	100.00%	\$5,666,414
Gatesville	204	132	65%	\$154,106	44	21.60%	\$130,682	28	14%	\$66,726	204	100.00%	\$351,514
Hertford	8,307	6,611	79.60%	\$2,440,557	1,519	18%	\$622,777	126	2%	\$443,602	8,256	99.40%	\$3,506,936
Ahoskie	2,744	2,313	84.30%	\$1,091,349	313	11%	\$366,548	102	4%	\$101,147	2,728	99.40%	\$1,559,045
Como	91	62	68%	\$15,192	25	28%	\$849	3	3%	\$2,542	90	99%	\$18,583
Harrellsville	100	85	85%	\$49,337	8	8%	\$803	6	6%	\$1,470	99	99%	\$51,611
Murfreesboro	2,275	2,009	88.30%	\$527,629	183	8%	\$35,050	76	3%	\$28,154	2,268	99.70%	\$590,833
Winton	479	399	83%	\$97,387	33	7%	\$21,461	43	9%	\$84,541	475	99%	\$203,388
Cofield	287	233	81%	\$88,904	47	16%	\$14,194	3	1%	\$291	283	99%	\$103,389
Pasquotank	10,460	9,020	86.20%	\$15,944,151	1,138	10.90%	\$4,234,241	202	2%	\$1,290,367	10,360	99.00%	\$21,468,760
Elizabeth City	8,713	7,354	84.40%	\$6,930,504	951	10.90%	\$3,026,638	293	3%	\$1,447,320	8,598	99%	\$11,404,463
Perquimans	6,255	5,680	91%	\$8,715,461	284	4.50%	\$2,311,211	134	2%	\$1,619,593	6,098	97.50%	\$12,646,264
Hertford	1,224	965	78.80%	\$1,142,877	137	11.20%	\$233,317	74	6%	\$723,328	1,176	96.10%	\$2,099,523
Winfall	419	344	82.10%	\$549,835	32	7.60%	\$152,023	30	7%	\$306,672	406	96.90%	\$1,008,530
Total	62,884	52,026	82.7%	\$56,356,105	8,636	13.7%	\$13,762,486	1,621	2.6%	\$7,615,189	62,283	99.0%	\$77,733,784

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Table 4.51 – Estimated Buildings Impacted by 100-Year Hurricane Wind Event

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.40%	\$16,817,401	638	11.80%	\$515,433	159	2.90%	\$659,100	5,353	99%	\$17,991,934
Chowan	6,314	5,149	81.50%	\$10,821,818	1,052	16.70%	\$2,013,926	79	1%	\$515,447	6,280	99.50%	\$13,351,191
Edenton	2,976	2,452	82.40%	\$7,906,927	416	14.00%	\$3,433,130	106	3.60%	\$1,246,578	2,974	99.90%	\$12,586,635
Gates	6,637	4,662	70.20%	\$9,034,551	1,816	27.40%	\$1,431,329	157	2%	\$1,846,575	6,635	100.00%	\$12,312,454
Gatesville	204	132	65%	\$387,895	44	21.60%	\$287,646	28	14%	\$212,282	204	100.00%	\$887,824
Hertford	8,307	6,611	79.60%	\$4,721,552	1,519	18%	\$1,293,879	126	2%	\$990,171	8,256	99.40%	\$7,005,602
Ahoskie	2,744	2,313	84.30%	\$1,596,835	313	11%	\$598,986	102	4%	\$138,601	2,728	99.40%	\$2,334,422
Como	91	62	68%	\$48,510	25	28%	\$5,250	3	3%	\$6,118	90	99%	\$59,878
Harrellsville	100	85	85%	\$100,505	8	8%	\$3,987	6	6%	\$7,732	99	99%	\$112,223
Murfreesboro	2,275	2,009	88.30%	\$1,235,193	183	8%	\$102,304	76	3%	\$85,320	2,268	99.70%	\$1,422,817
Winton	479	399	83%	\$215,474	33	7%	\$57,909	43	9%	\$125,045	475	99%	\$398,428
Cofield	287	233	81%	\$88,904	47	16%	\$14,194	3	1%	\$291	283	99%	\$103,389
Pasquotank	10,460	9,020	86.20%	\$35,226,972	1,138	10.90%	\$7,503,677	202	2%	\$3,172,933	10,360	99.00%	\$45,903,581
Elizabeth City	8,713	7,354	84.40%	\$20,042,640	951	10.90%	\$8,332,605	293	3%	\$3,745,766	8,598	99%	\$32,121,011
Perquimans	6,255	5,680	91%	\$24,203,178	284	4.50%	\$5,670,594	134	2%	\$2,322,125	6,098	97.50%	\$32,195,898
Hertford	1,224	965	78.80%	\$3,415,648	137	11.20%	\$728,658	74	6%	\$1,985,603	1,176	96.10%	\$6,129,910
Winfall	419	344	82.10%	\$1,689,081	32	7.60%	\$321,162	30	7%	\$747,326	406	96.90%	\$2,757,568
Total	62,884	52,026	82.7%	\$137,553,084	8,636	13.7%	\$32,314,669	1,621	2.6%	\$17,807,013	62,283	99.0%	\$187,674,765

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Table 4.52 – Estimated Buildings Impacted by 300-Year Hurricane Wind Event

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.40%	\$65,107,907	638	11.80%	\$2,465,992	159	2.90%	\$3,098,935	5,353	99%	\$70,672,834
Chowan	6,314	5,149	81.50%	\$41,309,024	1,052	16.70%	\$7,493,210	79	1%	\$1,869,742	6,280	99.50%	\$50,671,976
Edenton	2,976	2,452	82.40%	\$25,935,302	416	14.00%	\$11,091,236	106	3.60%	\$4,548,720	2,974	99.90%	\$41,575,258
Gates	6,637	4,662	70.20%	\$31,511,212	1,816	27.40%	\$4,359,293	157	2%	\$5,166,129	6,635	100.00%	\$41,036,634
Gatesville	204	132	65%	\$1,120,997	44	21.60%	\$575,124	28	14%	\$608,520	204	100.00%	\$2,304,641
Hertford	8,307	6,611	79.60%	\$18,247,101	1,519	18%	\$3,617,081	126	2%	\$4,057,493	8,256	99.40%	\$25,921,675
Ahoskie	2,744	2,313	84.30%	\$5,328,663	313	11%	\$2,966,293	102	4%	\$879,574	2,728	99.40%	\$9,174,529
Como	91	62	68%	\$284,746	25	28%	\$80,742	3	3%	\$51,776	90	99%	\$417,264
Harrellsville	100	85	85%	\$227,496	8	8%	\$17,063	6	6%	\$35,341	99	99%	\$279,899
Murfreesboro	2,275	2,009	88.30%	\$6,594,859	183	8%	\$934,610	76	3%	\$976,833	2,268	99.70%	\$8,506,302
Winton	479	399	83%	\$1,100,787	33	7%	\$310,373	43	9%	\$723,972	475	99%	\$2,135,133
Cofield	287	233	81%	\$418,826	47	16%	\$214,724	3	1%	\$2,811	283	99%	\$636,361
Pasquotank	10,460	9,020	86.20%	\$165,470,636	1,138	10.90%	\$35,920,925	202	2%	\$14,978,100	10,360	99.00%	\$216,369,661
Elizabeth City	8,713	7,354	84.40%	\$147,861,540	951	10.90%	\$48,990,883	293	3%	\$21,933,537	8,598	99%	\$218,785,961
Perquimans	6,255	5,680	91%	\$118,240,666	284	4.50%	\$19,154,252	134	2%	\$10,401,583	6,098	97.50%	\$147,796,502
Hertford	1,224	965	78.80%	\$10,352,529	137	11.20%	\$2,145,222	74	6%	\$4,790,645	1,176	96.10%	\$17,288,395
Winfall	419	344	82.10%	\$4,753,629	32	7.60%	\$636,080	30	7%	\$1,624,689	406	96.90%	\$7,014,398
Total	62,884	52,026	82.7%	\$643,865,920	8,636	13.7%	\$140,973,103	1,621	2.6%	\$75,748,400	62,283	99.0%	\$860,587,423

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Table 4.53 – Estimated Buildings Impacted by 700-Year Hurricane Wind Event

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.40%	\$135,996,523	638	11.80%	\$5,332,950	159	2.90%	\$7,049,645	5,353	99%	\$148,379,118
Chowan	6,314	5,149	81.50%	\$74,922,218	1,052	16.70%	\$13,555,327	79	1%	\$4,341,746	6,280	99.50%	\$92,819,290
Edenton	2,976	2,452	82.40%	\$53,668,562	416	14.00%	\$22,958,900	106	3.60%	\$10,288,524	2,974	99.90%	\$86,915,986
Gates	6,637	4,662	70.20%	\$77,598,869	1,816	27.40%	\$9,828,567	157	2%	\$11,991,953	6,635	100.00%	\$99,419,389
Gatesville	204	132	65%	\$2,888,941	44	21.60%	\$1,124,410	28	14%	\$1,521,901	204	100.00%	\$5,535,253
Hertford	8,307	6,611	79.60%	\$40,134,237	1,519	18%	\$7,379,966	126	2%	\$9,394,279	8,256	99.40%	\$56,908,482
Ahoskie	2,744	2,313	84.30%	\$13,114,428	313	11%	\$8,053,162	102	4%	\$2,294,062	2,728	99.40%	\$23,461,652
Como	91	62	68%	\$284,746	25	28%	\$80,742	3	3%	\$51,776	90	99%	\$417,264
Harrellsville	100	85	85%	\$535,714	8	8%	\$51,631	6	6%	\$109,445	99	99%	\$696,790
Murfreesboro	2,275	2,009	88.30%	\$7,056,112	183	8%	\$1,049,491	76	3%	\$1,024,405	2,268	99.70%	\$9,130,007
Winton	479	399	83%	\$2,682,188	33	7%	\$666,741	43	9%	\$1,720,545	475	99%	\$5,069,474
Cofield	287	233	81%	\$1,037,262	47	16%	\$745,208	3	1%	\$8,769	283	99%	\$1,791,239
Pasquotank	10,460	9,020	86.20%	\$281,847,976	1,138	10.90%	\$62,965,187	202	2%	\$28,186,472	10,360	99.00%	\$372,999,635
Elizabeth City	8,713	7,354	84.40%	\$274,985,669	951	10.90%	\$93,121,701	293	3%	\$43,660,523	8,598	99%	\$411,767,893
Perquimans	6,255	5,680	91%	\$211,068,685	284	4.50%	\$33,926,537	134	2%	\$17,775,921	6,098	97.50%	\$262,771,144
Hertford	1,224	965	78.80%	\$24,879,422	137	11.20%	\$5,287,072	74	6%	\$9,850,131	1,176	96.10%	\$40,016,626
Winfall	419	344	82.10%	\$10,023,622	32	7.60%	\$1,216,513	30	7%	\$3,129,955	406	96.90%	\$14,370,090
Total	62,884	52,026	82.7%	\$1,212,725,174	8,636	13.7%	\$267,344,105	1,621	2.6%	\$152,400,052	62,283	99.0%	\$1,632,469,332

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The damage estimates for the 100-year hurricane wind event total \$187,674,765, which equates to a loss ratio of 2.6 percent. These damage estimates account for only wind impacts and actual damages would likely be higher due to flooding. Therefore, the Region would likely experience a higher overall loss ratio from the 100-year hurricane event and face difficulty recovering from such an event.

Environment

Hurricane winds can cause massive damage to the natural environment, uprooting trees and other debris within the storm's path. Animals can either be killed directly by the storm or impacted indirectly through changes in habitat and food availability caused by high winds, storm surge and intense rainfall. Endangered species can be dramatically impacted. Forests can be completely defoliated by strong winds.

Consequence Analysis

Table 4.54 summarizes the potential negative consequences of hurricanes and tropical storms.

Table 4.54 – Consequence Analysis – Hurricane and Tropical Storm

Category	Consequences
Public	Impacts include injury or death, loss of property, outbreak of diseases, mental trauma and loss of livelihoods. Power outages and flooding are likely to displace people from their homes. Water can become polluted such that if consumed, diseases and infection can be easily spread. Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed, resulting in cascading impacts on the public.
Responders	Localized impact expected to limit damage to personnel in the inundation area at the time of the incident.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel from flooding or wind may require temporary relocation of some operations. Operations may be interrupted by power outages. Disruption of roads and/or utilities may postpone delivery of some services. Regulatory waivers may be needed locally. Fulfillment of some contracts may be difficult. Impact may reduce deliveries.
Property, Facilities and Infrastructure	Structural damage to buildings may occur; loss of glass windows and doors by high winds and debris; loss of roof coverings, partial wall collapses, and other damages requiring significant repairs are possible in a major (category 3 to 5) hurricane.
Environment	Hurricanes can devastate wooded ecosystems and remove all the foliage from forest canopies, and they can change habitats so drastically that the indigenous animal populations suffer as a result. Specific foods can be taken away as high winds will often strip fruits, seeds and berries from bushes and trees. Secondary impacts may occur; for example, high winds and debris may result in damage to an above-ground fuel tank, resulting in a significant chemical spill.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period of time, depending on damages. Intangible impacts also likely, including business interruption and additional living expenses.
Public Confidence in the Jurisdiction's Governance	Likely to impact public confidence due to possibility of major event requiring substantial response and long-term recovery effort.

4.5.8 Severe Weather (Thunderstorm, Lightning and Hail)

Hazard Background

Thunderstorm Winds

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

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

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

Warning Time: 4 – Less than six hours

Duration: 1 – less than six hours

Lightning

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

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

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

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

Hail

According to NOAA, hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere causing them to freeze. The raindrops form into

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small frozen droplets and then continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen rain droplet can continue to grow and form hail. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow.

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

Hailstorms in North Carolina cause damage to property, crops, and the environment, and kill and injure livestock. In the United States, hail causes more than \$1 billion in damage to property and crops each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are the other things most commonly damaged by hail. Hail has been known to cause injury to humans; occasionally, these injuries can be fatal. Table 4.58 describes typical damage impacts of the various sizes of hail.

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

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

Location

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

Extent

Thunderstorm Winds

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

- ▶ **High Wind** – Sustained non-convective winds of 40mph or greater lasting for one hour or longer or winds (sustained or gusts) of 58 mph for any duration on a widespread or localized basis.
- ▶ **Strong Wind** – Non-convective winds gusting less than 58 mph, or sustained winds less than 40 mph, resulting in a fatality, injury, or damage.
- ▶ **Thunderstorm Wind** – Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 58 mph, or winds of any speed (non-severe thunderstorm winds below 58 mph) producing a fatality, injury or damage.

The Beaufort Wind Force Scale is an empirical measure that relates wind speed to observed conditions at sea or on land. In the United States, winds of force 6 to 7 are designated as “strong;” 8 to 9 “gale force;” 10 to 11 “usually results in a storm warning or tropical storm warning; and force 12 results in a hurricane warning.

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Table 4.55 – Beaufort Wind Force Scale

Rating	(MPH)	Name	Appearance of Wind Effects	
			On Water	On Land
0	<1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	13-18	Moderate Breeze	Small waves 1-4 ft, becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	19-24	Fresh Breeze	Moderate waves 4-8 ft taking longer to form, many whitecaps, some spray	Small trees in leaf begin to sway
6	25-31	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	32-38	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks of breakers	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Moderately high (18-25 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	47-54	Strong Gale	High waves (23-32 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Very high waves (29-41 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, “considerable structural damage”
11	64-72	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility more reduced	Very rarely experienced; widespread damage
12	73+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	Devastation

Source: NOAA Storm Prediction Center

The strongest recorded wind event across the region occurred on January 7, 2009 with peak thunderstorm wind gusts of 83 mph and 81 mph between Corapeake and Savage.

Impact: 2 – Limited

Spatial Extent: 4 – Large

Lightning

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

Table 4.56 – Lightning Activity Level Scale

Lightning Activity Level Scale	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground lightning strikes in a five minute period

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Lightning Activity Level Scale	
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a five minute period
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a five minute period
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a five minute period
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag warning

Source: National Weather Service

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

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

Impact: 1 – Minor

Spatial Extent: 1 – Negligible

Hail

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4.57 indicates the hailstone measurements utilized by the National Weather Service.

Table 4.57 – Hailstone Measurement Comparison Chart

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

Source: National Weather Service

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The Tornado and Storm Research Organization (TORRO) has further described hail sizes by their typical damage impacts. Table 4.58 describes typical intensity and damage impacts of the various sizes of hail, based on the TORRO Hailstorm Intensity Scale.

Table 4.58 – TORRO Hailstorm Intensity Scale

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

Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University

Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity.

The average hailstone size recorded between 1998 and 2017 in the Albemarle Region had a diameter of 1"; the largest stone recorded was 3.5", recorded on June 4, 1985. The largest hailstone ever recorded in the U.S. fell in Vivian, SD on June 23, 2010, with a diameter of 8 inches and a circumference of 18.62 inches.

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

Impact: 1 – Minor

Spatial Extent: 2 – Small

Historical Occurrences

Thunderstorm Winds

Between January 1, 1988 and December 31, 2017, the NCEI recorded 294 separate incidents of thunderstorm winds, strong winds and high winds across the six counties, occurring on 148 separate days. These events caused \$1,885,000 in recorded property damage, 1 injury and 2 fatalities during this time span. The recorded gusts averaged 58.2 mph, with the highest gusts recorded at almost 83 mph.

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239 wind gusts caused property damage. Wind gusts with property damage recorded averaged almost \$8,000 in damage, with two gusts causing a reported \$400,000 in damage each.

Table 4.59 – Winds Summary by County, 1988-2017

Location	Wind Incidents	Average Wind Speed (MPH)	Top Wind Speed (MPH)	Recorded Fatalities	Recorded Injuries	Recorded Property Damage
Camden	33	52.6	62	0	0	\$170,000
Chowan	46	49.5	74.8	0	0	\$587,000
Gates	49	51.7	82.85	1	0	\$96,000
Hertford	50	45.2	59.8	0	0	\$168,000
Pasquotank	70	49.6	69	0	0	\$647,000
Perquimans	45	53	69	0	0	\$217,000

Source: NCEI

Table 4.60 – Recorded Lightning Strikes in Albemarle Region, 1998-2017

County	Location	Date	Fatalities	Injuries	Property Damage
Perquimans	Beach Spring	8/1/1999	0	0	\$15,000
Pasquotank	Elizabeth City	8/1/2004	0	2	\$0
Gates	Corapeake	8/10/2008	0	0	\$5,000
Perquimans	Delight Nixon Crossroads	6/9/2009	0	0	\$1,000
Pasquotank	Elizabeth City	6/19/2014	0	0	\$5,000
Perquimans	Woodsville	6/26/2015	0	0	\$5,000
Total			0	2	\$31,000

Source: NCEI

One incident caused a fatality, and four incidents caused injuries. These incidents are recorded below:

Table 4.61 – Recorded Thunderstorm Winds with Injuries and/or Fatalities, 1998-2017

Location	Date	Time	Wind Speed (MPH)	Fatalities	Injuries	Property Damage
Raleigh	8/21/2007	17:40	50	0	8	\$0
Neuse	1/11/2014	14:05	86	1	2	\$0
Forestville	1/11/2014	14:05	86	0	1	\$0
Brookhaven	1/11/2014	14:05	86	0	1	\$0

Source: NCEI

Probability of Future Occurrence

Based on historical occurrences recorded by NCEI for the 20-year period from 1998 through 2017, the Region averaged almost 12 thunderstorm wind, high wind or strong wind events per year. Over this same period, seven lightning events were reported, which equates to an average of one lightning strikes every three years.

Over the 20-year period from 1998 through 2017, the Region experienced 97 reported hail incidents; this averages to almost five reported incidents per year somewhere in the planning area, or a 100% chance that the Region will experience a hail incident each year.

Based on these historical occurrences, there is a 100% chance that the Region will experience severe weather each year. The probability of a damaging impacts is highly likely.

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Probability: 4 – Highly Likely

Climate Change

According to the National Aeronautics and Space Administration (NASA), thunderstorm events in the future are likely to become more frequent in the southeast as a result of weather extremes. Thunderstorm potential is measured by an index that NASA created called the Convective Available Potential Energy (CAPE) index. This measures how warm and moist the air is, which is a major contributing factor in thunderstorm/tornado formation. NASA projects that by the period of 2072-2099, the CAPE in the southeastern United States will increase dramatically. Parts of North Carolina are in an area that will likely experience the greatest increase in CAPE in the United States and all of the state is likely to experience at least some increase. This indicates that there will potentially be even more frequent thunderstorms in the state going forward.

Vulnerability Assessment

Methodologies and Assumptions

Population and property at risk to wind events was estimated using data from the North Carolina Emergency Management (NCEM) IRISK database, which was compiled in NCEM's Risk Management Tool.

People

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

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

People and populations exposed to the elements are most vulnerable to tornados. The availability of sheltered locations such as basements, buildings constructed using hail-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. According to 2017 data from the U.S. Census Community Fact Finder, 10,079 homes are classified as "mobile homes," 21.05% of homes across the region. Based on an average estimate of household size across the region, there are almost 25,000 people living in mobile homes. Table 4.62 shows total mobile housing units and potential populations impacted by county.

Table 4.62 – Mobile Homes Across the Region

County	Total Mobile Housing Units	Percentage of Total Housing	Estimated Average Household	Population at Risk
Camden	684	16.3%	2.71	1853.64
Chowan	1,574	21.6%	2.40	3777.6
Gates	1,590	30.0%	2.60	4134
Hertford	2,632	24.7%	2.40	6316.8
Pasquotank	2,048	12.0%	2.51	5140.48
Perquimans	1,551	21.7%	2.39	3706.89
Region Total	10,079	21.05%	2.50	24,929.41

Source: 2017 American Community Survey

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Individuals who work outdoors may also face increased risk.

Since 1998, the NCEI records two fatalities due to thunderstorm winds. The NCEI records three injuries, with two attributed to lightning and one attributed to thunderstorm wind. No fatalities were attributed to lightning or hail, and no injuries were attributed to hail.

Property

Property damage caused by lightning usually occurs in one of two ways – either by direct damages through fires ignited by lightning, or by secondary impacts due to power loss. According to data collected on lightning strikes in the Region, the vast majority of recorded property damage was due to structure fires, though NCEI also records damage to a vehicle in Pasquotank County and a herd of cattle killed while standing under a tree struck by lightning.

NCEI records lightning impacts over 20 years (1998-2017), with \$51,000 in property damage recorded. Historically, this has resulted in \$2,550 in property impacts annually across the region. The average impact from lightning per incident in the Region is \$7,285.

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

During a 30-year span between January 1, 1988 and December 31, 2017 in the region, NCEI reported \$57,000 in property damage as a direct result of hail. According to a National Insurance Crime Bureau (NICB) study of insurance claims from the Insurance Services Office (ISO) ClaimSearch database, between 2014 and 2016, North Carolina saw 45,274 separate hail damage claims. It should be noted that property damage due to hail is usually insured loss, with damages covered under most major comprehensive insurance plans. Because of this, hail losses are notoriously underreported by the NCEI. It is difficult to find an accurate repository of hail damages in the region, thus the NCEI is still used to form a baseline.

When strong enough, wind events can cause significant direct damage to buildings and infrastructure. NCEI records \$1,099,000 in total damages from winds, with an average of \$4,700 in damages per incident. NCEM's IRISK database estimates damages from increasing magnitudes of wind events, detailed in Table 4.63 through Table 4.66.

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Table 4.63 – Estimated Buildings Impacted by 50-Year Thunderstorm Winds

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.4%	\$12,110,544	638	11.8%	\$390,345	159	2.9%	\$477,738	5,353	99.1%	\$12,978,627
Chowan	6,314	5,149	81.5%	\$6,935,776	1,052	16.7%	\$1,169,525	79	1.3%	\$284,103	6,280	99.5%	\$8,389,404
Edenton	2,976	2,452	82.4%	\$4,781,604	416	14.0%	\$2,022,455	106	3.6%	\$684,469	2,974	99.9%	\$7,488,528
Gates	6,637	4,662	70.2%	\$7,692,891	1,816	27.4%	\$1,255,947	157	2.4%	\$1,368,533	6,635	100.0%	\$10,317,370
Gatesville	204	132	64.7%	\$240,057	44	21.6%	\$199,239	28	13.7%	\$122,590	204	100.0%	\$561,886
Hertford	8,307	6,611	79.6%	\$4,003,483	1,519	18.3%	\$952,140	126	1.5%	\$981,312	8,256	99.4%	\$5,936,935
Ahoskie	2,744	2,313	84.3%	\$1,294,831	313	11.4%	\$437,435	102	3.7%	\$109,872	2,728	99.4%	\$1,842,137
Como	91	62	68.1%	\$77,716	25	27.5%	\$12,168	3	3.3%	\$10,449	90	98.9%	\$100,333
Harrellsville	100	85	85.0%	\$70,699	8	8.0%	\$1,877	6	6.0%	\$3,529	99	99.0%	\$76,105
Murfreesboro	2,275	2,009	88.3%	\$1,235,193	183	8.0%	\$102,304	76	3.3%	\$85,320	2,268	99.7%	\$1,422,817
Winton	479	399	83.3%	\$315,132	33	6.9%	\$90,750	43	9.0%	\$197,627	475	99.2%	\$603,509
Cofield	287	233	81.2%	\$126,437	47	16.4%	\$26,830	3	1.0%	\$501	283	98.6%	\$153,768
Pasquotank	10,460	9,020	86.2%	\$28,575,606	1,138	10.9%	\$6,807,555	202	1.9%	\$3,082,474	10,360	99.0%	\$38,465,634
Elizabeth City	8,713	7,354	84.4%	\$20,042,640	951	10.9%	\$8,332,605	293	3.4%	\$3,745,766	8,598	98.7%	\$32,121,011
Perquimans	6,255	5,680	90.8%	\$18,651,066	284	4.5%	\$4,439,204	134	2.1%	\$2,125,607	6,098	97.5%	\$25,215,877
Hertford	1,224	965	78.8%	\$1,957,752	137	11.2%	\$424,540	74	6.0%	\$1,245,194	1,176	96.1%	\$3,627,485
Winfall	419	344	82.1%	\$1,429,788	32	7.6%	\$307,106	30	7.2%	\$659,946	406	96.9%	\$2,396,840
Total	62,884	52,026	82.7%	\$109,541,215	8,636	13.7%	\$26,972,025	1,621	2.6%	\$15,185,030	62,283	99.0%	\$151,698,266

Source: NCEM Risk Management Tool

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Table 4.64 – Estimated Buildings Impacted by 100-Year Thunderstorm Winds

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.4%	\$20,735,186	638	11.8%	\$728,516	159	2.9%	\$914,501	5,353	99.1%	\$22,378,204
Chowan	6,314	5,149	81.5%	\$10,860,528	1,052	16.7%	\$2,013,926	79	1.3%	\$515,447	6,280	99.5%	\$13,389,901
Edenton	2,976	2,452	82.4%	\$7,906,927	416	14%	\$3,433,130	106	3.6%	\$1,246,578	2,974	99.9%	\$12,586,635
Gates	6,637	4,662	70.2%	\$13,369,470	1,816	27.4%	\$2,005,663	157	2.4%	\$2,295,187	6,635	100%	\$17,670,319
Gatesville	204	132	64.7%	\$387,895	44	21.6%	\$287,646	28	13.7%	\$212,282	204	100%	\$887,824
Hertford	8,307	6,611	79.6%	\$6,528,512	1,519	18.3%	\$1,469,238	126	1.5%	\$1,624,189	8,256	99.4%	\$9,621,939
Ahoskie	2,744	2,313	84.3%	\$2,271,130	313	11.4%	\$1,033,970	102	3.7%	\$308,102	2,728	99.4%	\$3,613,203
Como	91	62	68.1%	\$118,979	25	27.5%	\$24,131	3	3.3%	\$18,090	90	98.9%	\$161,199
Harrellsville	100	85	85%	\$100,505	8	8%	\$3,987	6	6%	\$7,732	99	99%	\$112,223
Murfreesboro	2,275	2,009	88.3%	\$1,843,997	183	8%	\$180,474	76	3.3%	\$156,246	2,268	99.7%	\$2,180,717
Winton	479	399	83.3%	\$462,295	33	6.9%	\$134,715	43	9%	\$298,935	475	99.2%	\$895,945
Cofield	287	233	81.2%	\$180,342	47	16.4%	\$51,780	3	1%	\$849	283	98.6%	\$232,971
Pasquotank	10,460	9,020	86.2%	\$49,000,893	1,138	10.9%	\$11,789,869	202	1.9%	\$5,169,229	10,360	99%	\$65,959,991
Elizabeth City	8,713	7,354	84.4%	\$35,852,094	951	10.9%	\$13,748,384	293	3.4%	\$6,156,285	8,598	98.7%	\$55,756,763
Perquimans	6,255	5,680	90.8%	\$35,541,818	284	4.5%	\$7,775,970	134	2.1%	\$3,459,433	6,098	97.5%	\$46,777,220
Hertford	1,224	965	78.8%	\$5,019,156	137	11.2%	\$1,165,079	74	6%	\$2,870,927	1,176	96.1%	\$9,055,162
Winfall	419	344	82.1%	\$2,979,511	32	7.6%	\$460,789	30	7.2%	\$1,138,034	406	96.9%	\$4,578,333
Total	62,884	52,026	82.7%	\$193,159,238	8,636	13.7%	\$46,307,267	1,621	2.6%	\$26,392,046	62,283	99.0%	\$265,858,549

Source: NCEM Risk Management Tool

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Table 4.65 – Estimated Buildings Impacted by 300-Year Thunderstorm Winds

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.4%	\$55,139,236	638	11.8%	\$2,071,625	159	2.9%	\$2,742,973	5,353	99.1%	\$59,953,833
Chowan	6,314	5,149	81.5%	\$28,591,296	1,052	16.7%	\$5,687,523	79	1.3%	\$1,642,742	6,280	99.5%	\$35,921,561
Edenton	2,976	2,452	82.4%	\$22,418,472	416	14%	\$9,665,542	106	3.6%	\$3,961,387	2,974	99.9%	\$36,045,401
Gates	6,637	4,662	70.2%	\$31,509,059	1,816	27.4%	\$4,359,293	157	2.4%	\$5,166,129	6,635	100%	\$41,034,481
Gatesville	204	132	64.7%	\$1,120,997	44	21.6%	\$575,124	28	13.7%	\$608,520	204	100%	\$2,304,641
Hertford	8,307	6,611	79.6%	\$12,986,272	1,519	18.3%	\$3,058,112	126	1.5%	\$2,680,774	8,256	99.4%	\$18,725,158
Ahoskie	2,744	2,313	84.3%	\$3,478,415	313	11.4%	\$1,806,856	102	3.7%	\$539,515	2,728	99.4%	\$5,824,786
Como	91	62	68.1%	\$187,003	25	27.5%	\$47,347	3	3.3%	\$32,447	90	98.9%	\$266,797
Harrellsville	100	85	85%	\$227,496	8	8%	\$17,063	6	6%	\$35,341	99	99%	\$279,899
Murfreesboro	2,275	2,009	88.3%	\$4,491,375	183	8%	\$601,834	76	3.3%	\$569,993	2,268	99.7%	\$5,663,202
Winton	479	399	83.3%	\$714,720	33	6.9%	\$209,228	43	9%	\$475,214	475	99.2%	\$1,399,162
Cofield	287	233	81.2%	\$273,123	47	16.4%	\$200,865	3	1%	\$1,593	283	98.6%	\$475,581
Pasquotank	10,460	9,020	86.2%	\$128,214,913	1,138	10.9%	\$30,767,049	202	1.9%	\$13,044,622	10,360	99%	\$172,026,584
Elizabeth City	8,713	7,354	84.4%	\$100,070,340	951	10.9%	\$34,258,999	293	3.4%	\$15,371,743	8,598	98.7%	\$149,701,082
Perquimans	6,255	5,680	90.8%	\$73,685,380	284	4.5%	\$14,690,951	134	2.1%	\$6,591,409	6,098	97.5%	\$94,967,740
Hertford	1,224	965	78.8%	\$10,349,708	137	11.2%	\$2,145,222	74	6%	\$4,754,302	1,176	96.1%	\$17,249,232
Winfall	419	344	82.1%	\$4,753,629	32	7.6%	\$636,080	30	7.2%	\$1,624,689	406	96.9%	\$7,014,398
Total	62,884	52,026	82.7%	\$478,211,434	8,636	13.7%	\$110,798,713	1,621	2.6%	\$59,843,393	62,283	99.0%	\$648,853,538

Source: NCEM Risk Management Tool

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Table 4.66 – Estimated Buildings Impacted by 700-Year Thunderstorm Winds

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,556	84.4%	\$81,212,732	638	11.8%	\$3,018,429	159	2.9%	\$4,059,062	5,353	99.1%	\$88,290,223
Chowan	6,314	5,149	81.5%	\$47,377,043	1,052	16.7%	\$9,427,299	79	1.3%	\$2,910,748	6,280	99.5%	\$59,715,090
Edenton	2,976	2,452	82.4%	\$36,666,758	416	14%	\$16,111,155	106	3.6%	\$6,929,258	2,974	99.9%	\$59,707,172
Gates	6,637	4,662	70.2%	\$59,478,888	1,816	27.4%	\$7,499,805	157	2.4%	\$8,948,230	6,635	100%	\$75,926,924
Gatesville	204	132	64.7%	\$1,900,816	44	21.6%	\$827,395	28	13.7%	\$1,021,598	204	100%	\$3,749,809
Hertford	8,307	6,611	79.6%	\$24,490,290	1,519	18.3%	\$4,855,469	126	1.5%	\$5,774,293	8,256	99.4%	\$35,120,052
Ahoskie	2,744	2,313	84.3%	\$8,343,933	313	11.4%	\$4,976,685	102	3.7%	\$1,485,419	2,728	99.4%	\$14,806,037
Como	91	62	68.1%	\$447,337	25	27.5%	\$136,013	3	3.3%	\$81,870	90	98.9%	\$665,220
Harrellsville	100	85	85%	\$360,576	8	8%	\$33,814	6	6%	\$71,294	99	99%	\$465,684
Murfreesboro	2,275	2,009	88.3%	\$7,056,112	183	8%	\$1,049,491	76	3.3%	\$1,024,405	2,268	99.7%	\$9,130,007
Winton	479	399	83.3%	\$1,774,720	33	6.9%	\$478,608	43	9%	\$1,184,393	475	99.2%	\$3,437,721
Cofield	287	233	81.2%	\$675,225	47	16.4%	\$450,108	3	1%	\$5,279	283	98.6%	\$1,130,613
Pasquotank	10,460	9,020	86.2%	\$185,972,436	1,138	10.9%	\$43,189,164	202	1.9%	\$18,334,300	10,360	99%	\$247,495,900
Elizabeth City	8,713	7,354	84.4%	\$147,861,540	951	10.9%	\$48,990,883	293	3.4%	\$21,933,537	8,598	98.7%	\$218,785,961
Perquimans	6,255	5,680	90.8%	\$144,355,265	284	4.5%	\$27,918,309	134	2.1%	\$11,290,252	6,098	97.5%	\$183,563,826
Hertford	1,224	965	78.8%	\$24,850,712	137	11.2%	\$5,287,072	74	6%	\$9,782,453	1,176	96.1%	\$39,920,237
Winfall	419	344	82.1%	\$10,023,622	32	7.6%	\$1,216,513	30	7.2%	\$3,129,955	406	96.9%	\$14,370,090
Total	62,884	52,026	82.7%	\$782,848,005	8,636	13.7%	\$175,466,212	1,621	2.6%	\$97,966,346	62,283	99.0%	\$1,056,280,566

Source: NCEM Risk Management Tool

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Severe weather can also cause significant agricultural losses. Table 4.67 summarizes regional crop losses due to the identified impacts of severe thunderstorms (hail, wind, and excess moisture) as reported in the RMA system.

Table 4.67 – Regional Crop Losses Resulting from Severe Thunderstorm, 2007-2016

Year	Hail		Wind		Excess Moisture	
	Determined Acres	Indemnity Amount	Determined Acres	Indemnity Amount	Determined Acres	Indemnity Amount
2007	70.01	\$118,120	-	-	1,611.80	\$137,945
2008	246.70	\$26,592	16.00	\$27,166	2,641.92	\$104,635
2009	235.80	\$56,809	206.78	\$10,110	27,560.06	\$2,633,111
2010	-	-	419.18	\$599,000	45,252.03	\$5,242,310
2011	6.06	\$1,077	21.60	\$1,954	8,503.44	\$1,593,850
2012	376.48	\$352,860	-	-	14,609.72	\$1,584,645
2013	-	-	65.30	\$22,828	16,464.02	\$1,532,541
2014	-	-	29.50	\$3,026	14,137.54	\$1,129,900.95
2015	365.16	\$102,207.45	24.86	\$28,753.75	37,327.74	\$5,022,503.02
2016	68.12	\$4,583	28.30	\$66,444	44,249.50	\$5,403,798.21
Total	1,368.33	\$662,248.45	811.52	\$759,281.75	212,357.77	\$24,385,239.18

Source: USDA Risk Management Agency

Table 4.68 summarizes county-specific data on indemnity amounts, as well as average payout amounts per year per county. Hertford County has suffered the greatest impacts agriculturally from drought, with nearly \$8 million in payouts over the 10-year timespan.

Table 4.68 – County-Specific Total Crop Losses Resulting from Drought, 2007-2016

County	Determined Acres	Indemnity Amount	Average Annual Indemnity
Camden	16,580.85	\$1,671,121.25	\$167,112.12
Chowan	19,595.68	\$2,307,979.16	\$230,797.91
Gates	17,268.97	\$3,550,858.00	\$355,085.80
Hertford	29,822.34	\$7,967,678.82	\$796,767.88
Pasquotank	55,368.95	\$5,539,812.55	\$553,981.25
Perquimans	61,019.86	\$5,684,897.62	\$568,489.76

Source: USDA Risk Management Agency

Environment

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

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

Consequence Analysis

Table 4.69 summarizes the potential negative consequences of severe weather.

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Table 4.69 – Consequence Analysis – Severe Weather (Thunderstorm Winds, Lightning, and Hail)

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

4.5.9 Severe Winter Storm

Hazard Background

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

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

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

Warning Time: 1 – More than 24 hours

Advancements in meteorology and forecasting usually allow for mostly accurate forecasting a few days in advance of an impending storm.

Duration: 3 – Less than 1 week

Most storms have a duration of a few hours. Impacts can last a few days after the initial incident until cleanup is completed.

Location

Severe winter storms are usually a countywide or regional hazard, impacting the entire county at the same time. The risk of severe winter storm occurring is uniform across the Region.

Extent

NOAA uses the Regional Snowfall Index (RSI) to assess the societal impact of winter storms in the six easternmost regions in the United States. The index makes use of population and regional differences to assess the impact of snowfall. For example, areas which receive very little snowfall on average may be more adversely affected than other regions, resulting in a higher severity.

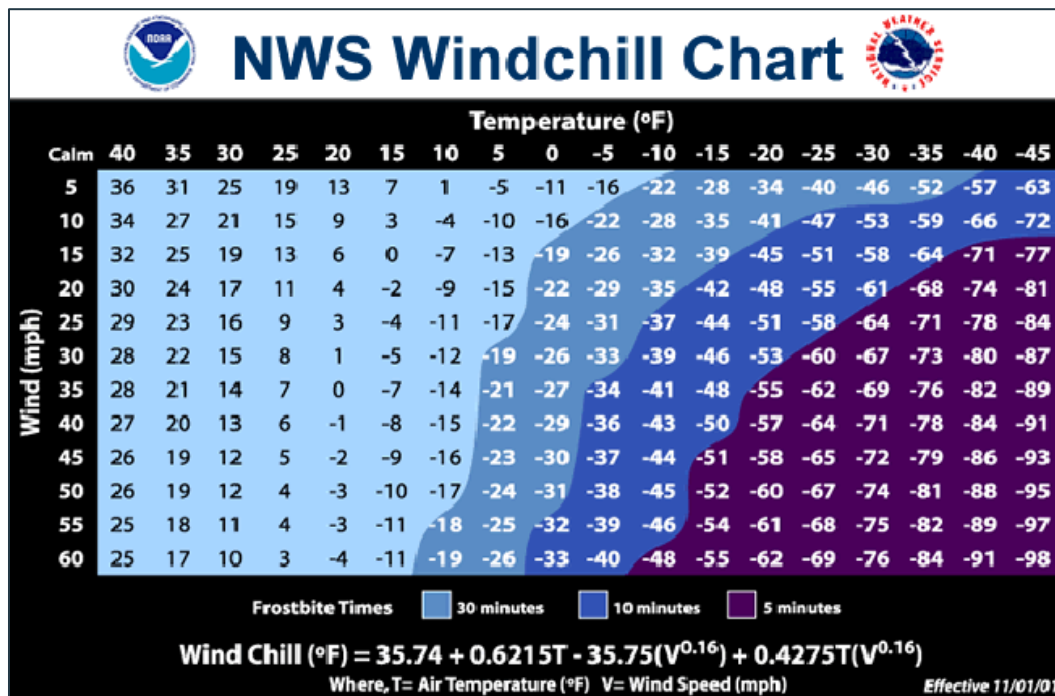
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Table 4.70 – Regional Snowfall Index (RSI) Values

Category	RSI Value	Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18+	Extreme

Severe winter storms often involve a mix of hazardous weather conditions. The magnitude of an event can be defined based on the severity of each of the involved factors, including precipitation type, precipitation accumulation amounts, temperature, and wind. The NWS Wind Chill Temperature Index, shown in Figure 4.45, provides a formula for calculating the dangers of winter winds and freezing temperatures.

Figure 4.45 – NWS Wind Chill Temperature Index



Source: <http://www.nws.noaa.gov/om/winter/windchill.shtml>

Table 4.71 notes greatest one-day snowfall totals for each county in the Albemarle Region. Note that data was not available in Camden, Gates and Perquimans counties, due to no available county-specific weather stations.

Table 4.71 – Greatest One-Day Snowfall by County

County	Inches	Location	Date
Camden	No weather stations with data in this county		
Chowan	26.0 in	Edenton	Mar 1, 1927
Gates	No weather stations with data in this county		
Hertford	10.0 in	Murfreesboro	Dec 26, 2010

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County	Inches	Location	Date
Pasquotank	15.0 in	Elizabeth City	Feb 10, 1948
Perquimans	No weather stations with data in this county		

Source: North Carolina Climate Office

Impact: 2 – Limited

Spatial Extent: 4 – Large

The entirety of North Carolina is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Region is accustomed to smaller scale severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire Region has uniform exposure to a winter storm.

Historical Occurrences

To get a full picture of the range of impacts of a severe winter storm, data for the following weather types as defined by the National Weather Service (NWS) Raleigh Forecast Office and tracked by NCEI were collected:

- **Blizzard** – A winter storm which produces the following conditions for 3 consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile.
- **Cold/Wind Chill** – Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory conditions of 0°F to -14°F with wind speeds 10 mph (9 kt) or greater.
- **Extreme Cold/Wind Chill** – A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria, defined as wind chill -15°F or lower with wind speeds 10 mph (9 kt) or greater.
- **Frost/Freeze** – A surface air temperature of 32°F or lower, or the formation of ice crystals on the ground or other surfaces, for a period of time long enough to cause human or economic impact, during the locally defined growing season.
- **Heavy Snow** – Snow accumulation meeting or exceeding 12 and/or 24 hour warning criteria of 3 and 4 inches, respectively.
- **Ice Storm** – Ice accretion meeting or exceeding locally/regionally defined warning criteria of ¼ inch or greater resulting in significant, widespread power outages, tree damage and dangerous travel. Issued only in those rare instances where just heavy freezing rain is expected and there will be no "mixed bag" precipitation meaning no snow, sleet or rain.
- **Sleet** – Sleet accumulations meeting or exceeding locally/regionally defined warning criteria of ½ inch or more.
- **Winter Storm** – A winter weather event that has more than one significant hazard and meets or exceeds locally/regionally defined 12 and/or 24 hour warning criteria for at least one of the precipitation elements. Defined by NWS Raleigh Forecast Office as snow accumulations 3 inches or greater in 12 hours (4 inches or more in 24 hours); Freezing rain accumulations ¼ inch (6 mm) or greater; Sleet accumulations ½ inch (13 mm) or more. Issued when there is at least a 60% forecast confidence of any one of the three criteria being met.
- **Winter Weather** – A winter precipitation event that causes a death, injury, or a significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria.

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Summarized impacts from data collected for the years 1998 through 2017 are included in Table 4.72. In this timeframe, NCEI recorded no fatalities, injuries, property or crop damage from the impacts of severe winter storm in any of the counties in the Albemarle Region, though these types of impacts are possible in future events. No extreme cold/wind chill, heavy snow or sleet events were recorded during this timeframe.

Table 4.72 – Historical Hazard Occurrence 1998-2017

Hazard	Camden	Chowan	Gates	Hertford	Pasquotank	Perquimans	Total
Blizzard	0	0	0	0	0	0	0
Cold/Wind Chill	0	0	0	0	0	0	0
Extreme Cold/Wind Chill	0	0	0	0	0	0	0
Frost/Freeze	3	3	4	4	3	3	20
Heavy Snow	0	0	0	0	0	0	0
Ice Storm	0	0	1	1	0	0	2
Sleet	0	0	0	0	0	0	0
Winter Storm	17	15	15	17	16	16	96
Winter Weather	10	13	15	14	10	13	75
Total	30	31	35	36	29	32	193

Source: NCEI

The counties in the Albemarle Region have received three separate FEMA disaster declarations for impacts from winter storms since 1968. Table 4.73 lists all declarations that have impacted the counties in the region. As a state, North Carolina received eight disaster declarations related to severe winter storms during this timeframe.

Table 4.73 – Disaster Declarations in Albemarle Region due to Severe Winter Storms

Disaster Number	Date	Disaster Type	Incident Start	Incident End	Declared Counties
234	2/10/1968	Severe Ice Storm	2/10/1968	2/10/1968	Chowan, Hertford, Pasquotank, Perquimans
1087	1/13/1996	Snow	1/6/1996	1/12/1996	Camden, Chowan, Gates, Hertford, Pasquotank
1103	2/23/1996	Snow	2/2/1996	2/9/1996	Gates, Hertford

Source: FEMA Disaster Declarations, December 2018

Probability of Future Occurrence

According to the NCEI, the Albemarle Region experienced 79 separate severe winter weather-related incidents occurring over 42 days between 1998 and 2017. This averages to almost four incidents recorded per year somewhere in the Region. Based on this historical analysis, there is a 100% chance of experiencing a severe winter weather incident in an average year.

Probability: 4 – Highly Likely

Climate Change

According to the 2018 North Carolina Hazard Mitigation Plan, the uncertainty associated with potentially changing climate conditions creates uncertainty for predicting future severe winter storms. If it is

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determined that global temperatures are indeed rising, this could cause shorter and warmer winters in many areas; however, the likelihood of dangerously low temperatures may increase due to continuing trends of temperature extremes. Warmer winters, however, mean that precipitation that would normally fall as snow may begin to fall as rain or freezing rain instead.

Vulnerability Assessment

Using NCEI, historical data was searched for impacts from the following recorded hazards:

- Blizzard
- Cold/Wind Chill
- Extreme Cold/Wind Chill
- Frost/Freeze
- Heavy Snow
- Ice Storm
- Sleet
- Winter Storm
- Winter Weather

In this timeframe, the Albemarle Region experienced no fatalities, injuries, property or crop damage from the impacts of any aspect of severe winter storm, though these types of impacts are possible in future events.

People

Winter storms are considered deceptive killers because most deaths are indirectly related to the storm event. The leading cause of death during winter storms is from automobile or other transportation accidents due to poor visibility and/or slippery roads. Additionally, exhaustion and heart attacks caused by overexertion may result from winter storms.

Power outages during very cold winter storm conditions can also create potentially dangerous situations. Elderly people account for the largest percentage of hypothermia victims. In addition, if the power is out for an extended period, residents are forced to find alternative means to heat their homes. The danger arises from carbon monoxide released from improperly ventilated heating sources such as space or kerosene heaters, furnaces, and blocked chimneys. House fires also occur more frequently in the winter due to lack of proper safety precautions when using an alternative heating source.

Property

According to reported data of storm impacts recorded by the NCEI, between 1998 and 2017 the Region didn't experience any recorded property or property damage related to the impacts of severe winter storm.

Environment

Winter storm events may include ice or snow accumulation on trees which can cause large limbs, or even whole trees, to snap and potentially fall on buildings, cars, or power lines. This potential for winter debris creates a dangerous environment to be outside in; significant injury or fatality may occur if a large limb snaps while a local resident is out driving or walking underneath it.

Consequence Analysis

Table 4.74 summarizes the potential negative consequences of severe winter storm.

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Table 4.74 – Consequence Analysis – Severe Winter Storm

Category	Consequences
Public	Localized impact expected to be severe for affected areas and moderate to light for other less affected areas.
Responders	Adverse impact expected to be severe for unprotected personnel and moderate to light for trained, equipped, and protected personnel.
Continuity of Operations (including Continued Delivery of Services)	Localized disruption of roads and/or utilities caused by incident may postpone delivery of some services.
Property, Facilities and Infrastructure	Localized impact to facilities and infrastructure in the areas of the incident. Power lines and roads most adversely affected.
Environment	Environmental damage to trees, bushes, etc.
Economic Condition of the Jurisdiction	Local economy and finances may be adversely affected, depending on damage.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

4.5.10 Tornado

Hazard Background

According to the Glossary of Meteorology (AMS 2000), a tornado is "a violently rotating column of air, pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud." Tornadoes can appear from any direction. Most move from southwest to northeast, or west to east. Some tornadoes have changed direction amid path, or even backtracked.

Tornadoes are commonly produced by land falling tropical cyclones. Those making landfall along the Gulf coast traditionally produce more tornadoes than those making landfall along the Atlantic coast. Tornadoes that form within hurricanes are more common in the right front quadrant with respect to the forward direction, but can occur in other areas as well. According to the NHC, about 10% of the tropical cyclone-related fatalities are caused by tornadoes. Tornadoes are more likely to be spawned within 24 hours of landfall and are usually within 30 miles of the tropical cyclone’s center.

Tornadoes have the potential to produce winds in excess of 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive – some in the Great Plains have exceeded two miles in width. Tornadoes associated with tropical cyclones, however, tend to be of lower intensity (EF0 to EF2) and much smaller in size than ones that form in the Great Plains.

Figure 4.46 – Types of Tornadoes



Source: NOAA National Weather Service

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

Tornados can occur anywhere in the Albemarle Region. Tornadoes typically impact a small area, but damage may be extensive. Tornado locations are completely random, meaning risk to tornado isn't

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increased in one area of the region versus another. The entirety of the Region is uniformly exposed to this hazard.

Figure 4.47 – Tornado Activity in the United States

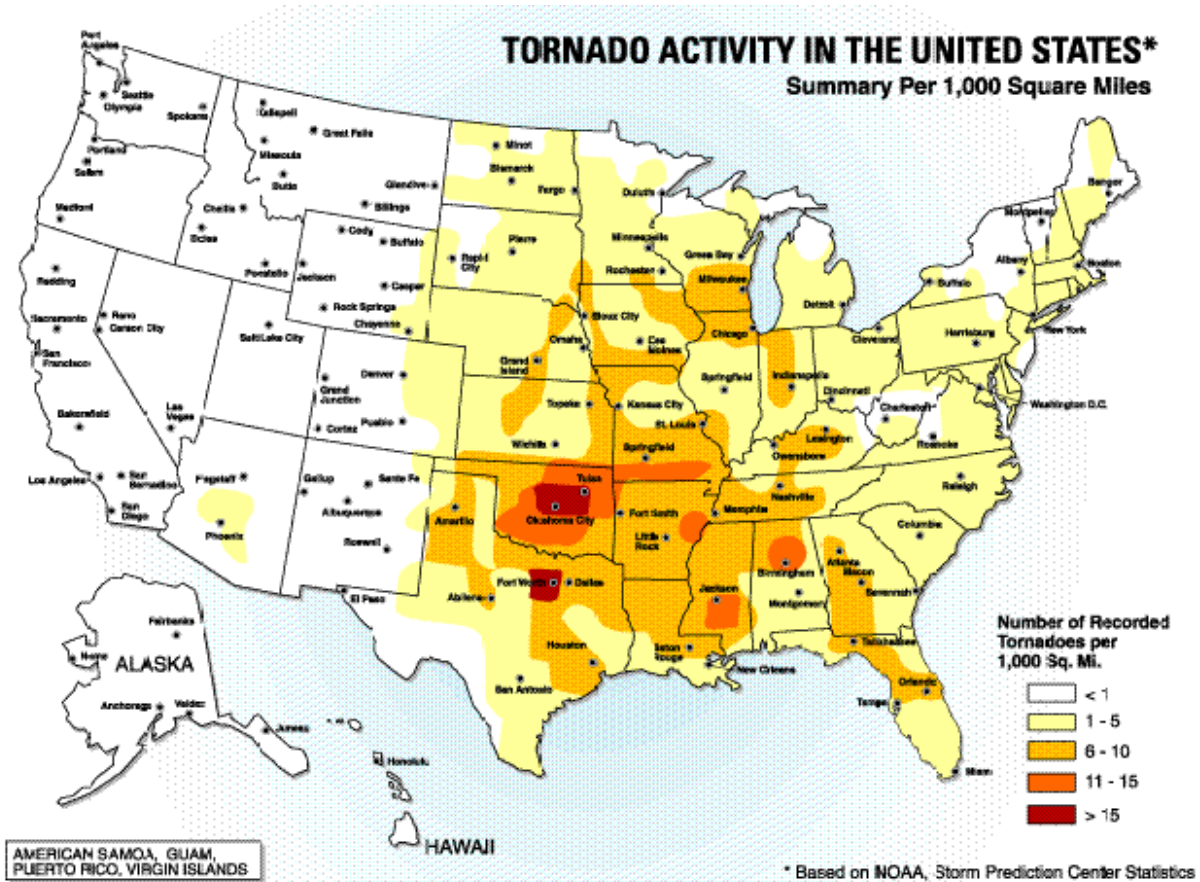


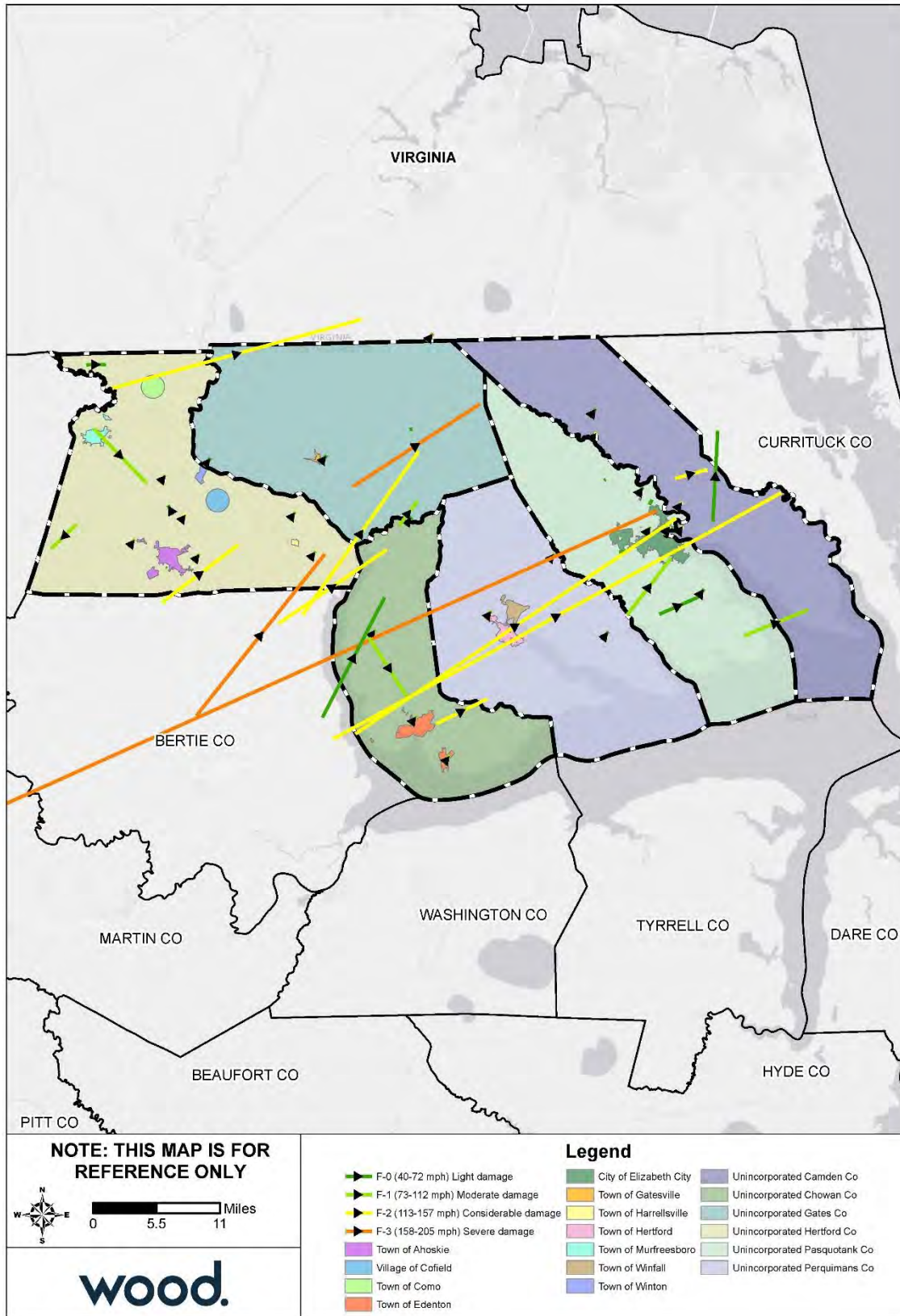
Figure 1.1 The number of tornadoes recorded per 1,000 square miles

Source: American Society of Civil Engineers

Location

Figure 4.48 reflects the tracks of past tornados that have passed through counties in the Albemarle Region.

Figure 4.48 – Tornado Paths Across the Albemarle Region



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Extent

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita (EF) scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis, better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 4.75 shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different levels of intensity.

Table 4.75 – Enhanced Fujita Scale

EF Number	3 Second Gust (mph)	Damage
0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
1	96-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
5	Over 200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m; high-rise buildings have significant structural deformation; incredible phenomena will occur.

The most intense tornado to pass through the Albemarle Region was an F4 in 1988; this tornado also had the longest path (83 miles) and resulted in the most injuries (154 people). An F2 tornado in 1981 had the widest observed path in the county at 800 yards. An F3 tornado in 2011 resulted in the most fatalities, killing six people. An EF3 tornado in 2011 caused \$115 million in recordable property damage.

Impact: 3 – Critical

Spatial Extent: 2 – Small

Historical Occurrences

According to the NCEI, the counties in the Albemarle Region have experienced 48 tornado incidents between 1988 and 2017, causing one fatality, 10 injuries, over \$6.8 million in property damage and over \$2 million in crop damage. Table 4.76 shows historical tornadoes in the region during this time period.

Table 4.76 – Recorded Tornadoes in the Albemarle Region, 1988-2017

County	Total Recorded Occurrences	Recorded Deaths	Recorded Injuries	Total Reported Property Damage	Total Reported Crop Damage
Camden	4	0	0	\$115,000	\$0
Chowan	10	1	1	\$765,250	\$0

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County	Total Recorded Occurrences	Recorded Deaths	Recorded Injuries	Total Reported Property Damage	Total Reported Crop Damage
Gates	3	0	0	\$81,000	\$0
Hertford	9	0	6	\$2,235,000	\$2,017,000
Pasquotank	15	0	25	\$4,620,000	\$0
Perquimans	5	0	0	\$2,152,500	\$0
Total	47	1	32	\$9,968,750	\$2,017,000

Source: NCEI

Of the tornadoes recorded by NCEI, 22 were categorized as F0 or EF0, 11 were categorized as F1 or EF1, and 12 were categorized as F2 or EF2, and two were categorized as F3. The average tornado caused \$212,000 in recorded property damage, while crop damage averages were \$500,000, though there were only four incidents with recorded crop damage and amounts of damage varied widely. Specific incidents with some level of impact include:

October 17, 1999 – a tornado associated with Hurricane Irene touched down one mile north of Weeksville. Two trailers were totally destroyed, as well as other structure and property damage. A refrigerator was carried the entire length of the tornado path and deposited in the front yard of the modular home. The storm caused one injury, cause unrecorded.

June 1, 2001 – A tornado touched down in the vicinity of Menotal and Ahoskie Tri County Airport in Hertford County. There were reports of trees down and several buildings damaged; 3 injuries were recorded.

April 16, 2011 – Scattered severe thunderstorms produced damaging winds, large hail and several tornadoes across portions of northeast North Carolina. An EF2 tornado tracked from northeast Bertie County into southeast Hertford County. The tornado produced mainly EF2 damage in southeast Hertford County. Many homes were destroyed, and several others suffered various degrees of damage. In addition, there was damage to trees and wooded areas in the path of the tornado. Poultry houses and other farm equipment were also damaged. The tornado tracked northeast into Gates County. The tornado caused \$1.8 million in property damage, and \$2 million in crop damage to the Newsome Store area in Hertford County. In addition, an EF1 tornado caused \$40,000 in Harbinger in Currituck County, and an EF1 tornado caused \$30,000 in damage in Vivian in Gates County.

April 25, 2014 – A localized tornado outbreak struck North Carolina, killing one person and injuring 27 others. Tornadoes associated with this outbreak struck Camden, Chowan, Pasquotank and Perquimans counties. A total of 327 homes were damaged or destroyed across four counties during the outbreak. Two long-track tornadoes crossed the Albemarle Region, resulting in one fatality in Edenton. Reports indicated damage to trees, homes and outbuildings associated with these storm cell. This storm resulted in a declared state of emergency for the areas impacted but did not result in a FEMA disaster declaration.

Probability of Future Occurrence

In a 30-year span between 1988 and 2017, the region experienced 47 separate tornado incidents. This correlates to 1.6 tornado incidents per year, or a 100% historical probability that the planning area will experience at least one tornado somewhere in its boundaries every year. Table 4.77 shows probability of future occurrence by county in the region.

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Table 4.77 – Annual Probability by County

County	Tornadoes	Timespan (in years)	Probability of Annual Future Occurrence
Camden	4	30	13%
Chowan	10	30	33%
Gates	3	30	10%
Hertford	9	30	30%
Pasquotank	15	30	50%
Perquimans	6	30	20%

Probability: 3 – Likely

Climate Change

There presently is not enough data or research to quantify the magnitude of change that climate change may have related to tornado frequency and intensity. NASA’s Earth Observatory has conducted studies which aim to understand the interaction between climate change and tornadoes. Based on these studies meteorologists are unsure why some thunderstorms generate tornadoes and others don’t, beyond knowing that they require a certain type of wind shear. Tornadoes spawn from approximately one percent of thunderstorms, usually supercell thunderstorms that are in a wind shear environment that promotes rotation. Some studies show a potential for a decrease in wind shear in mid-latitude areas. Because of uncertainty with the influence of climate change on tornadoes, future updates to the mitigation plan should include the latest research on how the tornado hazard frequency and severity could change. The level of significance of this hazard should be revisited over time.

Vulnerability Assessment

Methodologies and Assumptions

Probability of future occurrence was calculated based on past occurrences and was assumed to be uniform across the region.

People

People and populations exposed to the elements are most vulnerable to tornados. The availability of sheltered locations such as basements, buildings constructed using tornado-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. According to 2017 data from the U.S. Census Community Fact Finder, 10,079 homes are classified as “mobile homes,” 21.05% of homes across the region. Based on an average estimate of household size across the region, there are almost 25,000 people living in mobile homes. Table 4.78 shows total mobile housing units and potential populations impacted by county.

Table 4.78 – Mobile Homes Across the Region

County	Total Mobile Housing Units	Percentage of Total Housing	Estimated Average Household	Population at Risk
Camden	684	16.3%	2.71	1,853.64
Chowan	1,574	21.6%	2.40	3,777.6
Gates	1,590	30.0%	2.60	4134
Hertford	2,632	24.7%	2.40	6,316.8
Pasquotank	2,048	12.0%	2.51	5,140.48

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County	Total Mobile Housing Units	Percentage of Total Housing	Estimated Average Household	Population at Risk
Perquimans	1,551	21.7%	2.39	3,706.89
Region Total	10,079	21.05%	2.50	24,929.41

Source: 2017 American Community Survey

Since 1950, the NCEI records five fatalities and 56 injuries attributed to tornadoes across the region; these fatalities and injuries were the result of tornadoes rated as low as F1, illustrating the destructive power of tornadoes and the dangers they pose to exposed populations without proper shelter.

Property

General damages to property are both direct (what the tornado physically destroys) and indirect, which focuses on additional costs, damages and losses attributed to secondary hazards spawned by the tornado, or due to the damages caused by the tornado. Depending on the size of the tornado and its path, a tornado is capable of damaging and eventually destroying almost anything. Construction practices and building codes can help maximize the resistance of the structures to damage.

Secondary impacts of tornado damage often result from damage to infrastructure. Downed power and communications transmission lines, coupled with disruptions to transportation, create difficulties in reporting and responding to emergencies. These indirect impacts of a tornado put tremendous strain on a community. In the immediate aftermath, the focus is on emergency services.

Since 1950, damaging tornadoes across the region are directly responsible for almost \$42 million in recorded damage to property. This includes damages to homes, buildings, businesses, and belongings. These tornadoes also caused over \$2 million in reported damage to crops, according to NCEI data.

Table 4.79 details the estimated buildings impacted from an EF4 tornado (no analysis was generated in IRISK on a potential EF5 tornado). Note that the table provides an estimate of building damages should all exposed property be impacted by an event of the stated magnitude; actual damages resulting from a tornado event of each magnitude would be lower because the event would impact only a fraction of the region. The EF4 analysis is presented as a top-end estimation of impacts; while the same numbers of buildings would be vulnerable to a tornado rated EF0 through EF3, the damages would not be as high. A full accounting of each jurisdiction's vulnerability to all tornadoes and ratings can be found in the jurisdictional annexes.

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Table 4.79 – Potential Tornado Damages from EF4 Tornado

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	4,599	85.2%	\$619,375,110	638	11.8%	\$49,169,471	159	2.9%	\$90,075,673	5,396	99.9%	\$758,620,254
Chowan	6,314	5,179	82%	\$634,618,458	1,053	16.7%	\$197,685,212	79	1.3%	\$87,992,465	6,311	100%	\$920,296,135
Edenton	2,976	2,453	82.4%	\$420,775,388	416	14%	\$263,673,456	106	3.6%	\$117,873,543	2,975	100%	\$802,322,387
Gates	6,637	4,662	70.2%	\$674,964,938	1,816	27.4%	\$255,823,436	157	2.4%	\$185,978,353	6,635	100%	\$1,116,766,727
Gatesville	204	132	64.7%	\$23,518,227	44	21.6%	\$15,117,937	28	13.7%	\$27,420,061	204	100%	\$66,056,225
Hertford	8,307	6,618	79.7%	\$519,830,557	1,519	18.3%	\$217,253,431	126	1.5%	\$137,824,824	8,263	99.5%	\$874,908,812
Ahoskie	2,744	2,313	84.3%	\$260,576,264	313	11.4%	\$209,539,899	102	3.7%	\$59,364,095	2,728	99.4%	\$529,480,258
Como	91	62	68.1%	\$5,046,388	25	27.5%	\$1,577,008	3	3.3%	\$758,401	90	98.9%	\$7,381,797
Harrellsville	100	85	85%	\$7,166,527	8	8%	\$729,829	6	6%	\$1,238,562	99	99%	\$9,134,918
Murfreesboro	2,275	2,009	88.3%	\$168,265,865	183	8%	\$50,861,176	76	3.3%	\$86,391,566	2,268	99.7%	\$305,518,607
Winton	479	399	83.3%	\$33,626,146	33	6.9%	\$40,447,568	43	9%	\$33,165,125	475	99.2%	\$107,238,838
Cofield	287	233	81.2%	\$14,934,166	47	16.4%	\$20,285,555	3	1%	\$618,804	283	98.6%	\$35,838,526
Pasquotank	10,460	9,092	86.9%	\$1,164,068,341	1,139	10.9%	\$457,589,594	202	1.9%	\$318,345,299	10,433	99.7%	\$1,940,003,234
Elizabeth City	8,713	7,444	85.4%	\$1,003,891,877	957	11%	\$634,552,069	293	3.4%	\$362,504,050	8,694	99.8%	\$2,000,947,997
Perquimans	6,255	5,834	93.3%	\$898,552,870	285	4.6%	\$189,702,250	136	2.2%	\$161,462,838	6,255	100%	\$1,249,717,958
Hertford	1,224	1,007	82.3%	\$160,934,370	143	11.7%	\$73,949,163	74	6%	\$88,013,873	1,224	100%	\$322,897,405
Winfall	419	356	85%	\$48,308,352	33	7.9%	\$14,617,764	30	7.2%	\$31,401,066	419	100%	\$94,327,182
Total	62,884	52,477	83.5%	\$6,658,453,844	8,652	13.8%	\$2,692,574,818	1,623	2.6%	\$1,790,428,598	62,752	99.8%	\$11,141,457,260

Source: GIS Analysis

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Environment

Tornadoes can cause massive damage to the natural environment, uprooting trees and other debris within the tornado's path. This is part of a natural process, however, and the environment will return to its original state in time.

Consequence Analysis

Tornado could potentially have the following consequences.

Table 4.80 – Consequence Analysis - Tornado

Category	Consequences
Public	Injuries; fatalities
Responders	Injuries; fatalities; potential impacts to response capabilities due to storm impacts
Continuity of Operations (including Continued Delivery of Services)	Potential impacts to continuity of operations due to storm impacts; delays in providing services
Property, Facilities and Infrastructure	The weakest tornadoes, EF0, can cause minor roof damage, while strong tornadoes can destroy frame buildings and even badly damage steel reinforced concrete structures. Buildings are vulnerable to direct impact from tornadoes and also from wind borne debris. Mobile homes are particularly susceptible to damage during tornadoes.
Environment	Potential devastating impacts in storm's path
Economic Condition of the Jurisdiction	Contingent on tornado's path; can severely impact/destroy critical infrastructure and other economic drivers
Public Confidence in the Jurisdiction's Governance	Public confidence in the jurisdiction's governance may be influenced by severe tornado events if response and recovery are not timely and effective.

4.5.11 Wildfire

Hazard Background

A wildfire is an uncontained fire that spreads through the environment. Wildfires have the ability to consume large areas, including infrastructure, property, and resources. When massive fires, or conflagrations, develop near populated areas, evacuations possibly ensue. Not only do the flames impact the environment, but the massive volumes of smoke spread by certain atmospheric conditions also impact the health of nearby populations. There are three general types of fire spread that are recognized.

- ▶ **Ground fires** – burn organic matter in the soil beneath surface litter and are sustained by glowing combustion.
- ▶ **Surface fires** – spread with a flaming front and burn leaf litter, fallen branches and other fuels located at ground level.
- ▶ **Crown fires** – burn through the top layer of foliage on a tree, known as the canopy or crown fires. Crown fires, the most intense type of fire and often the most difficult to contain, need strong winds, steep slopes and a heavy fuel load to continue burning.

Generally, wildfires are started by humans, either through arson or carelessness. Fire intensity is controlled by both short-term weather conditions and longer-term vegetation conditions. During intense fires, understory vegetation, such as leaves, small branches, and other organic materials that accumulate on the ground, can become additional fuel for the fire. The most explosive conditions occur when dry, gusty winds blow across dry vegetation.

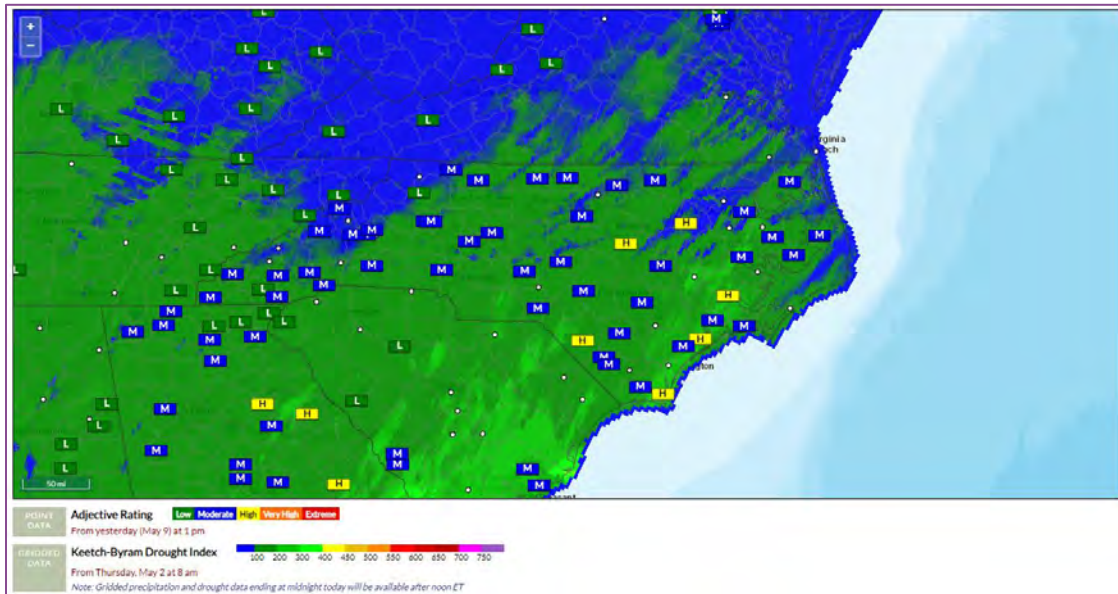
Weather plays a major role in the birth, growth and death of a wildfire. Weather conditions favorable to wildfire include drought, which increases flammability of surface fuels, and winds, which aid a wildfire’s progress. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Rapid response can contain wildfires and limit their threat to property. In support of forecasting for fire weather, the National Weather Service Fire Weather Program emerged. This service is provided to federal and state land management agencies for the prevention, suppression, and management of forest and rangeland fires. The National Weather Service Wakefield, Virginia Forecast Office provides year-round fire weather forecasts for the Albemarle Region.

The Albemarle Region experiences a variety of wildfire conditions found in the Keetch-Byram Drought Index, which is described in Table 4.81. The Keetch-Byram Drought Index (KBDI) for December 19, 2018 is shown in Figure 4.49 along with a Daily Fire Danger Estimate Adjective Rating for certain points across the state. The KBDI for across the Albemarle Region at this time was below 100, and the Fire Danger Estimate for the nearby area was “Medium.”

Table 4.81 – Keetch-Byram Drought Index Fire Danger Rating System

KBDI	Description
0-200	Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
200-400	Fires more readily burn and will carry across an area with no gaps. Heavier fuels will still not readily ignite and burn. Also, expect smoldering and the resulting smoke to carry into and possibly through the night.
400-600	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
600-800	Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

Figure 4.49 – Keetch-Byram Drought Index, May 2019



Source: USFS Wildland Fire Assessment System

Warning Time: 4 – Less than 6 hours

Duration: 3 – Less than 1 week

Location

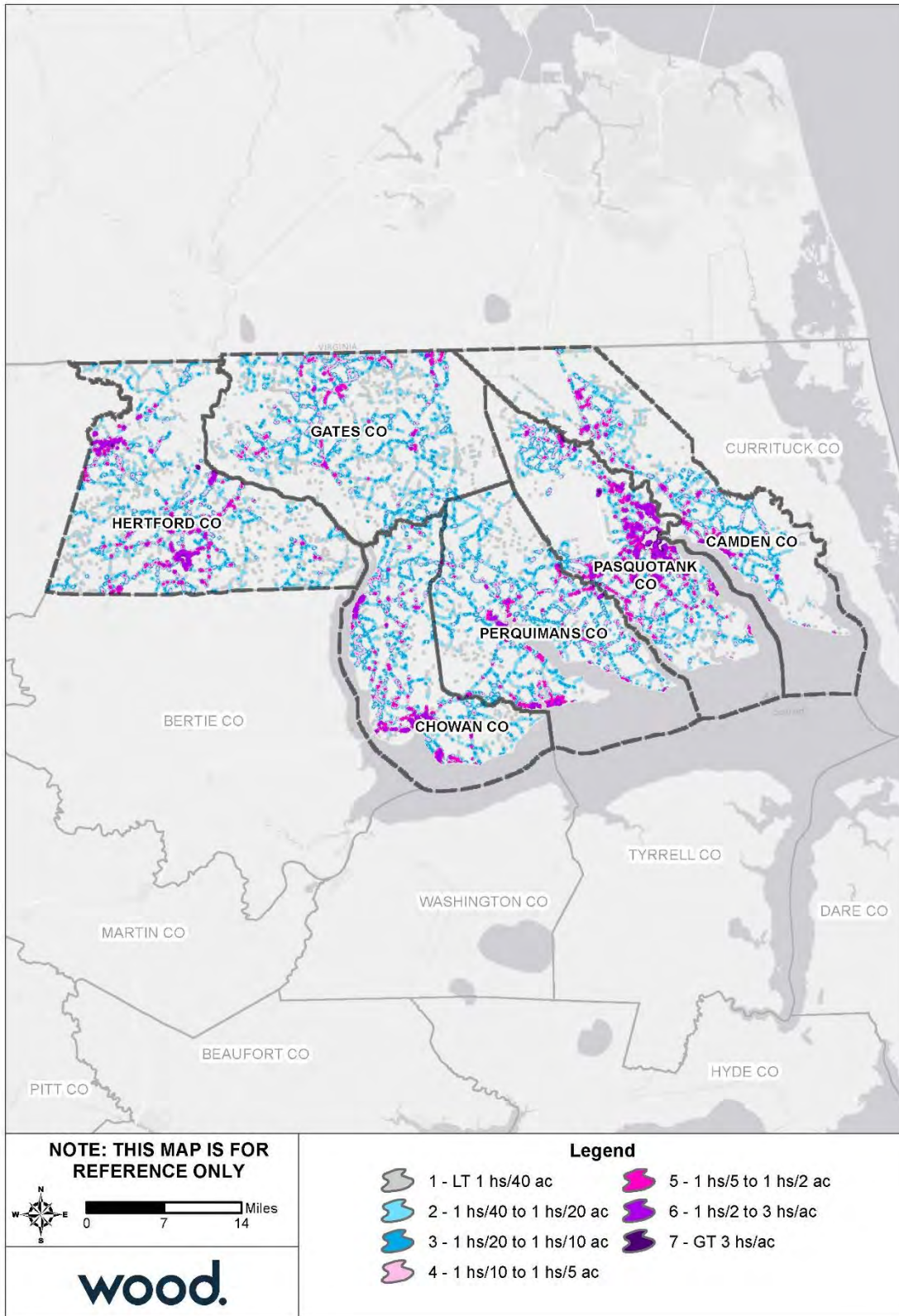
The location of wildfire risk can be defined by the acreage of Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels, and thus demarcates the spatial extent of wildfire risk. The WUI is essentially all the land in each county that is not heavily urbanized. The Southern Wildfire Risk Assessment (SWRA) estimates that 93 percent of the Albemarle Region’s projected population lives within the WUI. The expansion of residential development from urban centers out into rural landscapes increases the potential for wildland fire threat to public safety and the potential for damage to forest resources and dependent industries. Population growth within the WUI substantially increases the risk of wildfire. Table 4.82 details the extent of the WUI in the Region, and Figure 4.50 maps the WUI across the Region.

Table 4.82 – Wildland Urban Interface, Population and Acres

	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
	LT 1hs/40ac	2,667	2.5 %	146,103	35.0 %
	1hs/40ac to 1hs/20ac	5,156	4.8 %	86,477	20.7 %
	1hs/20ac to 1hs/10ac	11,794	11.0 %	83,218	19.9 %
	1hs/10ac to 1hs/5ac	16,832	15.6 %	53,473	12.8 %
	1hs/5ac to 1hs/2ac	20,807	19.3 %	30,545	7.3 %
	1hs/2ac to 3hs/1ac	44,815	41.6 %	17,525	4.2 %
	GT 3hs/1ac	5,599	5.2 %	449	0.1 %
	Total	107,670	100.0 %	417,790	100.0 %

Source: Southern Wildfire Risk Assessment

Figure 4.50 – Wildland Urban Interface, Albemarle Region



Source: Southern Wildfire Risk Assessment

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Extent

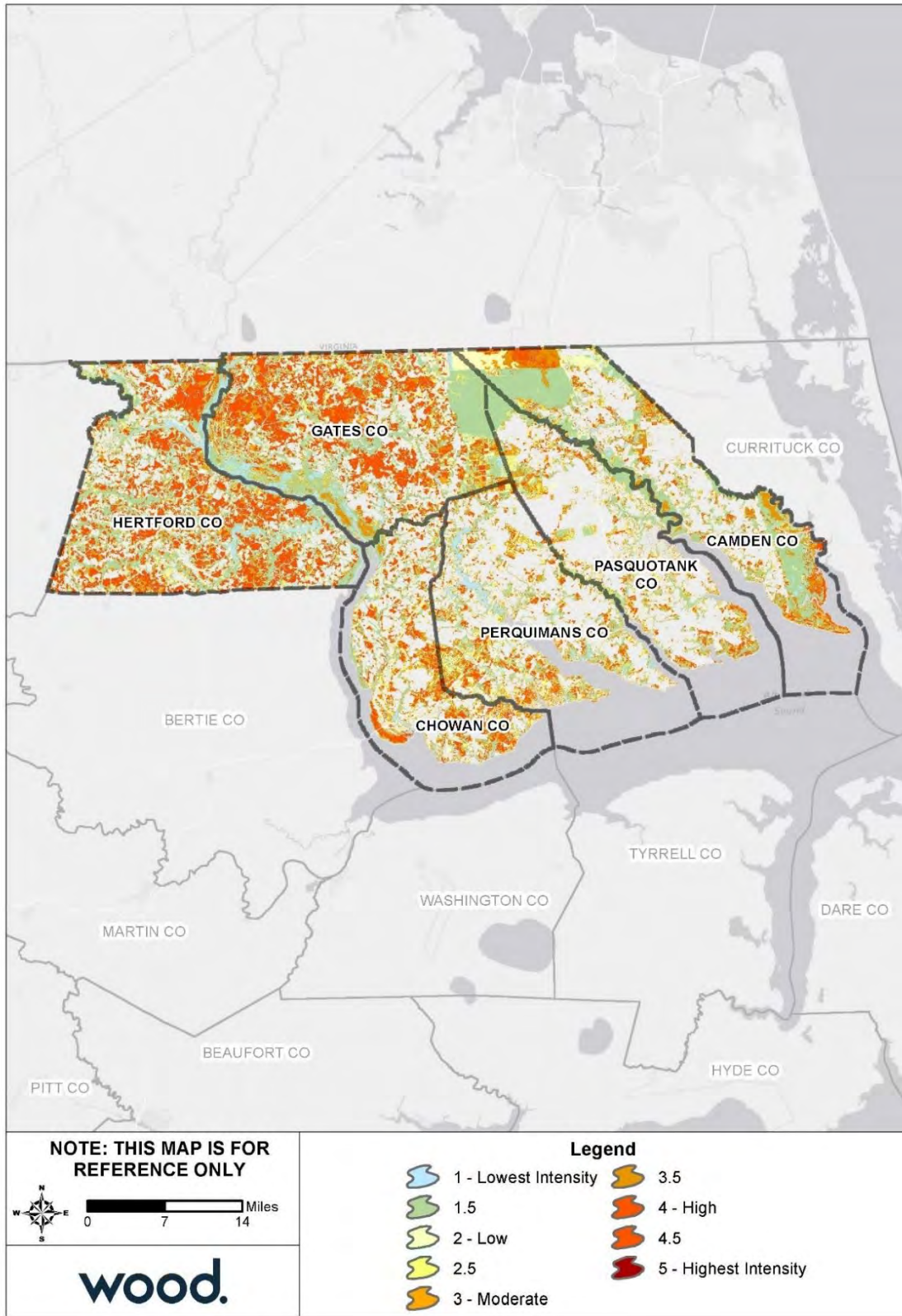
Wildfire extent can be defined by the fire's intensity and measured by the Characteristic Fire Intensity Scale, which identifies areas where significant fuel hazards which could produce dangerous fires exist. Fire Intensity ratings identify where significant fuel hazards and dangerous fire behavior potential exist based on fuels, topography, and a weighted average of four percentile weather categories. The Fire Intensity Scale consists of five classes, as defined by Southern Wildfire Risk Assessment and shown in Table 4.83. Figure 4.51 shows the potential fire intensity within the WUI across the Albemarle Region.

Table 4.83 – Fire Intensity Scale Descriptions

Class	Description
1, Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
2, Low	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
3, Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
4, High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
5, Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Source: Southern Wildfire Risk Assessment

Figure 4.51 – Characteristic Fire Intensity, Albemarle Region



Source: Southern Wildfire Risk Assessment

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Table 4.84 shows the amount and percentage of land area susceptible to each level of the fire intensity scale by acre. Almost 48% of the region is considered non-burnable, but over 107,000 acres or 9% of the region's total land area is susceptible to Class 4.5 fire intensity.

Table 4.84 – Fire Intensity Scale

	Class	Acres	Percent
	Non-Burnable	569,976	47.8 %
	1 Lowest Intensity	28,800	2.4 %
	1.5	240,082	20.1 %
	2 Low	34,678	2.9 %
	2.5	47,140	4.0 %
	3 Moderate	51,631	4.3 %
	3.5	58,418	4.9 %
	4 High	54,347	4.6 %
	4.5	107,439	9.0 %
	5 Highest Intensity	0	0.0 %
	Total	1,192,511	100.0 %

Source: Southern Wildfire Risk Assessment

Impact: 2 – Limited

Spatial Extent: 3 – Moderate

Historical Occurrences

The North Carolina Forest Service (NCFS) began keeping records of fire occurrence on private and state-owned lands in 1928. Since this time, there has been an average of approximately 4,000 fires burning more than 115,000 acres annually. Recently, within the last 10 years, the State has averaged closer to 3,200 fires per year and 15,000 acres burned annually.

Table 4.85 lists past occurrences of wildfire in the Albemarle Region since 1999 as provided by the North Carolina Forest Service (NCFS). This data only accounts for occurrences under the NCFS jurisdiction, as well as larger events in incorporated areas where local fire departments requested NCFS support for fire suppression. Actual number of fires and acreage burned may be higher than what can be reported here.

Based on NCFS records, over the 20-year period from 1999 through 2018, the Albemarle Region experienced 1,812 wildfire events that have burned nearly 8,838 acres of land, or approximately 4.9 acres per fire on average. Total fire counts and acreage burned by county are reported in each county's jurisdictional annex.

Table 4.85 – Records for Wildfire in Albemarle Region, 1999-2018

Year	Wildfire Count	Acres Burned	Average Acreage Burned
1999	74	184.3	2.49
2000	73	294.0	4.03
2001	161	517.5	3.21
2002	83	444.1	5.35

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Year	Wildfire Count	Acres Burned	Average Acreage Burned
2003	34	34.8	1.02
2004	89	484.2	5.44
2005	88	389.5	4.43
2006	122	204.6	1.68
2007	155	805.3	5.20
2008	158	4,089.0	25.88
2009	71	221.9	3.13
2010	94	223.8	2.38
2011	119	314.0	2.64
2012	64	149.5	2.34
2013	78	162.4	2.08
2014	66	121.5	1.84
2015	45	22.0	0.49
2016	78	48.64	0.62
2017	82	91.0	1.11
2018	78	35.6	0.46
Total	1,812	8,837.7	4.88

Source: NC Forest Service

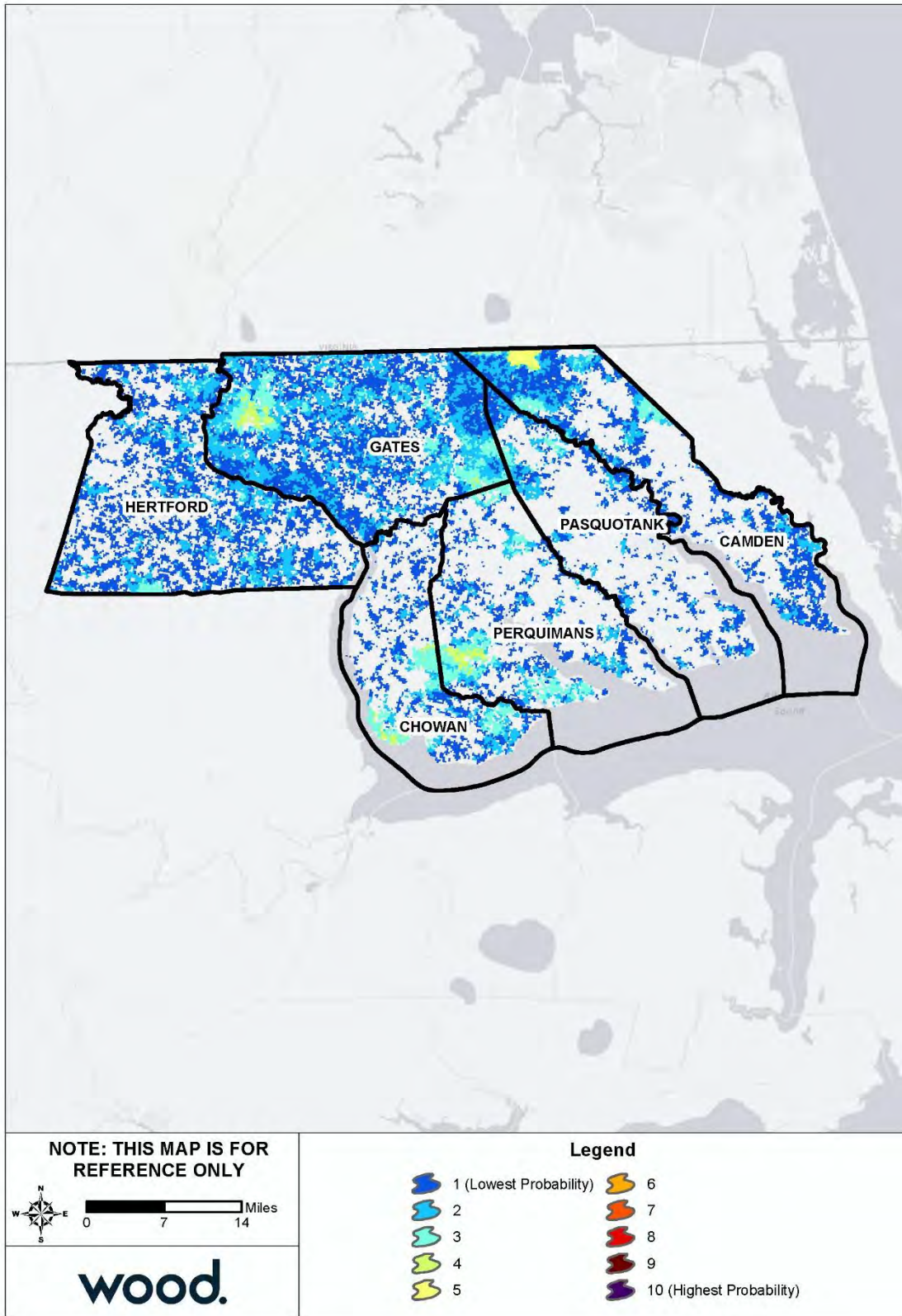
Probability of Future Occurrence

The Southern Wildfire Risk Assessment provides a Burn Probability analysis which predicts the probability of an area burning based on landscape conditions, weather, historical ignition patterns, and historical fire prevention and suppression efforts. Burn Probability data is generated by simulating fires under different weather, fire intensity, and other conditions. Values in the Burn Probability (BP) data layer indicate, for each pixel, the number of times that cell was burned by a modeled fire, divided by the total number of annual weather scenarios simulated. The simulations are calibrated to historical fire size distributions. The Burn Probability for the Albemarle Region is presented in Table 4.86 and shown in Figure 4.52.

Table 4.86 – Burn Probability, Albemarle Region

Class	Acres	Percent
1	280,171	57.0%
2	153,893	31.3%
3	48,205	9.8%
4	6,935	1.4%
5	2,414	0.5%
6	0	0.0%
7	0	0.0%
8	0	0.0%
9	0	0.0%
10	0	0.0%
Total	491,618	100.0 %

Figure 4.52 – Burn Probability, Albemarle Region



Source: Southern Wildfire Risk Assessment

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All of the Albemarle Region has a relatively low burn probability, with the highest probabilities reaching a rating of 5 or less. The areas of relatively higher burn probability are located primarily in northern Camden County, western Gates County, and southwestern Chowan and Perquimans Counties.

Probability: 2 – Possible

Climate Change

Wildfires are usually prevalent with a combination of high temperatures and dry conditions, combustible fuels and an ignition source. Climate change has been linked to longer, warmer and drier conditions in the southeast, exacerbating key potential conditions for a wildfire to spread.

Vulnerability Assessment

People

Wildfire can cause fatalities and human health hazards. Ensuring procedures are in place for rapid warning and evacuation are essential to reducing vulnerability. Table 4.87 shows the potential regional population impacted by wildfire in identified risk zones.

Table 4.87 – Potential Population Impacted by Wildfire

County	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Child Population	Child Population at Risk	
		Number	Percent		Number	Percent		Number	Percent
Camden	9,954	5,795	58.2%	1,280	745	58.2%	593	345	58.2%
Chowan	14,799	9,038	61.1%	2,908	1,776	61.1%	879	537	61.1%
Gates	12,189	10,243	84%	1,831	1,539	84.1%	695	584	84%
Hertford	24,660	12,786	51.8%	3,897	2,021	51.9%	1,415	733	51.8%
Pasquotank	40,654	18,608	45.8%	5,513	2,524	45.8%	2,694	1,233	45.8%
Perquimans	13,455	8,086	60.1%	2,887	1,735	60.1%	745	447	60%
Total	115,711	64,556	55.79%	18,316	10,340	56.45%	7,021	3,879	55.25%

Source: GIS Analysis

Property

Wildfire can cause direct property losses, including damage to buildings, vehicles, landscaped areas, agricultural lands, and livestock. Construction practices and building codes can increase fire resistance and fire safety of structures. Techniques for reducing vulnerability to wildfire include using street design to ensure accessibility to fire trucks, incorporating fire resistant materials in building construction, and using landscaping practices to reduce flammability and the ability for fire to spread.

The sectors facing the greatest risk to wildfire in the Albemarle Region are banking and finance, critical manufacturing, commercial facilities, energy, government facilities, water and transportation systems. Table 4.88 shows potential buildings impacted by wildfire across the region and Table 4.89 provides estimated critical facilities risk.

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Table 4.88 – Potential Buildings Impacted by Wildfire

County	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Camden	5,399	2,677	49.6%	\$371,230,438	327	6.1%	\$26,575,101	93	1.7%	\$60,811,420	3,097	57.4%	\$458,616,959
Chowan	6,314	3,770	59.7%	\$453,058,805	591	9.4%	\$96,857,059	58	0.9%	\$64,174,817	4,419	70%	\$614,090,681
Edenton	2,976	1,048	35.2%	\$184,574,136	153	5.1%	\$107,218,126	38	1.3%	\$51,647,169	1,239	41.6%	\$343,439,432
Gates	6,637	8,058	59%	\$561,613,333	1,447	21.8%	\$198,362,259	135	2%	\$171,777,918	5,496	82.8%	\$931,753,510
Gatesville	204	3,914	56.4%	\$19,669,858	38	18.6%	\$13,044,218	24	11.8%	\$26,062,140	177	86.8%	\$58,776,216
Hertford	8,307	2,854	34.4%	\$224,766,830	471	5.7%	\$137,702,146	69	0.8%	\$53,133,384	3,394	40.9%	\$415,602,361
Ahoskie	2,744	1,802	65.7%	\$202,385,288	154	5.6%	\$140,521,852	58	2.1%	\$39,175,043	2,014	73.4%	\$382,082,183
Como	91	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Harrellsville	100	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Murfreesboro	2,275	838	36.8%	\$70,071,903	32	1.4%	\$12,103,756	33	1.5%	\$50,396,187	903	39.7%	\$132,571,846
Winton	479	246	51.4%	\$20,979,061	21	4.4%	\$38,704,006	21	4.4%	\$16,175,586	288	60.1%	\$75,858,654
Cofield	287	217	75.6%	\$13,957,621	30	10.5%	\$12,703,079	3	1%	\$618,804	250	87.1%	\$27,279,504
Pasquotank	10,460	5,491	52.5%	\$722,507,608	555	5.3%	\$179,372,863	72	0.7%	\$60,395,677	6,118	58.5%	\$962,276,148
Elizabeth City	8,713	2,352	27%	\$325,071,434	272	3.1%	\$183,393,179	78	0.9%	\$127,433,800	2,702	31%	\$635,898,413
Perquimans	6,255	3,979	63.6%	\$609,883,881	199	3.2%	\$137,878,404	93	1.5%	\$119,388,725	4,271	68.3%	\$867,151,010
Hertford	1,224	232	19%	\$39,979,735	52	4.2%	\$29,504,839	25	2%	\$27,090,276	309	25.2%	\$96,574,850
Winfall	419	244	58.2%	\$33,747,961	18	4.3%	\$11,205,747	9	2.1%	\$11,818,493	271	64.7%	\$56,772,200
Total	62,884	37,722	60.0%	\$3,853,497,892	4,360	6.9%	\$1,325,146,634	809	1.3%	\$880,099,439	34,948	55.6%	\$6,058,743,967

Source: GIS Analysis

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Table 4.89 – Critical Facilities at Risk to Wildfire

Sector	Number of Buildings at Risk	Estimated Damages
Banking and Finance	16	\$11,702,641
Commercial Facilities	1,383	\$916,549,494
Communications	2	\$1,603,182
Critical Manufacturing	419	\$310,528,258
Defense Industrial Base	1	\$92,649
Emergency Services	12	\$11,439,184
Energy	13	\$252,770,304
Food and Agriculture	2,748	\$247,566,455
Government Facilities	369	\$461,245,149
Healthcare and Public Health	100	\$113,887,386
Nuclear Reactors, Materials and Waste	1	\$5,743,536
Other	1	\$1,543,973
Transportation Systems	188	\$126,135,272
Water	52	\$151,565,795
Total	5,305	\$2,612,373,278

Source: NCEM Risk Management Tool

Environment

Wildfires have the potential to destroy forest and forage resources and damage natural habitats. Wildfire can also damage agricultural crops on private land. Wildfire is part of a natural process, however, and the environment will return to its original state in time.

Consequence Analysis

Table 4.90 summarizes the potential detrimental consequences of wildfire.

Table 4.90 – Consequence Analysis - Wildfire

Category	Consequences
Public	In addition to the potential for fatalities, wildfire and the resulting diminished air quality pose health risks. Exposure to wildfire smoke can cause serious health problems within a community, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Vulnerable populations include children, the elderly, people with respiratory problems or with heart disease. Even healthy citizens may experience minor symptoms, such as sore throats and itchy eyes.
Responders	Public and firefighter safety is the first priority in all wildland fire management activities. Wildfires are a real threat to the health and safety of the emergency services. Most fire-fighters in rural areas are 'retained'. This means that they are part-time and can be called away from their normal work to attend to fires.
Continuity of Operations (including Continued Delivery of Services)	Wildfire events can result in a loss of power which may impact operations. Downed trees, power lines and damaged road conditions may prevent access to critical facilities and/or emergency equipment.
Property, Facilities and Infrastructure	Wildfires frequently damage community infrastructure, including roadways, communication networks and facilities, power lines, and water distribution systems. Restoring basic services is critical and a top priority. Efforts to restore roadways include the costs of maintenance and damage assessment teams, field data collection, and replacement or repair costs. Direct impacts to municipal water supply may occur

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Category	Consequences
	through contamination of ash and debris during the fire, destruction of aboveground distribution lines, and soil erosion or debris deposits into waterways after the fire. Utilities and communications repairs are also necessary for equipment damaged by a fire. This includes power lines, transformers, cell phone towers, and phone lines.
Environment	Wildfires cause damage to the natural environment, killing vegetation and animals. The risk of floods and debris flows increases after wildfires due to the exposure of bare ground and the loss of vegetation. In addition, the secondary effects of wildfires, including erosion, landslides, introduction of invasive species, and changes in water quality, are often more disastrous than the fire itself.
Economic Condition of the Jurisdiction	Wildfires can have significant short-term and long-term effects on the local economy. Wildfires, and extreme fire danger, may reduce recreation and tourism in and near the fires. If aesthetics are impaired, local property values can decline. Extensive fire damage to trees can significantly alter the timber supply, both through a short-term surplus from timber salvage and a longer-term decline while the trees regrow. Water supplies can be degraded by post-fire erosion and stream sedimentation. Wildfires can also have positive effects on local economies. Positive effects come from economic activity generated in the community during fire suppression and post-fire rebuilding. These may include forestry support work, such as building fire lines and performing other defenses, or providing firefighting teams with food, ice, and amenities such as temporary shelters and washing machines.
Public Confidence in the Jurisdiction's Governance	Wildfire events may cause issues with public confidence because they have very visible impacts on the community.

4.5.12 Radiological Incident

Hazard Background

A radiological incident is an occurrence resulting in the release of radiological material at a fixed facility (such as power plants, hospitals, laboratories, etc.) or in transit.

Radiological incidents related to transportation are described as an incident resulting in a release of radioactive material during transportation. Transportation of radioactive materials through North Carolina over the interstate highway system is considered a radiological hazard. The transportation of radioactive material by any means of transport is licensed and regulated by the federal government. As a rule, there are two categories of radioactive materials that are shipped over the interstate highways:

- Low level waste consists of primarily of materials that have been contaminated by low level radioactive substances but pose no serious threat except through long-term exposure. These materials are shipped in sealed drums within placarded trailers. The danger to the public is no more than a wide array of other hazardous materials.
- High level waste, usually in the form of spent fuel from nuclear power plants, is transported in specially constructed casks that are built to withstand a direct hit from a locomotive.

Radiological emergencies at nuclear power plants are divided into classifications. Table 4.91 shows these classifications, as well as descriptions of each.

Table 4.91 – Radiological Emergency Classifications

Emergency Classification	Description
Notification of Unusual Event (NOUE)	Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
Alert	Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protective Action Guides (PAGs)
Site Area Emergency (SAE)	Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.
General Emergency	Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

Warning Time: 4 – Less than six hours

Duration: 4 – More than one week

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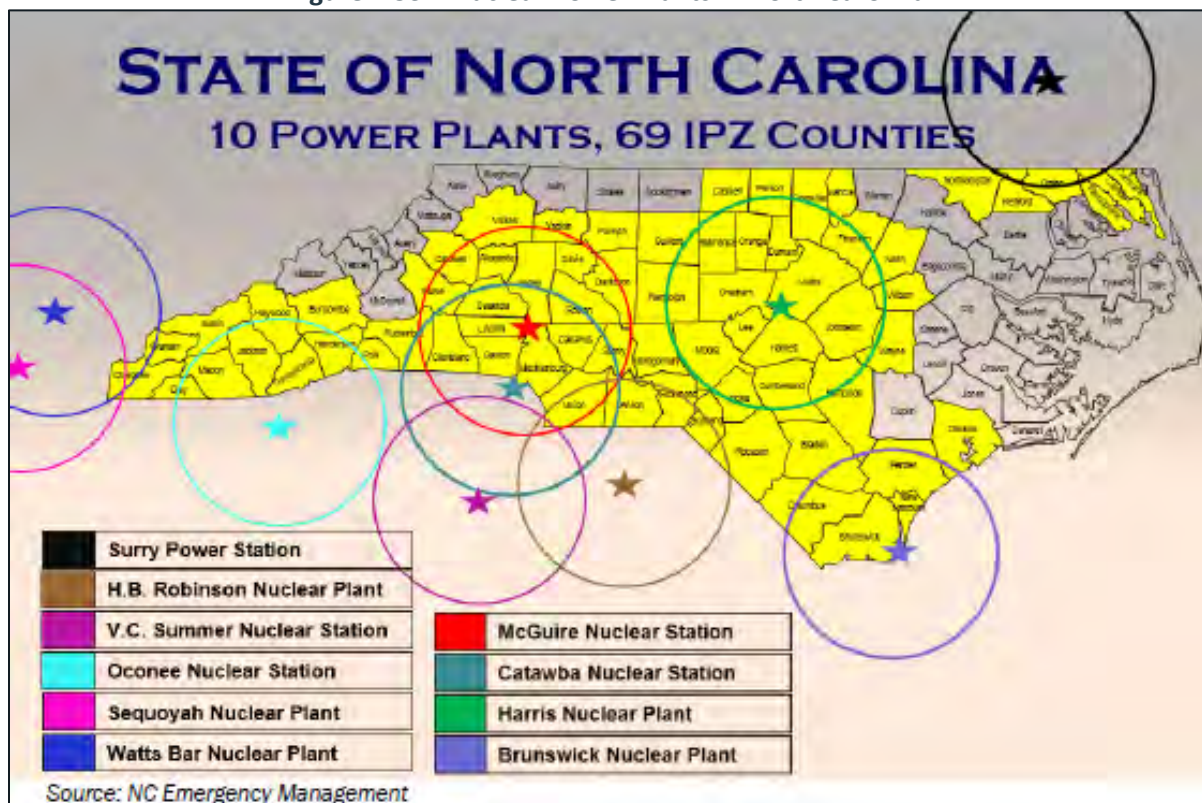
Location

The Nuclear Regulatory Commission defines two emergency planning zones around nuclear plants:

- ▶ **Emergency Planning Zone (EPZ)** – The EPZ is a 10-mile radius around nuclear facilities. It is also known as the Plume Exposure Pathway. Areas located within this zone are considered to be at highest risk of exposure to radioactive materials. Within this zone, the primary concern is exposure to and inhalation of radioactive contamination. Predetermined action plans within the EPZ are designed to avoid or reduce dose from such exposure. Residents within this zone would be expected to evacuate in the event of an emergency. Other actions such as sheltering, evacuation, and the use of potassium-iodide must be taken to avoid or reduce exposure in the event of a nuclear incident.
- ▶ **Ingestion Pathway Zone (IPZ)** – The IPZ is delineated by a 50-mile radius around nuclear facilities as defined by the federal government. Also known as the Ingestion Exposure Pathway, the IPZ has been designated to mitigate contamination in the human food chain resulting from a radiological accident at a nuclear power facility. Contamination to fresh produce, water supplies, and other food produce may occur when radionuclides are deposited on surfaces.

The Surry Power Station is located in Surry, Virginia, about 17 miles away from Newport News. Its license of operation was issued in 1972 and is currently operating under a renewed license until 2032. The plant generates enough power for 420,000 homes. It is operated by Dominion Generation and owned by Dominion Resource, Inc. Camden, Gates, Hertford and Pasquotank counties are all located within the 50-mile radius EPZ for this plant and could see impacts if there was a failure at the plant. Figure 4.53 shows nuclear power plants located in or impacting portions of the state, as well as their ingestion pathways. Figure 4.54 shows the location of Surry Power Station and the area that falls within the EPZ and IPZ of the plant.

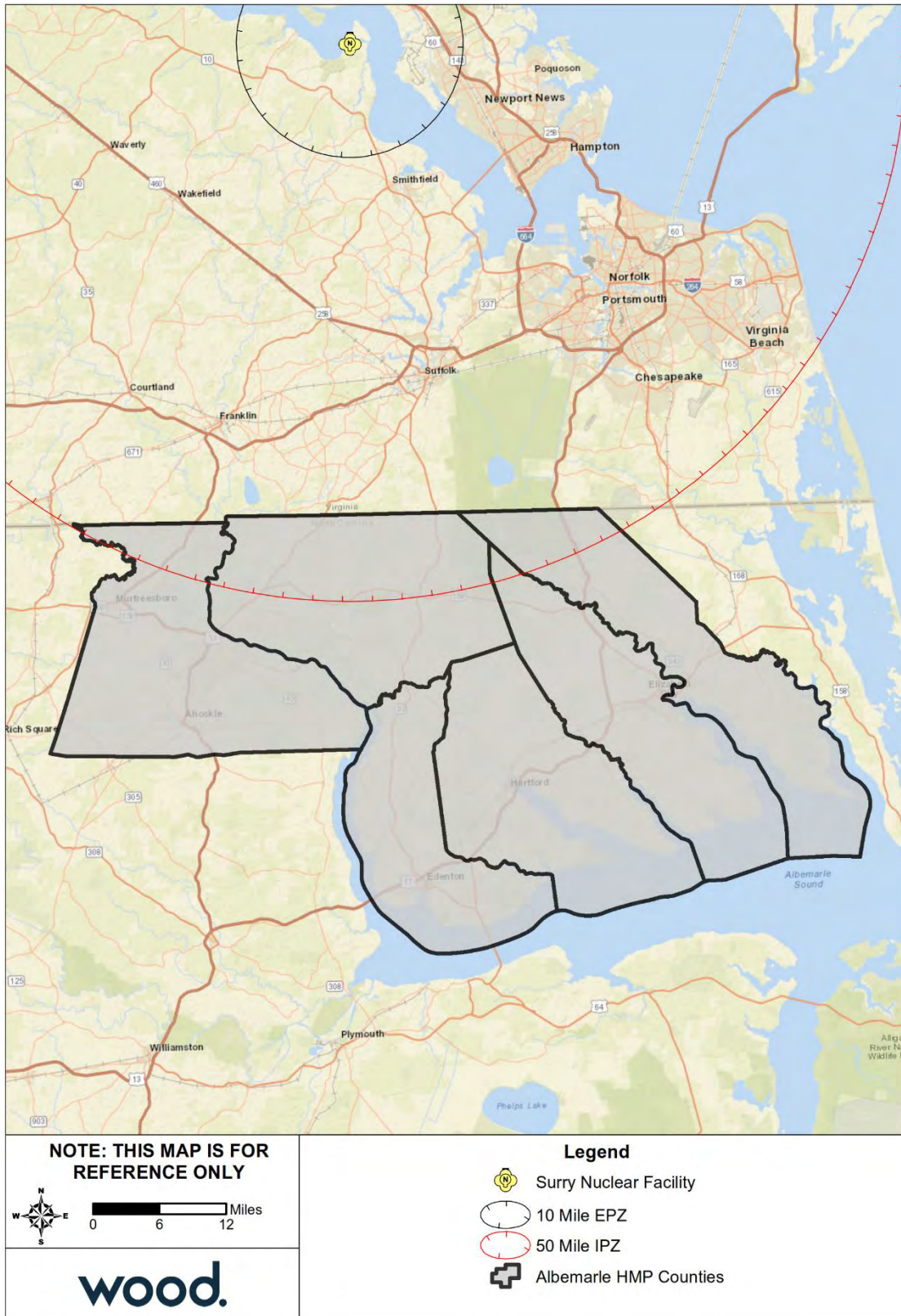
Figure 4.53 – Nuclear Power Plants in North Carolina



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Figure 4.54 – Surry Power Station EPZ and IPZ Range

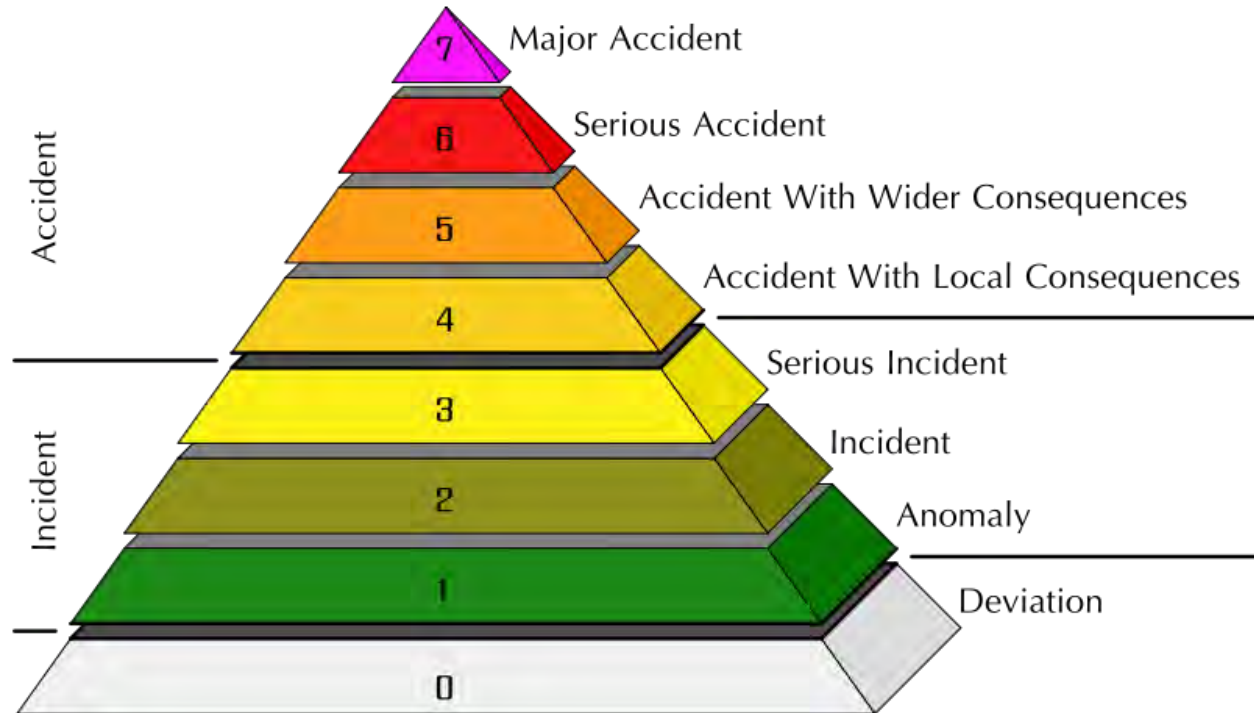


Source: GIS analysis

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Extent

The International Atomic Energy Association (IAEA) developed the International Nuclear and Radiological Event Scale to quantify the magnitude of radiological events. This scale is logarithmic, meaning each increasing level represents a 10-fold increase in severity compared to the previous level.



Source: International Atomic Energy Association

Impact: 3 – Critical

Spatial Extent: 3 – Moderate

Historical Occurrences

As reported in the 2018 State Hazard Mitigation Plan, there have been no major release events in North Carolina nuclear facilities; there was one situation in 2008 where the nuclear material was being monitored for criticality that occurred within the fuel rod fabrication facility.

On August 23rd, 2011, an Earthquake occurred in central Virginia. Dominion Energy's North Anna reactors automatically shut down. The earthquake was felt at the Surry Power Station, but not as strongly. Dominion Energy declared a Notification of Unusual Event but exited it later the same day. The station was built to seismic standards appropriate for the region.

Probability of Future Occurrence

Radiological hazards are highly unpredictable. Nuclear reactors present the possibility of catastrophic damages, yet the industry is highly regulated and historical precedence suggests an incident is unlikely.

Probability: 1 – Unlikely

Climate Change

Climate change is not projected to have any impact on a potential radiological incident.

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Vulnerability Assessment

People

People within the 50-mile IPZ are at risk of exposure through ingestion of contaminated food and water. Camden, Gates, Hertford and Pasquotank counties are all located within a 50-mile radius, or within the IPZ of Surry Power Station.

Low levels of radiation are not considered harmful, but a high exposure to radiation can cause serious illness or death.

Property

A radiological incident could cause severe damage to the power station itself but would not cause direct property damage outside the station. However, property values could drop substantially if a radiological incident resulted in contamination of nearby areas.

Environment

A radiological incident could result in the spread of radioactive material into the environment, which could contaminate water and food sources and harm animal and plant life.

Consequence Analysis

Table 4.92 summarizes the potential detrimental consequences of radiological incident.

Table 4.92 – Consequence Analysis – Radiological Incident

Category	Consequences
Public	High levels of radiation could cause serious illness or death. Those living and working closest to the nuclear station would face the greatest risk of exposure.
Responders	Responders face potential for heightened exposure to radiation, which could cause severe chronic illness and death.
Continuity of Operations (including Continued Delivery of Services)	An incident at the nuclear station could interrupt power generation and cause power shortages. Regular operations would likely be affected by the response effort an event would require.
Property, Facilities and Infrastructure	The plant itself could be damaged by a radiological incident. Nearby property and facilities could be affected by contamination.
Environment	Water supplies, food crops, and livestock within 50 miles of the nuclear station could be contaminated by radioactive material in the event of a major incident.
Economic Condition of the Jurisdiction	The local economy could be affected if a radiological incident caused contamination of nearby areas. Property values and economic activity could decline as a result.
Public Confidence in the Jurisdiction's Governance	A radiological incident would likely cause severe loss of public confidence given that the hazard is human-caused and highly regulated.

4.6 CONCLUSIONS ON HAZARD RISK

Priority Risk Index

As discussed in Section 4.3 Risk Assessment Methodology and Assumptions, the Priority Risk Index was used to rate each hazard on a set of risk criteria and determine an overall standardized score for each hazard. The conclusions drawn from this process are summarized below.

Table 4.93 summarizes the degree of risk assigned to each identified hazard using the PRI method.

Table 4.93 – Summary of PRI Results

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Dam & Levee Failure	Unlikely	Limited	Negligible	Less than 6 hrs	Less than 1 week	1.8
Drought	Likely	Minor	Large	More than 24 hrs	More than 1 week	2.5
Earthquake	Unlikely	Minor	Large	Less than 6 hrs	Less than 6 hrs	1.9
Erosion	Likely	Minor	Negligible	More than 24 hrs	Less than 6 hrs	1.6
Extreme Heat	Highly Likely	Minor	Large	More than 24 hrs	Less than 1 week	2.7
Flood	Possible	Limited	Moderate	6 to 12 hours	Less than 1 week	2.4
Hurricane & Tropical Storm	Likely	Catastrophic	Large	More than 24 hrs	Less than 1 week	3.3
Severe Weather: Hail ¹	Highly Likely	Minor	Small	Less than 6 hrs	Less than 6 hrs	2.4
Severe Weather: Lightning ¹	Highly Likely	Minor	Negligible	Less than 6 hrs	Less than 6 hrs	2.2
Severe Weather: Thunderstorm Winds ¹	Highly Likely	Limited	Large	Less than 6 hrs	Less than 6 hrs	3.1
Severe Winter Storm	Highly Likely	Limited	Large	More than 24 hrs	Less than 1 week	3.0
Tornado	Likely	Critical	Small	Less than 6 hrs	Less than 6 hrs	2.7
Wildfire	Possible	Limited	Small	Less than 6 hrs	Less than 1 week	2.3
Radiological Incident	Unlikely	Critical	Moderate	Less than 6 hrs	More than 1 week	2.6

¹Note: Severe Weather hazards average to a score of 2.6 and are therefore considered together as a high risk hazard.

The results from the PRI have been classified into three categories based on the assigned risk value which are summarized in Table 4.94:

- ▶ **High Risk** – Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread.
- ▶ **Moderate Risk** – Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- ▶ **Low Risk** – Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal. This is not a priority hazard.

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Table 4.94 – Summary of Hazard Risk Classification

High Risk (> 2.4)	Hurricane Severe Winter Storm Extreme Heat Tornado Severe Weather Radiological Incident Drought
Moderate Risk (2.0 – 2.4)	Flood Wildfire
Low Risk (< 2.0)	Earthquake Dam & Levee Failure Erosion

5 Capability Assessment

This section discusses the capability of the Albemarle Region to implement hazard mitigation activities. It consists of the following four subsections:

- 5.1 Overview
- 5.2 Conducting the Capability Assessment
- 5.3 Capability Assessment Findings
- 5.4 Conclusions on Local Capability

5.1 OVERVIEW

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

A capability assessment has two primary components: 1) an inventory of a local jurisdiction’s relevant plans, ordinances, and programs already in place; and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. The capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

The capability assessment completed for the Albemarle Region serves as a critical planning step toward developing an effective mitigation strategy. Coupled with the risk assessment, the capability assessment helps identify and target effective goals, objectives, and mitigation actions that are realistically achievable under given local conditions.

5.2 CONDUCTING THE CAPABILITY ASSESSMENT

To facilitate the inventory and analysis of local government capabilities within the planning area, a detailed Local Capability Self-Assessment worksheet was distributed to members of the HMPC after the first planning committee meeting. The survey questionnaire requested information on a variety of “capability indicators” such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the region’s ability to implement hazard mitigation actions. Other indicators included information related to the region’s fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes, and existing education and outreach programs that can be used to promote mitigation. Communities were also asked to comment on the current political climate with respect to hazard mitigation, an important consideration for any local planning or decision-making process.

At a minimum, the survey results provide an extensive and consolidated inventory of existing local plans, ordinances, programs, and resources in place or under development. With this information, inferences can be made about the overall effect on hazard loss reduction in each community. In completing the

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survey, local officials were also asked to rate their jurisdiction’s specific capabilities. The survey instrument thereby not only helps accurately assess the degree of local capability, but it also serves as a good source of introspection for counties and local jurisdictions that want to improve their capabilities. Identified gaps, weaknesses, or conflicts can be recast as opportunities for specific actions to be proposed as part of the mitigation strategy.

The information provided in response to the survey questionnaire was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction’s overall capability. According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation. Additional points were added based on the jurisdiction’s self-assessment of their own planning and regulatory capability, administrative and technical capability, fiscal capability, education and outreach capability, and political capability.

Using this scoring methodology, a total score and an overall capability rating of “High,” “Moderate,” or “Limited” could be determined according to the total number of points received. These classifications are designed to provide nothing more than a general assessment of local government capability. In combination with the narrative responses provided by local officials, the results of this capability assessment provide critical information for developing an effective and meaningful mitigation strategy.

5.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this plan to provide insight into the relevant capacity of the Albemarle Planning Area to implement hazard mitigation activities. All information is based upon the input provided by local government officials through the Local Capability Self-Assessment.

5.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction’s commitment to guiding and managing growth, development, and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning. Regulatory capability also includes the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built, as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development for the Albemarle region, along with their potential effect on loss reduction. This information will help identify opportunities to address gaps, weaknesses, or conflicts with other initiatives and integrate the implementation of this plan with existing planning mechanisms where appropriate.

Table 5.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Albemarle region. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A plus sign (+) indicates that a jurisdiction is covered for that item under a county-implemented version. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Hazard Mitigation Plan.

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Table 5.1 – Relevant Plans, Ordinances, and Programs

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Camden County	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√
Chowan County	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√		√	
Town of Edenton	√	√	√	√	+	+	+	+	+	√	√	√	√	√	√	√	√	√	√	√		√	√		√	
Gates County	√	√	√		√	√	√	√	√	√	√				√	√	√	√	√			√	√		√	
Town of Gatesville	√	√	√		√	+	+	+	+	+					√	√	√	√	√			√	√		√	
Hertford County	√	√	√			√	√	√	√	√	√		√	√	√	√	√	√	√			√	√		√	
Town of Ahoskie	√		√		√	+	+	+	+	+	√		√	√	√	√	√	√	√			√	√		√	
Village of Cofield	√		√			+	+	+	+	+	√	√		√	√	√	√	√	√			√	√		√	
Town of Como	√					+	+	+	+	+							√	√	√			√	√		√	
Town of Harrellsville	√					+	+	+	+	+												√	√			
Town of Murfreesboro	√	√				+	+	+	+	+	√		√	√		√	√	√	√			√	√		√	
Town of Winton	√	√	√			+	+	+	+	+	√		√	√		√	√	√	√			√	√		√	
Pasquotank County	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√		√	
City of Elizabeth City	√	√		√	√						√	√	√	√	√	√	√	√	√	√		√	√		√	
Perquimans County	√	√		√	√	√	√	√	√	√	√		√		√	√	√	√	√			√	√	√	√	
Town of Hertford	√	√				+	+	+	+	+		√			√	√	√	√	√			√	√		√	
Town of Winfall	√	√				+	+	+	+	+	√					√	√	√	√			√	√		√	

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A more detailed discussion on the region's planning and regulatory capability follows, along with the incorporation of additional information based on the narrative comments provided by local officials in response to the survey questionnaire.

5.3.1.1 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management, as is shown in Figure 5.1. In reality, mitigation is interconnected with all other phases and is an essential component of effective preparedness, response, and recovery. Opportunities to reduce potential losses through mitigation practices are most often implemented before a disaster event, such as through the elevation of flood-prone structures or by regular enforcement of policies that regulate development. However, mitigation opportunities can also be identified during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane. Furthermore, incorporating mitigation during the long-term recovery and redevelopment process following a disaster event is what enables a community to become more resilient.

Figure 5.1 – The Four Phases of Emergency Management



Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As such, the Local Capability Self-Assessment asked several questions across a range of emergency management plans to assess the region's willingness to plan and their level of technical planning proficiency.

Hazard Mitigation Plan

A hazard mitigation plan is a community's blueprint for how it intends to reduce the impact of natural, and in some cases human-caused, hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

- ▶ All participating jurisdictions in this regional planning effort have previously been covered by the Albemarle Regional Hazard Mitigation Plan.

Disaster Recovery Plan

A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster event. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on

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opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

- ▶ 13 of the 17 participating jurisdictions have a disaster recovery plan either in place.

Emergency Operations Plan

An emergency operations plan outlines responsibilities and how resources will be deployed during and following an emergency or disaster.

- ▶ All participating jurisdictions have an emergency operations plan either in place or are covered under a county plan (6 jurisdictions have one in place; 11 covered under a county plan).

Continuity of Operations Plan

A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event.

- ▶ All participating jurisdiction have a continuity of operations plan either in place or are covered under a county plan (6 jurisdictions have one in place; 11 covered under a county plan).

5.3.1.2 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they may not be designed as such. The Local Capability Self-Assessment asked questions regarding general planning capabilities and the degree to which hazard mitigation is integrated into other ongoing planning efforts in the region.

Comprehensive/General Plan

A comprehensive land use plan, or general plan, establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically, a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions.

- ▶ 13 of the 17 participating jurisdictions have a comprehensive land use plan in place.

Capital Improvements Plan

A capital improvements plan guides the scheduling of spending on public improvements. A capital improvements plan can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

- ▶ 7 of the 17 participating jurisdictions have a capital improvements plan in place.

Historic Preservation Plan

A historic preservation plan is intended to preserve historic structures or districts within a community. An often-overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards, and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not

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meet current building standards or are within a historic district that cannot easily be relocated out of harm's way.

- ▶ 10 of the 17 participating jurisdictions have an historic preservation plan in place.

Zoning Ordinance

Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

- ▶ 16 of the 17 participating jurisdictions have a zoning ordinance in place.

Subdivision Ordinance

A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

- ▶ 16 of the 17 participating jurisdictions have a subdivision ordinance in place.

Building Codes, Permitting, and Inspections

Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

- ▶ All participating jurisdictions have building codes in place.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program, developed by the Insurance Services Office, Inc. (ISO). In North Carolina, the North Carolina Department of Insurance assesses the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The expectation is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses, and as a result should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education, as well as number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10, with a BCEGS grade of 1 representing exemplary commitment to building code enforcement, and a grade of 10 indicating less than minimum recognized protection.

5.3.1.3 Floodplain Management

Flooding represents the greatest natural hazard facing the nation, yet the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and

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the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program. It is therefore used as part of this capability assessment as a key indicator for measuring local capability.

In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings be protected from damage by a 100-year flood event, and that new development in the floodplain not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

Table 5.2 provides NFIP policy and claim information for each participating jurisdiction in the Albemarle region.

All jurisdictions in the region participate in the NFIP and will continue to comply with all required provisions of the program. Floodplain management is managed through zoning ordinances, building code restrictions, and the county building inspection program. The jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to Special Flood Hazard Areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property.

Community Rating System

An additional indicator of floodplain management capability is active participation in the CRS. The CRS is an incentive-based program that encourages communities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP. Each of the CRS mitigation activities is assigned a point value. As a community earns points and reaches identified thresholds, they can apply for an improved CRS class. Class ratings, which range from 10 to 1 and increase on 500-point increments, are tied to flood insurance premium reductions. Every class improvement earns an additional 5 percent discount for NFIP policyholders, with a starting discount of 5 percent for Class 9 communities and a maximum possible discount of 45 percent for Class 1 communities.

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it.

- ▶ 2 of 17 participating jurisdictions in the Albemarle Region participate in the CRS. Each community's CRS Class is shown in the table below.

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Table 5.2 – NFIP Policy and Claim Information

Jurisdiction	Date of First FHBM or FIRM	CRS Class	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Written Premium in Force	Closed Losses	Total Payments
Camden County	12/20/74	7	10/05/04	881	\$202,967,300	\$597,556	204	\$3,171,892
Chowan County	01/27/78	-	10/16/08	264	\$69,200,200	\$157,727	81	\$1,455,527
Town of Edenton	02/15/74	8	10/16/08	196	\$52,089,100	\$174,201	146	\$4,408,215
Gates County	02/14/75	-	07/20/09	72	\$17,285,500	\$69,890	18	\$256,704
Town of Gatesville	02/22/74	-	07/20/09	3	\$1,370,000	\$5,445	3	\$159,447
Hertford County	06/02/78	-	08/03/09	71	\$14,883,200	\$43,456	60	\$1,453,763
Town of Ahoskie	02/22/74	-	08/03/09	25	\$6,950,100	\$25,921	59	\$1,444,592
Village of Cofield	03/07/80	-	08/03/09	0	\$0	\$0	0	\$0
Town of Como	11/01/99	-	08/03/09	0	\$0	\$0	0	\$0
Town of Harrellsville	08/03/09	-	08/03/09	0	\$0	\$0	0	\$0
Town of Murfreesboro	11/10/78	-	08/03/09	2	\$560,000	\$735	0	\$0
Town of Winton	12/29/78	-	08/03/09	3	\$875,000	\$1,088	2	\$31,122
Pasquotank County	12/20/74	-	10/05/04	1,247	\$284,518,100	\$717,282	148	\$1,346,462
City of Elizabeth City	11/09/73	-	10/05/04	1,418	\$271,269,700	\$1,010,595	204	\$4,531,402
Perquimans County	07/28/78	-	10/05/04	659	\$163,869,200	\$338,912	63	\$567,547
Town of Hertford	02/15/74	-	10/05/04	47	\$12,608,000	\$36,393	16	\$315,015
Town of Winfall	07/25/75	-	10/05/04	17	\$4,398,600	\$13,826	2	\$55,030
TOTAL PLAN	-	-	-	4,905	\$1,102,844,000	\$3,193,027	1,006	\$19,196,718

Source: FEMA NFIP Policy Statistics via NCEM Risk Management Tool, accessed May 2019

FHBM = Flood Hazard Boundary Map

Note: As of December 2019, Harrellsville is not participating in the NFIP

Floodplain Management Plan

A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

- ▶ 8 of the 17 participating jurisdictions have a floodplain management plan in place.

Open Space Management Plan

An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state, and to expand or connect areas in the public domain such as parks, greenways, and other outdoor recreation areas. In many instances open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity.

- ▶ 6 of the 17 participating jurisdictions have an open space management plan in place.

Stormwater Management Plan

A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

- ▶ 9 of the 17 participating jurisdictions have a stormwater management plan in place or are covered under a county plan (8 jurisdictions have one in place; 1 covered under a county plan).

5.3.2 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using geographic information systems (GIS) to analyze and assess community hazard vulnerability. The Local Capability Self-Assessment was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 5.3 provides a summary of the Local Capability Self-Assessment results for the region with regard to relevant staff and personnel resources. A checkmark indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

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Table 5.3 – Relevant Staff/Personnel Resources

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Camden County	√	√	√	√	√	√			√	√	√	√	√	√
Chowan County	√		√	√	√	√			√	√	√	√	√	√
Town of Edenton	√	√	√	√	√	√			√	√	√	√	√	√
Gates County	√			√	√	√				√			√	√
Town of Gatesville	√					√								√
Hertford County	√	√		√	√	√			√	√	√	√	√	√
Town of Ahoskie						√							√	√
Village of Cofield	√	√				√			√				√	√
Town of Como														
Town of Harrellsville														√
Town of Murfreesboro	√		√						√				√	
Town of Winton	√	√				√			√				√	
Pasquotank County	√	√	√	√	√	√			√	√	√	√	√	√
City of Elizabeth City	√	√	√	√	√	√			√	√	√	√	√	√
Perquimans County	√	√		√	√	√				√	√	√	√	√
Town of Hertford	√	√	√	√		√			√	√	√	√	√	√
Town of Winfall	√	√	√						√	√			√	

Source: Local Capability Assessment Survey

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5.3.3 Fiscal Capability

The ability of a local government to implement mitigation actions is often dependent on the amount of money available. This may take the form of outside grant funding awards or locally based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project such as the acquisition of flood-prone houses, which can require a substantial commitment from local, state, and federal funding sources.

The Local Capability Self-Assessment was used to capture information on the region’s fiscal capability through the identification of locally available financial resources.

Table 5.4 provides a summary of the results for the region with regard to relevant fiscal resources. A checkmark (√) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

Table 5.4 – Relevant Fiscal Resources

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Camden County	√	√			√						
Chowan County					√						
Town of Edenton	√			√	√						
Gates County		√			√						
Town of Gatesville											
Hertford County					√						
Town of Ahoskie					√						
Village of Cofield				√							
Town of Como											
Town of Harrellsville					√						
Town of Murfreesboro											
Town of Winton											
Pasquotank County	√	√			√						
City of Elizabeth City	√			√	√	√	√	√	√		
Perquimans County		√			√						
Town of Hertford	√			√	√						
Town of Winfall											

Source: Local Capability Assessment Survey

5.3.4 Education and Outreach Capability

This type of local capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information. Examples include natural disaster or safety related school programs; participation in community programs such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns such as a Tornado Awareness Month.

Table 5.5 provides a summary of the results for the region with regard to relevant education and outreach resources. A checkmark (√) indicates that the given resource is locally available for hazard mitigation purposes.

Table 5.5 – Education and Outreach Resources

Jurisdiction	Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Natural disaster or safety related school programs	StormReady certification	Firewise Communities certification	Public-private partnership initiatives addressing disaster-related issues	Other
Camden County	√	√	√			√	
Chowan County	√	√	√			√	
Town of Edenton	√	√	√			√	
Gates County	√	√	√				
Town of Gatesville							
Hertford County	√	√	√				
Town of Ahoskie							
Village of Cofield							
Town of Como							
Town of Harrellsville							
Town of Murfreesboro							
Town of Winton							
Pasquotank County	√	√	√			√	
City of Elizabeth City	√						
Perquimans County	√	√	√	√			
Town of Hertford	√						
Town of Winfall							

Source: Local Capability Assessment Survey

5.3.5 Mitigation Capability

This type of local capability refers to the mitigation strategies and actions that are developed by the communities in this plan.

Table 5.6 provides a summary of the results for the planning area with regard to relevant mitigation resources. A checkmark (v) indicates that the given resource is locally available for hazard mitigation purposes.

Table 5.6 – Mitigation Resources

Jurisdiction	Do you apply for mitigation grant funding?	Do you perform reconstruction projects?	Do you perform building elevations?	Do you perform acquisitions?
Camden County	✓	✓	✓	✓
Chowan County	✓	✓	✓	✓
Town of Edenton	✓	✓	✓	✓
Gates County	✓	✓	✓	✓
Town of Gatesville	✓	✓	✓	✓
Hertford County	✓	✓	✓	✓
Town of Ahoskie	✓	✓	✓	✓
Village of Cofield	✓	✓	✓	✓
Town of Como	✓	✓	✓	✓
Town of Harrellsville				
Town of Murfreesboro	✓	✓	✓	✓
Town of Winton	✓	✓	✓	✓
Pasquotank County	✓	✓	✓	✓
City of Elizabeth City	✓	✓	✓	✓
Perquimans County	✓	✓	✓	✓
Town of Hertford	✓	✓	✓	✓
Town of Winfall	✓	✓	✓	✓

5.3.6 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority, or it may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The Local Capability Self-Assessment was used to capture information on political capability of the region. Survey respondents were asked to rate political support as they perceive it and identify general examples

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of local political capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (e.g., building codes, floodplain management, etc.). The comments provided by the participating jurisdictions are listed below:

HMPC representatives from all participating jurisdictions responded that political leaders are at least potentially willing to implement mitigation measures. Additionally, several participating jurisdictions have some local standards that exceed state requirements. For example, Camden County, Chowan County, Edenton, Gates County, Gatesville, and Pasquotank County have a two-foot freeboard requirement; Elizabeth City requires a three-foot freeboard.

5.3.7 Local Self-Assessment Rating

In addition to the inventory and analysis of specific local capabilities, the Local Capability Self-Assessment asked counties and local jurisdictions within the Albemarle region to assign a rating of their perceived capability across each of the capability categories and overall as either “limited,” “moderate,” or “high.”

Table 5.7 summarizes the results of the self-assessment ratings for each community in the Albemarle Region.

Table 5.7 – Self-Assessment of Capability

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	OVERALL CAPABILITY
Camden County	High	High	High	High	High	High	High
Chowan County	High	High	High	High	High	High	High
Town of Edenton	High	High	High	High	High	High	High
Gates County	High	High	High	High	High	High	High
Town of Gatesville	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Hertford County	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Ahoskie	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Village of Cofield	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Como	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Town of Harrellsville	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Town of Murfreesboro	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Town of Winton	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Pasquotank County	High	High	High	High	High	High	High
City of Elizabeth City	High	High	High	High	High	High	High
Perquimans County	High	High	High	High	High	High	High
Town of Hertford	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Winfall	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate

Source: Local Capability Assessment Survey

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5.4 CONCLUSIONS ON LOCAL CAPABILITY

In order to form meaningful conclusions on the assessment of local capability, a quantitative scoring methodology was designed and applied to results of the Local Capability Assessment Survey. This methodology attempts to assess the overall level of capability of the Albemarle region to implement hazard mitigation actions.

Table 5.8 shows the results of the capability assessment using the designed scoring methodology. The capability score is based solely on the information provided by local officials in response to the Local Capability Self-Assessment. According to the assessment, the average local capability score for all responding jurisdictions is 145.

Table 5.8 – Capability Assessment Results

Jurisdiction	Overall Capability Score	Overall Capability Rating
Camden County	232	High
Chowan County	107	High
Town of Edenton	222	High
Gates County	182	High
Town of Gatesville	134	High
Hertford County	180	High
Town of Ahoskie	148	High
Village of Cofield	148	High
Town of Como	90	Moderate
Town of Harrellsville	56	Low
Town of Murfreesboro	124	High
Town of Winton	144	High
Pasquotank County	113	High
City of Elizabeth City	106	High
Perquimans County	202	High
Town of Hertford	152	High
Town of Winfall	128	High

Source: Local Capability Assessment Survey, NCEM Risk Management Tool

As previously discussed, one of the reasons for conducting a capability assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified, for each jurisdiction, in the tables found throughout this section. The participating jurisdictions used the capability assessment as part of the basis for the mitigation actions that are identified in Section 7; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their mitigation actions.

6 Mitigation Strategy

Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the process for developing the mitigation strategy for the Albemarle Regional Hazard Mitigation Plan. It describes how the Region met the requirements for Planning Step 6 (Set Goals), Planning Step 7 (Review Possible Activities), and Planning Step 8 (Draft an Action Plan). This section includes the following sub-sections:

- ▶ 6.1 Goals and Objectives
- ▶ 6.2 Identification & Analysis of Mitigation Activities

6.1 GOALS AND OBJECTIVES

Requirement §201.6(c)(3)(i): [The mitigation strategy section shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Goal setting builds upon the findings of Section 4, which documents the hazards and associated risks that threaten the Albemarle planning area, and Section 5, which evaluates the capacity of the Region to reduce the impact of those hazards. The intent of Goal Setting is to identify areas where improvements to existing capabilities can be made so that community vulnerability is reduced. Goals are also necessary to guide the review of possible mitigation measures. This plan needs to make sure that recommended actions are consistent with what is appropriate for the Region. Mitigation goals need to reflect community priorities and should be consistent with other local plans.

- ▶ **Goals** are general guidelines that explain what is to be achieved. They are usually broad-based policy type statements, long term and represent global visions. Goals help define the benefits that the plan is trying to achieve.
- ▶ **Objectives** are short term aims that, when combined, form a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.

6.1.1 Coordination with Other Planning Efforts

The goals of this plan need to be consistent with and complement the goals of other local planning efforts. The primary planning documents that the goals of this plan should complement and be consistent with are the counties’ and participating jurisdictions’ comprehensive plans. Comprehensive plans are important because they are developed and designed to guide future growth within their communities. Keeping the Hazard Mitigation Plan and Comprehensive Plans consistent ensures that land development is done with awareness and understanding of hazard risk and that mitigation projects complement rather than contradict community development objectives.

6.1.2 Goal Setting

At the second planning meeting, held on March 28, 2019, the HMPC reviewed and discussed the goals from the 2015 plan. The goals of the 2015 Albemarle Regional Hazard Mitigation Plan were as follows:

- | | |
|----|---|
| #1 | Reduce the risk of loss of life and personal injury from natural hazards. |
|----|---|

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#2	Reduce the risk and impact of future natural disasters by regulating development in known high hazard areas.
#3	Maintain critical facilities in functional order.
#4	Protect infrastructure from damage.
#5	Ensure that hazard mitigation is considered when redevelopment occurs after a natural disaster.
#6	Provide education to citizens that empowers them to protect themselves and their families from natural hazards.
#7	Fulfill Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance.
#8	Improve interjurisdictional cooperation and coordination, especially regarding the reduction of natural hazard impacts.

The HMPC largely approved of the existing goals, but proposed changes to consolidate them into fewer, stronger goals. Goals 6, 7, and 8 were largely maintained, and the sentiment of goals 1 through 5 was combined into one new goal.

During the second planning meeting, held on March 28, 2019, the HMPC discussed objectives within each goal in order to better facilitate the development of clearly defined mitigation actions.

The revised goals and the new objectives of this plan update are detailed below in Section 6.1.3.

6.1.3 Resulting Goals and Objectives

The HMPC agreed upon seven general goals for this planning effort and included specific objectives in support of each goal. The refined goals and objectives are as follows:

Goal 1 – Reduce the risk of loss of life and personal injury from natural hazards through local land development regulations, capital improvements, planning/investment, and proactive long-range planning regarding land use and post-disaster redevelopment.

Objective 1.1: Reduce the length of time that local infrastructure systems are deemed inoperable due to the impacts of natural hazards.

Objective 1.2: Preserve open space in floodplain areas.

Objective 1.3: Reduce flooding and erosion vulnerability through land development initiatives, maintenance, and improvement of storm drainage.

Goal 2 – Provide education and notification to citizens that empowers them to protect themselves and their families from natural hazards.

Objective 2.1: Ensure adequate warning and notification relating to hazards including efforts to establish well publicized, accessible shelter facilities that meet national standards for safety and supply.

Objective 2.2: Improve the public awareness and understanding of local vulnerability to hazards and improve disaster warning/post-disaster information efforts.

Goal 3 – Fulfill Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance.

Objective 3.1: Improve all participating Jurisdictions' general hazard mitigation capability.

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Objective 3.2: Work toward compliance with all State and Federal planning and regulatory requirements including standards for Local Emergency Operations Plans, Flood Damage Prevention Ordinances, Continuity of Operations Plans, and the Community Rating System.

Goal 4 – Improve interjurisdictional/interagency cooperation and coordination, especially regarding the reduction of natural hazard impacts.

Objective 4.1: Reduce the risk of damage from wildfires (including under fires) to existing and future development.

Objective 4.2: Ensure effective local/interagency communication and response during disaster events.

6.2 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIVITIES

Requirement §201.6(c)(3)(ii): [The mitigation strategy section shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

To identify and select mitigation projects that support the mitigation goals, each hazard identified in Section 4 Hazard Identification was evaluated. The following were determined based on the Priority Risk Index scores to be high and medium priority hazards:

- ▶ Drought
- ▶ Extreme Heat
- ▶ Flood
- ▶ Hurricane & Tropical Storm
- ▶ Severe Weather (Thunderstorm Wind, Lightning, & Hail)
- ▶ Severe Winter Storm
- ▶ Tornado
- ▶ Wildfire
- ▶ Radiological Incident

Note: While this list contains a technological/human-caused hazard, only natural hazards on this list were necessarily prioritized for mitigation. Mitigation action development for technological/human-caused hazards was left to the discretion of each jurisdiction.

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of mitigation categories which are utilized as part of the CRS planning process but are also applicable to multi-hazard mitigation. Acronyms used in the Mitigation Action Plans to identify each action's category are listed in parentheses.

- ▶ Prevention (P)
- ▶ Property Protection (PP)
- ▶ Natural Resource Protection (NRP)
- ▶ Emergency Services (ES)
- ▶ Structural Projects (SP)
- ▶ Public Information and Outreach (PIO)

The HMPC was also provided with examples of potential mitigation actions for each of the above categories. The HMPC was instructed to consider both future and existing buildings in evaluating possible mitigation actions. Facilitated discussions took place to examine and analyze the options. The HMPC also

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considered which actions from the previous plan that were not already completed should be continued in this action plan.

6.2.1 Prioritization Process

In the process of identifying continuing and new mitigation actions, the HMPC was provided with a set of prioritization criteria to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. HMPC members were asked to consider a set of prioritization criteria, which were grouped into three categories: Suitability, Risk Reduction, and Cost. The criteria for the prioritization process included the following:

- ▶ **Suitability**
 - Appropriateness of Action
 - Community Acceptance
 - Technical and Administrative Feasibility
 - Environmental Impact
 - Legal Conformance
 - Consistency with Existing Plans and Other Community Goals
- ▶ **Risk Reduction**
 - Scope of Benefits
 - Potential to Save Lives
 - Importance of Benefits
 - Level of Inconvenience or Unintended Consequence
 - Losses Avoided
 - Number of People to Benefit
- ▶ **Cost**
 - Estimate of Upfront Cost
 - Estimate of Ongoing Cost
 - Benefit to Cost Ratio
 - Financing Availability
 - Affordability
 - Elimination of Repetitive Damages

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority, as reflected in the prioritization criteria above. For each action, the HMPC considered the benefit-cost analysis in terms of:

- ▶ Ability of the action to address the problem
- ▶ Contribution of the action to save life or property
- ▶ Available technical and administrative resources for implementation
- ▶ Availability of funding and perceived cost-effectiveness

The consideration of these criteria helped to prioritize and refine mitigation actions but did not constitute a full benefit-cost analysis. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

Using these prioritization criteria, the HMPC assigned each action a ranking of High, Medium, or Low priority. The prioritization ranking for each mitigation action considered by the HMPC is provided in Section 7 Mitigation Action Plans.

7 Mitigation Action Plans

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include an] action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This section provides the mitigation action plan for each participating jurisdiction, grouped by county. To improve regional coordination and increase capability to implement projects, many actions are multi-jurisdictional but will be led by the respective county. In the cases where individual jurisdictions identified their own actions in addition to the countywide actions, these additional actions are listed by jurisdiction at the end of the county table.

The following acronyms are used to identify potential funding sources for each action:

- ▶ ARC – American Red Cross
- ▶ FEMA – Federal Emergency Management Agency
- ▶ GF – General Fund
- ▶ HMGP – Hazard Mitigation Grant Program
- ▶ NCDEQ – North Carolina Department of Environmental Quality
- ▶ NCDOT – North Carolina Department of Transportation
- ▶ NCDPS – North Carolina Department of Public Safety
- ▶ PDM – Pre-Disaster Mitigation
- ▶ UHMA – Unified Hazard Mitigation Assistance
- ▶ USDA – United States Department of Agriculture

SECTION 7: MITIGATION ACTION PLANS

Table 7.1 – Mitigation Action Plan, Camden County

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CAM1	Maintain “Storm Ready Community” Status	Camden County	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	Med	2.1	ES	County Emergency Management	\$20,000	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Camden County continues to maintain the County’s Storm Ready Status and will continue to do so through implementation of this plan.
CAM2	Minimize economic and property losses due to flooding through continued compliance in the National Flood Insurance Program (NFIS).	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	PP	<ul style="list-style-type: none"> County Planning & Zoning County Emergency Management County Board of Commissioners 	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Camden County continues to be an active participant of the NFIP program and will continue to do so through the planning period.
CAM3	Continue to participate in the Community Rating System (CRS) and carry out required activities to maintain the County’s Class 7 rating.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.2	P	<ul style="list-style-type: none"> County Planning & Zoning County Emergency Management County Board of Commissioners 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Camden County is one of only two communities in the Albemarle region that participates in the CRS Program. This plan update will be incorporated into the County’s next five-year audit and potentially improve its rating.
CAM4	Develop and maintain comprehensive water management policies for the County considering the connections between land-use, urban growth, and surface water and ground water issues.	Camden County	Drought	Med	3.2	NRP	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners County Emergency Management NCDPM – Coastal Area Management Act 	Staff Time	General Fund, NCDEQ, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Camden County continues to monitor its water resources and will maintain a water shortage management plan to ensure the availability of resources during drought conditions.
CAM5	Encourage critical facilities to apply structural hazard mitigation and sustainability concepts when building or remodeling their facilities; to include back-up power sources.	Camden County	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	High	1.1	ES	<ul style="list-style-type: none"> County Emergency Management County Planning County Board of Commissioners 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to promote the integration of these concepts into the design consideration of new or renovated critical facilities.
CAM6	Acquire generators or other forms of redundant power supply to ensure that critical facilities and infrastructure remain operational where normal power supply is not available.	Camden County	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	High	1.1	ES	County Emergency Management	To Be Determined	General Fund, NCDPS	2 to 3 years	In Progress – Carry Forward	The County will continue to work on establishing backup power supplies at all critical facilities. This will be undertaken as funding becomes available.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CAM7	Maintain Debris Removal and Monitoring Services Contracts	Camden County	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Med	1.1	ES	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning County Board of Commissioners 	To Be Determined	NCDPS, FEMA	Other – As necessary	In Progress – Carry Forward	Camden County maintains a pre-disaster debris management contract and reviews and renews this contract on an annual basis.
CAM8	Encourage the use of weather radios/severe weather warning apps especially in schools, rest homes, convalescent homes, retirement centers and other locations where people congregate to inform them of the approach of severe weather.	Camden County	All Hazards	Med	2.1	PIO	County Emergency Management	Staff Time	General Fund, Staff Time	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work with the American Red Cross to promote this program through the planning process.
CAM9	Review the Pasquotank-Camden-Elizabeth City Multi-Hazard Operations Plan annually and update the plan as necessary. Ensure all departments establish guidelines for response to emergencies and to maintain departmental operations. Work with County departments to ensure each department possesses a clear understanding of department responsibilities as outlined in the Pasquotank-Camden- Elizabeth City Multi-Hazard Operations Plan.	Camden County	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Camden County reviews its Emergency Operations Plan annually and specifically addresses issues identified through past storm experiences.
CAM10	Continue efforts to develop continuity of operations plans (COOP) for county departments. Continuity of operations planning has been completed by several departments and additional planning efforts are currently underway. These efforts will also be promoted for community businesses private facilities.	Camden County	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Camden County reviews its Continuity of Operations Plan annually and specifically addresses issues identified through past storm experiences.
CAM11	Record all tax parcel information and floodplain locations in a GIS system including repetitive loss areas, areas of greatest risk, and vulnerable populations.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	<ul style="list-style-type: none"> County GIS County Emergency Management 	Staff Time	General Fund, Staff Time, NCDPS	Maintain annually	In Progress – Carry Forward	Camden County maintains all GIS data through its tax department. These efforts will continue through this plan update.
CAM12	In conjunction with NCEM, produce an up-to-date flood map of Camden County that can be utilized to reduce development in the floodplain. This map should be independent of the County Flood Insurance Rate Maps and reflect the actual extent of past flood events.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	PP	<ul style="list-style-type: none"> County GIS County Emergency Management 	Staff Time	General Fund, Staff Time, NCDPS	1 to 2 Years	Not Started – Carry Forward	The alternate flood impact map has not been completed; however, the County will work to compile this information and incorporate the impacts of both Hurricanes Matthew and Florence.
CAM13	Minimize economic and property losses due to flooding through continued compliance with NFIP and participation in the Community Rating System (CRS).	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.2	P	County Planning and Zoning	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County, through implementation of this plan, will continue to carry out the requirements of the NFIP Community Rating System.
CAM14	Minimize the impacts of lightning strikes. Continue to educate the public on severe thunderstorm safety and the safety measures to be taken from lightening injuries.	Camden County	Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	Med	2.2	PIO	County Emergency Management	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Camden County will work closely with electric service providers to identify a cost effective solution to this problem.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CAM15	Reduce the impact of wind on trees near county structures and critical facilities. Monitor trees and branches at risk of breaking or falling in windstorms. Prune or thin trees or branches on county/city property when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the county.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	High	1.1	P	<ul style="list-style-type: none"> County Public Works County Manager 	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Camden County factors this aspect of emergency management and mitigation into its day-to-day operations. The County will continue to coordinate efforts with utility service providers.
CAM16	Continue the Stormwater Advisory Committee’s work in identifying major drainage issues in the four stormwater districts and work to identify what level of maintenance is needed in these areas.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	High	1.3	P	<ul style="list-style-type: none"> Stormwater Advisory Committee County Public Works County Planning & Zoning 	Staff Time	General Fund, NCDWR	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to identify ongoing stormwater hot spots, and where practicable and feasible establish a solution to these issues.
CAM17	Update/maintain the County’s current Action Plan for Wildfire Response. These efforts will include a review of inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires. This effort will also involve an education effort focused on informing home and property owners about Wildland/Urban Interface fire safety.	Camden County	Wildfire	Med	4.1	P	<ul style="list-style-type: none"> County Emergency Management County Manager Volunteer Fire Depts. US Forestry Service 	Staff Time	General Fund, US Forest Service	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work with the US Forest Service to address the issue of Wildfire safety throughout the County.
CAM18	Engage in comprehensive pre- and post-storm planning efforts utilizing the most accurate and thorough data available. These efforts will involve the review and incorporation of all existing policy and regulatory tools currently in place in an effort to identify cost effective and environmentally sound mitigation projects for implementation.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	Med	3.2	ES	<ul style="list-style-type: none"> County Planning & Zoning County Emergency Management 	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	The information provided in the current Hazard Mitigation Plan, as well as the plan update will be utilized during the review of all local emergency management documents and procedures.
CAM19	Continue to utilize annual, as well as post-disaster Federal (FEMA) and State mitigation funds, to acquire and elevate structures impact by excessive flooding.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	3.2	SP	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	To Be Determined	NCDPS, FEMA	Annually – As Needed	In Progress – Carry Forward	The County continues to utilize mitigation funding to address the impacts of recent natural hazard events including both Hurricanes Matthew and Florence.
CAM20	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses, contractors, realtors, developers and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both person and property.	Camden County	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to carry out these efforts through implementation of its local Community Rating System (CRS) Program.
CAM21	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Camden County	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	
CAM22	Engage in a comprehensive planning process aimed at establishing a management plan for all county-owned mitigation properties.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.2	PP	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund	Ongoing – next 5 years	New	N/A
CAM23	Undertake efforts to reestablish hydrologic connections between the Perquimans River and the Great Dismal Swamp.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	P	<ul style="list-style-type: none"> County Manager County Emergency Management County Board of Commissioners 	To Be Determined	General Fund, NCDOT	2 to 3 years	New	N/A

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Table 7.2 – Mitigation Action Plan, Chowan County

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CHO/EDN1	Map facilities and areas impacted by natural disasters through their respective GIS systems. Mapping efforts will include the location of all critical facilities, housing, businesses, and infrastructure impacted by past natural hazard events. Priority will be given to the mapping of homes impacted by flooding events, specifically those located within the defined flood hazard area. Mapping will be utilized to make a determination regarding potential mitigation funding.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	2.2	PIO	<ul style="list-style-type: none"> County GIS Municipal Planning 	Staff Time	General Fund NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County GIS Department will continue to maintain this data and incorporate new information as natural disasters occur.
CHO/EDN2	Work to improve drainage conditions throughout the County through the identification and implementation of capital improvements projects. A variety of funding mechanisms will be utilized to carry out these efforts and when possible, grant funding will be utilized. These efforts should initially focus on the following issues: <ul style="list-style-type: none"> Filberts Creek culvert replacement Clearing and snagging of drainage ditches and canals Potential drainage improvements to Pembroke Circle Potential drainage improvements to Dillard Mill Potential drainage improvements to Woodlawn Park	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	To Be Determined	General Fund, NCDPS, HMGP, NCDENR	3 to 5 years	New	N/A
CHO/EDN3	Repair and upgrade all facilities and equipment associated with both Bennett and Dillard Millpond.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	SP	<ul style="list-style-type: none"> County Administration Municipal Administration 	To Be Determined	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Completed – Carry Forward	The County has not initiated these efforts but will do so through implementation of this plan.
CHO/EDN4	Compile a map reflecting the “true” extent of past flooding events. This effort should document the flooding associated with each respective flooding event, and document flooding that coincides with defined NFIP Flood Hazard Areas. Additionally, impacted critical facilities, businesses, homes, and infrastructure should be catalogued.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.2	P	<ul style="list-style-type: none"> County GIS Municipal Planning 	Staff Time	General Fund NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will conduct this mapping efforts in an attempt to accurately reflect the impacts of both Hurricanes Matthew and Florence.
CHO/EDN5	Continue to utilize annual, as well as post-disaster Federal (FEMA) and State mitigation funds, to both acquire and elevate structures impacted by excessive flooding. These efforts should focus on the following portions of the County: <ul style="list-style-type: none"> Downtown Edenton Cape Colony Subdivision The Houghton Road Area 	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	SP	<ul style="list-style-type: none"> County Administration Municipal Administration 	To Be Determined	HMGP, FMA, General Fund	Ongoing – As needed	In Progress – Carry Forward	The County will work to address the impacts associated with Hurricane Matthew, as well as any future disaster events.
CHO/EDN6	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLP’s) from future flooding events. The County will maintain a list of RLP’s, and on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. These efforts will be carried out in coordination with the Town of Edenton.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather	Med	1.3	SP	<ul style="list-style-type: none"> County Administration Municipal Administration 	To Be Determined	HMGP, FMA, General Fund	Ongoing – As needed	In Progress – Carry Forward	The County will work to address the impacts associated with Hurricane Matthew, as well as any future disaster events.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CHO/EDN7	Continue to maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development. This information will also provide material outlining sound techniques for floodplain development and floodproofing of existing structures. The County will also maintain staff educated in these issues to work with prospective builders.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	2.2	PIO	<ul style="list-style-type: none"> County Planning and Inspections Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – As needed	In Progress – Carry Forward	The County Building Inspections Department will continue to provide this information, as well as be available to address questions and inquiries as necessary.
CHO/EDN8	Work to educate and inform local residents about current and potential threats associated with natural hazard events through the use of social media, news media outlets, County and Town distribution list, and television media. These efforts will include providing information regarding the dangers associated with residing within defined flood hazard areas.	Chowan County, Edenton	All Hazards	High	2.2	PIO	<ul style="list-style-type: none"> County Planning and Inspections Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – As needed	In Progress – Carry Forward	The County Building Inspections Department will continue to provide this information, as well as be available to address questions and inquiries as necessary.
CHO/EDN9	Continue to maintain a formal notification system to alert local residents when water conservation measures have been put in place stemming from prolonged drought conditions. Notification will follow the water use restriction schedule defined by the County Board of Commissioners and Town Council.	Chowan County, Edenton	Drought	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – As needed	In Progress – Carry Forward	The County will continue to institute measures associated with the County's Water Shortage Management Plan.
CHO/EDN10	Advocate the use of existing State and Federal regulatory programs for protecting and preserving coastal wetland Areas of Environmental Concern.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	3.1	NRP	<ul style="list-style-type: none"> County Planning Municipal Administration NCDEQ EPA 	Staff Time	General Fund, NCDEQ	Ongoing – As needed	New	N/A
CHO/EDN11	Support planning for improvements to the Chowan County/Edenton regional transportation systems to provide for safe traffic flow and evacuation. These efforts should include the identification of location for the use of electrical highways signs intended to provide warning regarding inclement weather and/or hazardous road conditions.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Low	1.1	P	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations NCDOT 	Staff Time	General Fund, NCDOT	Ongoing – next 5 years	New	N/A
CHO/EDN12	Work with the curriculum directors of both the public and private schools to add all mitigation hazards prevention and preparedness information.	Chowan County, Edenton	All Hazards	Med	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration County Board of Education 	Staff Time	General Fund	Ongoing – Annually	Not Started – Carry Forward	Chowan County will initiate this program through the implementation of this plan.
CHO/EDN13	Require all public utility companies as well as County- and Town-owned utilities to inspect and repair damage due to hurricanes within a 5-year time frame.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Med	1.1	P	<ul style="list-style-type: none"> County Administration Municipal Administration Utility Providers 	Staff Time	General Fund, Utility Providers	2 to 3 years	Not Started – Carry Forward	Chowan County will work with the Town of Edenton, as well as other Electric Service Providers to enact this policy.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CHO/EDN14	Work with local charities such as Baptist Men and/or Habitat for Humanity chapters, to apply non-structural mitigation measures to the homes of low-income senior citizens in the Flood Hazard Area.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	High	4.2	PP	<ul style="list-style-type: none"> County Administration Municipal Administration Local Non-Profits 	To Be Determined	General Fund, Local Non-Profits	Ongoing – next 5 years	In Progress – Carry Forward	These efforts are currently underway at the local level.
CHO/EDN15	Maintain information on the County website relating to evacuation and sheltering. Emergency information on the website will include: evacuation routes, sheltering, delays and closures, pet sheltering options, and special needs information.	Chowan County, Edenton	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A
CHO/EDN16	Maintain, and where necessary, establish backup generators at all identified critical facilities. Additionally, County Emergency Management will evaluate the equipment on a regular basis to assure it continues to meet operational demands at county facilities.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	High	1.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	To Be Determined	General Fund, NCDPS	2 to 3 years	In Progress – Carry Forward	The County will continue to identify need regarding the installation of backup generators and where necessary work with NCDPS to implement this strategy.
CHO/EDN17	Increase efforts to educate the public and increase agency capabilities in regard to wildfire response. These efforts will include a review of inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires. This effort will also involve an education effort focused on informing home and property owners about Wildland/Urban Interface fire safety.	Chowan County, Edenton	Wildfire	Med	4.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A
CHO/EDN18	Annually review and update the County's Emergency Operations Plan (EOP) to ensure compliance with all NCEM and NCOEMS procedures and policies. Through these updates, the County will work closely with the Town of Edenton to ensure that all jurisdictions continue to be educated and prepared for activation of the EOP in the event of a disaster event.	Chowan County, Edenton	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners Town of Edenton 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Chowan County, in conjunction with the Town of Edenton will reviews its Emergency Operations Plan annually, specifically the County addresses issues identified through past storm experiences.
CHO/EDN19	Improve awareness regarding the intensity of natural hazard events as they materialize through: <ul style="list-style-type: none"> Establishing an emergency radio broadcast frequency that runs a recorded message pre- and post-hazard to communicate critical time-sensitive information. It could include routes/bridges that are open or closed, weather/hazard forecasts, location of emergency shelters. More fully utilizing County/Town websites to provide pre-hazard and post-hazard recovery information (debris pick-up schedule, critical dates, forms, phone numbers, housing availability, etc.). 	Chowan County, Edenton	All Hazards	High	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	\$10,000	General Fund, NCDPS	2 to 3 Years	New	N/A

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Table 7.3 – Mitigation Action Plan, Gates County

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
GAT1	Establish a county-wide program focused on clearing and snagging watercourses and arterial ditches to open waterways by clearing debris throughout the county to minimize localized flooding.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDEQ, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Gates County carries this effort out annually and will continue to do so through implementation of this plan.
GAT2	Support the expansion of US Highway 13/158 to facilitate greater evacuation capacity.	Gates County, Gatesville	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	Low	1.1	ES	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Function of NCDOT Regional Transportation Improvement Program	GF, NCDOT	Ongoing – As Funds Become Available	Not Started – Carry Forward	The County continues to support this strategy and will do so until the project is funded and constructed through efforts associated with the County Transportation Improvement Plan.
GAT3	Expand efforts to provide public awareness of local hazard mitigation planning and emergency response procedures through the use of social media, local news outlets, and public meetings.	Gates County, Gatesville	All Hazards	High	2.2	PIO	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County currently undertakes these efforts and will continue to expand upon these efforts through implementation of this plan.
GAT4	Annually, or as deemed necessary, review and amend when necessary the flood damage prevention ordinance and ensure regulations are in place to mitigate potential losses from events.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS	Ongoing – As necessary	In Progress – Carry Forward	The County will amend the County Flood Damage Prevention Ordinance as necessary.
GAT5	Annually review hazard mitigation plan strategies and actions as they pertain to the County's Land Use Plan and Land Development Regulations, including incorporation of floodplain mapping.	Gates County, Gatesville	All Hazards	Med	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDEQ, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County will continue to utilize the Hazard Mitigation Plan when making determinations and decisions regarding Land Use Policy.
GAT6	Increase emergency management training opportunities for local government personnel.	Gates County, Gatesville	All Hazards	Med	4.2	ES	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County carries out this strategy; however, through implementation of this plan, the County will work to improve upon these efforts.
GAT7	Increase community awareness of wildlife-related issues and wildland fire safety by utilizing the Firewise program and its resources (www.firewise.org).	Gates County, Gatesville	Wildfire	High	4.1	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NC Forest Service, NCDPS	Ongoing - Annually	In Progress – Not Started	The County, through implementation of this plan, will work to incorporate Firewise recommendations into existing land development regulations, as well as land use policy.
GAT8	Further educate the public regarding methods to address structural mitigation and residing within the floodplain through public meetings and ongoing outreach efforts.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	2.2	PP	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS, FEMA	Ongoing - Annually	In Progress – Carry Forward	The County currently undertakes these efforts but will improve upon this program through implementation of this plan.
GAT9	Increase EMS and law enforcement personnel resources through the County's annual capital improvement budgeting process.	Gates County, Gatesville	All Hazards	Med	1.1	ES	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDPS	2 to 3 years	Not Started – Carry Forward	The County will consider increasing these staffing levels in association with annual budget deliberations.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
GAT10	Work closely with utility service providers to keep power/utility right-of-way clear by routinely pruning trees and clearing tree limbs.	Gates County, Gatesville	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	High	1.1	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, Utility Service Providers, NCDPS	Ongoing - Annually	In Progress – Carry Forward	This effort will continue to be carried out by the County in an effort to minimize the impacts of natural disasters on central services, most importantly the electrical grid.
GAT11	Investigate the potential advantages and disadvantages, if any, of joining the NFIP's Community Rating System (CRS). Consider making application to the CRS program during the five-year implementation of this plan.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.2	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDPS, FEMA	2 to 3 years	Not Started – Carry Forward	The County, as well as the Town of Gatesville will consider joining the Community Rating System program through implementation of this plan.
GAT12	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Gates County, Gatesville	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A
GAT13	Continue to work towards the Implementation of all projects defined within the Hurricane Matthew Resilient Redevelopment Plan	Gates County, Gatesville	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Med	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	General Fund, NCDPS, NCDEQ, NCDOT	Ongoing – As funding is available	New	N/A

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Table 7.4 – Mitigation Action Plan, Hertford County

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
HER1	Improve upon efforts to inform citizens of the location and availability of shelters and evacuation routes in the event of a natural disaster. These efforts will utilize local print and television media outlets, social networking, as well as Town and County websites. The County will also evaluate all shelter facilities to ensure that they all meet American Red Cross (ARC) standards.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	High	2.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administration County Public Works Municipal Public Works 	Staff Time	GF, Grant Funds, American Red Cross	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work towards improving upon the availability and education regarding established shelter facilities throughout the County.
HER2	Maintain continuous contact/working relationship with electric service providers in the County to address the following: (1) disaster preparedness techniques (e.g. tree trimming, vegetation planting requirements, pole replacement); (2) Identify critical electrical facilities needing retrofit or upgrade and map with elevation reference marks; and (3) communication with County officials during and immediately after a natural hazard event that results in loss of electrical power.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	Med	4.2	P	<ul style="list-style-type: none"> County Emergency Management Municipal Administration Electrical Utility Providers 	Staff Time	GF, Electric Service Providers	Ongoing – Annually	In Progress – Carry Forward	The County will establish a protocol to meet with Utility Service Providers annually to prepare for the impact of natural disasters, in particular tropical storms and hurricanes.
HER3	Maintain, and where necessary, establish backup generators at all identified critical facilities. Additionally, County Emergency Services will evaluate the equipment on a regular basis to assure it continues to meet operational demands at county facilities.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	High	1.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations County Public Works Municipal Public Works 	To Be Determined	GF, Grant Funds, Utility Providers	Ongoing – As Funding Becomes Available	In Progress – Carry Forward	The County will continue to establish backup generators in locations that do not currently have one as funding becomes available.
HER4	Retrofit all County and Municipal facilities for lightning protection.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	Med	1.1	PP	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations County Public Works Municipal Public Works 	To Be Determined	GF, Grant Funds, Utility Providers	Ongoing – As Funding Becomes Available	In Progress – Carry Forward	The County will work with electric service providers to establish funding and a solution for addressing this strategy.
HER5	Support through local ordinances conservation easements on all flood-prone property and impose such easements on all properties acquired with public assistance funds.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.2	PP	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations County Public Works Municipal Public Works 	Staff Time	Acquired through donation	Ongoing – as opportunities arise	In Progress – Carry Forward	The County will continue to accept conservation easements as opportunities arise through the development process.
HER6	Provide annual review of development restrictions in floodplain areas and maintain initiatives to ensure limited residential and commercial development in the floodplain and optimal protection of critical facilities.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	Med	1.3	PP	<ul style="list-style-type: none"> County Emergency Management County Administration Municipal Administrations 	Staff Time	GF, Grant Funds	Ongoing - Annually	In Progress – Carry Forward	The County will review development regulations annually in an attempt to identify methods to improve the resiliency of development in flood prone areas.
HER7	The HMPC will review "firewise" zoning and subdivision standards and recommend their appropriateness for incorporation into existing or new zoning or subdivision ordinances. (Source http://www.firewise.org)	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Wildfire	Med	4.1	P	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	GF, Grant Funds, US Forest Service	2 to 3 years	Not Started – Carry Forward	The County will make it a priority to undertake this effort during the planning period.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
HER8	Review county and municipal zoning, subdivision, and flood damage prevention ordinances for improved control of flooding hazards and improvement of drainage.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	PP	<ul style="list-style-type: none"> County Inspections County Administration Municipal Administrations 	Staff Time	GF, NCDPS	Ongoing – as need arises	In Progress – Carry Forward	The County will undertake this effort as the need arises.
HER9	Adopt and annually update a capital improvements plan with an emphasis on mitigation for critical facilities.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	High	1.1	P	<ul style="list-style-type: none"> County Administration Municipal Administrations 	Staff Time	GF	Ongoing - Annually	In Progress – Carry Forward	This will be addressed through the County's annual budgeting process.
HER10	At the local government staff level, work with the North Carolina Dept. of Transportation (NCDOT) and the Regional Planning Organization to identify drainage problem areas; develop resolutions for drainage issues created by NCDOT facilities, including inspections of channels, retention basins; and, as needed, pursue debris removal.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	NRP	<ul style="list-style-type: none"> County Emergency Management County Administration Municipal Administrations NCDOT 	Staff Time	GF	Ongoing – as need arises	In Progress – Carry Forward	The County will work with NCDOT, as well as all participating municipal jurisdictions to carry out this strategy.
HER11	Apply for all available funding from the Hazard Mitigation Grant Program (HMGP) and other funds to assist with the mitigation of severe repetitive loss properties by relocating structures out of the floodplain.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.2	NRP	<ul style="list-style-type: none"> County Emergency Management County Administration Municipal Administrations 	To Be Determined	GF, Grant Funding	Ongoing – As opportunities arise	In Progress – Carry Forward	The County will continue to carry out this strategy as is necessary following natural hazard events.
HER12	Inspect debris blockage problems and secure funds for the clearance of debris from rivers, streams and tributaries.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	NRP	<ul style="list-style-type: none"> County Soil and Water Conservation County Administration Municipal Administrations 	To Be Determined	GF	2 to 3 years	In Progress – Carry Forward	The County will continue these efforts. The County carries out this process through its annual capital improvements campaign.
HER13	Mail once annually a notice to all property owners whose land is located within a special flood hazard area. This notice should clearly state that the recipients' property is susceptible to flooding. The County will also maintain a flood map information service, whereby County residents can call or come by to receive information regarding their property in relation to the defined floodplain.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	2.2	PIO	<ul style="list-style-type: none"> County Inspections Municipal Inspections 	\$2,500	GF	Ongoing – Annually	Not Started – Carry Forward	The County will initiate these annual mailings through implementation of this plan.
HER14	Make information regarding hazards and development regulations within the floodplain available through the following: (1) The County Planning Director will ensure that the local library maintains information relating to flooding and flood protection. (Maintain dates of distribution and librarian certification of availability); (2) The County will provide a link on their website to FEMA resources addressing flooding and flood protection. This information will be made available to citizens, realtors, developers, and contractors.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	2.2	PIO	County Inspections	Staff Time	GF, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	This program is in place and will continue to be provided.
HER15	Coordinate with the Hertford County School System to establish a Hazards Awareness Educational Program for use by educators within the Hertford County School System.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	Med	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration County Board of Education 	Staff Time	General Fund	Ongoing – Annually	Not Started – Carry Forward	Hertford County will initiate this program through the implementation of this plan.
HER16	Maintain a registry of special needs individuals which has been coordinated with the Hertford County Department of Social Services. This list will include: (1) Persons on life support systems; (2) Persons dependent on electricity for medical equipment; and (3) Persons with severe mental handicap or mental illness.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	High	4.2	ES	County Emergency Management	Staff Time	GF	Ongoing – Annually	Not Started – Carry Forward	This effort is underway, and the County will continue to expand upon these efforts through implementation of this plan.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
HER17	Maintain a list of all hazardous material sites or transport corridors in Hertford County. This effort will be carried out through the efforts of the County LEPC.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	Med	4.2	ES	County Emergency Management	Staff Time	GF	Ongoing – next 5 years	In Progress – Carry Forward	The County maintains an active LEPC and will continue to do so through implementation of this plan.
HER18	Actively work with Federal, State, local and private partners to identify mitigation measures and secure funding via grants to alleviate flooding. These efforts should focus on the following areas: <ul style="list-style-type: none"> • US 13 at Ahoskie Creek • Harrellsville Island • Ahoskie Creek and DT Road • Murfreesboro Drainage and Culverts • Ebo Road Drainage and Culverts • Como Drainage and Culverts 	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	<ul style="list-style-type: none"> • County Planning & Zoning • County Board of Commissioners 	To Be Determined	General Fund, NCDPS, HMGP, NCDENR	3 to 5 years	New	N/A
HER19	Annually review and update the County's Emergency Operations Plan (EOP) to ensure compliance with all NCEM and NCOEMS procedures and policies. Through these updates, the County will work closely with participating municipal jurisdictions to ensure that all jurisdictions continue to be educated and prepared for activation of the EOP in the event of a disaster event.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> • County Emergency Management • County Board of Commissioners • Town Administrations 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	New	Chowan County, in conjunction with the Town of Edenton will reviews its Emergency Operations Plan annually, specifically the County addresses issues identified through past storm experiences.
HER20	Hertford County, and all participating jurisdictions, will work to implement all recommendations defined within the Hurricane Matthew Resiliency Redevelopment Plan	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	Med	3.1	P	<ul style="list-style-type: none"> • County Emergency Management • County Board of Commissioners • Town Administrations 	Staff Time	General Fund, Staff Time, NCDPS, NCDEQ, NCDOT	Other – Once Annually	New	N/A
HER21	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both person and property.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> • County Emergency Management • County Planning & Zoning • Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A

SECTION 7: MITIGATION ACTION PLANS

Table 7.5 – Mitigation Action Plan, Pasquotank County

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PAS1	Engage in comprehensive pre- and post-storm planning efforts utilizing the most accurate and thorough data available. These efforts will involve the review and incorporation of all existing policy and regulatory tools currently in place in an effort to identify cost effective and environmentally sound mitigation projects for implementation.	Pasquotank County, Elizabeth City	All Hazards	Med	1.3	P	<ul style="list-style-type: none"> County Planning Office City Planning Division County Board of Commissioners/City Council 	Staff Time	General Fund	Ongoing – As necessary	In Progress – Carry Forward	This effort will be undertaken as events occur within the County.
PAS2	Maintain “Storm Ready Community” Status	Pasquotank County, Elizabeth City	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	Med	2.1	ES	County Emergency Management	\$10,000	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Pasquotank County continues to maintain the County’s Storm Ready Status and will continue to do so through implementation of this plan.
PAS3	Join the Community Rating System (CRS).	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.2	P	<ul style="list-style-type: none"> County Board of Commissioners City Council County/City Staff 	\$15,000	General Fund	2 to 3 years	Not Started – Carry Forward	The County, as well as Elizabeth City, will consider joining the Community Rating System (CRS) through implementation of this plan.
PAS4	Develop and maintain comprehensive water management policies for Pasquotank County/Elizabeth City considering the connections between land use, urban growth, and surface water, and groundwater issues.	Pasquotank County, Elizabeth City	Drought	High	1.1	NRP	<ul style="list-style-type: none"> County Planning Office County Emergency Management County Board of Commissioners/City Council NCDCM – Coastal Area Management Act 	Staff Time	General Fund, Grant Funds	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to carry out these efforts through implementation of this plan.
PAS5	Continue to utilize annual, as well as post-disaster, Federal (FEMA) and State mitigation funds to both acquire and elevate structures impact by excessive flooding. The following provides a summary of mitigation target areas established following Hurricane Matthew in 2016: <ul style="list-style-type: none"> Mitigation Focus Areas: <ul style="list-style-type: none"> Oxford Heights Subdivision US 158 (near Blindman Road) One Non-residential structure (Chamber of Commerce building at 502 Ehringhaus Street) Elizabeth Street – Four Non-residential structures Laura Lee Street Shepard Street 	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.1	PP	<ul style="list-style-type: none"> County Public Works County Board of Commissioners City Administration 	To Be Determined	General Fund, NCDENR, NCDPS	Ongoing – As opportunities arise	New	This strategy addresses projects identified through the Hurricane Matthew Resilient Redevelopment Plan. These projects will be carried out through implementation of this plan.
PAS6	Encourage new or renovated critical facilities to apply structural hazard mitigation and sustainability concepts when building or remodeling their facilities, to include back-up power sources.	Pasquotank County, Elizabeth City	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	High	1.2	P	County Emergency Management	To Be Determined	General Fund, Grants	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to promote the integration of these concepts into the design consideration of new or renovated critical facilities.

SECTION 7: MITIGATION ACTION PLANS

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PAS7	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses, contractors, realtors, developers, and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both persons and property.	Pasquotank County, Elizabeth City	All Hazards	High	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management City Administration 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County undertakes these efforts but will aim to improve upon its outreach and education efforts through implementation of this plan.
PAS8	Encourage the use of weather radios/severe weather warning apps – especially in schools, rest homes, convalescent homes, retirement centers and other locations where people congregate – to inform them of approaching severe weather.	Pasquotank County, Elizabeth City	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	Med	2.1	PIO	County Emergency Management	Staff Time, American Red Cross	General Fund, Grant Funds through American Red Cross	Ongoing – next 5 years	In Progress – Carry Forward	This program is already in place and is considered important enough to carry forward into the implementation of this plan.
PAS9	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Pasquotank County, Elizabeth City	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management City Administration 	\$25,000	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County’s Emergency Alert System is in place; however, the effectiveness of the system is reviewed annually, as well as following natural hazard events.
PAS10	Review the Pasquotank-Camden-Elizabeth City Multi- Hazard Emergency Operations Plan annually and update the plan as necessary. Ensure all County and City departments continue to develop guidelines for response to emergencies and to maintain departmental operations. Work with County and City departments to ensure each department possesses a clear understanding of department responsibilities as outlined in the Pasquotank-Camden-Elizabeth City Multi-Hazard Emergency Operations Plan.	Pasquotank County, Elizabeth City	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners Elizabeth City 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Pasquotank County, in conjunction with Elizabeth City will reviews its Emergency Operations Plan annually, specifically the County addresses issues identified through past storm experiences.
PAS11	Continue efforts to develop continuity of operational plans (COOP) for county/city departments.	Pasquotank County, Elizabeth City	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> County Board of Commissioner/City Council County/City Planning Boards 	Staff Time	General Fund, NCDPS	Other – Once Annually	In Progress – Carry Forward	The Continuity of Operations Plan is reviewed annually in concert with the Emergency Operations Plan. This effort is based on the results of a staged table top exercise, and/or any events that have occurred over the past year.
PAS12	Encourage the installation of generator switches in new construction critical facilities. As projects go through Technical Review Committee, applicants can be encouraged to pre-wire facilities for a generator. New construction critical facilities that would benefit from pre-wiring include, but are not limited to, public schools, local government facilities, facilities that may be utilized as storm shelters, adult care facilities, etc.	Pasquotank County, Elizabeth City	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	High	1.1	ES	GIS Coordinator	To Be Determined	General Fund, NCDPS	Other – As funding is available and need determined	In Progress – Carry Forward	The County will continue to work on establishing backup power supplies at all critical facilities. This will be undertaken as funding becomes available.
PAS13	Incorporate shoreline vegetation protection buffers into the City of Elizabeth City’s Unified Development Ordinance as a stipulation to development in and near areas of environmental concern.	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	NRP	<ul style="list-style-type: none"> City Planning Division City Council 	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	This regulation has not been established to date but will be considered through implementation of this plan.
PAS14	The NC Forestry Service representatives will be invited to attend the County’s monthly Public Safety Meeting in an effort to address risk associated with wildfire.	Pasquotank County, Elizabeth City	Wildfire	Med	4.1	PP	<ul style="list-style-type: none"> County Planning Office NC Forestry Service 	Staff Time	General Fund, NC Forestry Service	1 year	Not Started – Carry Forward	This strategy has not yet been carried out but will be enacted through implementation of this plan.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PAS15	Information is distributed during public events and via social media. All structures rehabilitated greater than 50% damage or reconstructed greater than 50% have to meet present wind load requirements in NC Building Code.	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	2.2	PP	<ul style="list-style-type: none"> County Emergency Management City Administration 	\$2,500	General Fund, NCDPS	1 year	Not Started – Carry Forward	The County will identify opportunities to disseminate this information and carry that effort out through implementation of this plan.
PAS16	Reduce the vulnerability of infrastructure and the built environment by identifying infrastructure (i.e., pumping stations, roads) in the city/county that is repetitively damaged by flooding and consider ways to reduce those vulnerabilities.	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.1	P	<ul style="list-style-type: none"> County Public Works County Board of Commissioners City Administration 	To Be Determined	General Fund, NCDPS, NCDEQ	Ongoing, as needed	In Progress – Carry Forward	This strategy will be carried out by the County as opportunities arise.
PAS17	Actively work with Federal, State, local and private partners to identify mitigation measures and secure funding via grants to alleviate flooding. These efforts should focus on the following areas: <ul style="list-style-type: none"> Blindman Road (near US 158) Rehabilitation Center (901 Halstead Boulevard) Oxford Heights Subdivision (Providence Rd and Bonner Dr) Weeksville Road at Peartree Road Traci Drive Riverside at Flora Avenue (Elizabeth City) Timothy Drive Shillingtown Road Brays Estates Subdivision (Scott Road) Halls Creek Road Crossing over Halls Creek Elizabeth Street at N. Road Street 	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	SP	<ul style="list-style-type: none"> County Public Works County Board of Commissioners City Administration 	To Be Determined	General Fund, NCDENR, NCDPS	5 years	New	N/A
PAS18	Install a detailed river gauge on the Pasquotank River (at South Mills).	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	2.2	P	<ul style="list-style-type: none"> County Planning Office County Board of Commissioners 	To Be Determined	General Fund, NCDENR	2 to 3 years	New	N/A

SECTION 7: MITIGATION ACTION PLANS

Table 7.6 – Mitigation Action Plan, Perquimans County

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
Perquimans County and Jurisdictions												
PER1	Create a preferred foliage and wind resistant tree list for the County. Distribute the list to property owners in an effort to reduce the risk of trees and plants from breaking in high wind events.	Perquimans County	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Low	1.2	P	<ul style="list-style-type: none"> County Public Works County Board of Commissioners 	\$10,000	General Fund	2 to 3 years	Not Started – Carry Forward	The County has not undertaken this strategy but intends to do so in an effort to minimize tree damage.
PER2	Record all tax parcel information and floodplain locations in a GIS system including repetitive loss areas, areas of greatest risk, and vulnerable populations. Maintain and update GIS layers that identify critical facilities/infrastructure and other facilities to include childcare centers, mobile home parks/subdivisions, and senior care facilities.	Perquimans County, Hertford, Winfall	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	2.2	PIO	<ul style="list-style-type: none"> County GIS Municipal Planning 	Staff Time	General Fund NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County GIS Department will continue to maintain this data and incorporate new information as natural disasters occur.
PER3	Consider participating in the Community Rating System (CRS).	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	3.2	P	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	Staff Time	General Fund, NCDPS, NFIP	2 to 3 years	Not Started – Carry Forward	Perquimans County, as well as Hertford and Winfall will consider joining the CRS program through implementation of this plan.
PER4	Continue to acquire destroyed or substantially damaged properties and relocate households. Seek State and Federal funding (voluntary program).	Perquimans County, Hertford, Winfall	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.2	SP	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	To Be Determined	HMGP, FMA, CDBG, General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Perquimans County will continue to carry out the mitigation buyout/elevation programs related to Hurricanes Matthew and Florence, as well as potential future disasters.
PER5	Maintain and annually update the county Emergency Operations Plan. This plan should contain detailed information on responsible parties and contact information. This information should be updated as positions and contact information change.	Perquimans County, Hertford, Winfall	All Hazards	Med	3.2	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing - Annually	In Progress – Carry Forward	This effort is carried out annually by Perquimans County Emergency Services. The review and amendments are based on the results of the County’s annual tabletop exercise.
PER6	Work to improve/expand its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	High	2.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	\$20,000	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	The County will continue to work towards improving upon existing emergency notification system procedures.
PER7	Promote and encourage the training of Community Emergency Response Teams (CERT) throughout the county.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Med	2.2	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	\$10,000	General Fund, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County will continue efforts to expand upon its existing CERT program participation.
PER8	Work to develop continuity of operations plans (COOP) for county/town departments, assisted living facilities, long-term care facilities, day care centers, etc.	Perquimans County, Hertford, Winfall	All Hazards	High	4.2	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	The County will review and update the County’s Continuity of Operations Plan (COOP), following its annually scheduled tabletop exercise.

SECTION 7: MITIGATION ACTION PLANS

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PER9	Minimize construction of additional impervious surfaces within floodplains in order to reduce stormwater runoff, including limiting construction of impervious surface parking lots in the areas near the rivers through amendments to the County Land Development Regulations.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	NRP	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	Staff Time	General Fund, NCDEQ	2 to 3 years	Not Started – Carry Forward	The County will consider amending existing zoning and subdivision regulations in an effort to promote development that better manages stormwater runoff.
PER10	Continue to monitor and maintain prewired generator switches in new construction critical facilities and existing shelters. As projects go through the County's development review process, applicants can be encouraged to pre-wire facilities for a generator.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	High	2.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	County Emergency Management maintains switches at all critical facilities, the County Building Inspections Department will require switches be installed during the construction of any new facility deemed critical or that will potentially be utilized as a shelter.
PER11	Sponsor a hazard mitigation symposium for county residents, including information on preparedness for all significant hazards. The symposium should address the options of elevation, relocation, and flood-proofing.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Med	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County will host a symposium once annually prior to the start of hurricane season.
PER12	Continue to maintain a library of materials focused on educating property owners, contractors, realtors and developers about ways to mitigate the effects of high winds and flooding through the use of best management practices during the construction/renovation of residential and non-residential structures. The County will also utilize print and social media for awareness and education. The County will also maintain staff educated in these issues to work with prospective builders.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	Med	2.2	PIO	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	This activity is currently underway and will be maintained through the planning process.
PER13	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both person and property.	Perquimans County, Hertford, Winfall	All Hazards	High	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to carry out these efforts through continued outreach and public education efforts.
PER14	Develop and distribute information to the public regarding the requirements for anchoring LP gas tanks.	Perquimans County, Hertford, Winfall	All Hazards	High	2.2	PIO	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations 	\$1,000	General Fund, NCDPS	1 year	Not Started – Carry Forward	This effort is not currently underway; however, the County Building Inspections Department, will undertake this strategy through implementation of this plan.
PER15	Actively working with Federal, State, local and private partners to identify mitigation measures and secure funding via grants to alleviate flooding. These efforts should focus on the following areas: <ul style="list-style-type: none"> Property along the Perquimans River Bear Swamp Watershed Bagley Swamp Watershed Burnt Mill Watershed 	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	To Be Determined	General Fund, NCDPS, HMGP, NCDENR	3 to 5 years	New	N/A

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PER16	Establish active river gauges at various points along the Perquimans River.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	2.1	PIO	County Planning & Zoning	To Be Determined	General Fund, NCDPS	2 to 3 years	New	This strategy was defined within the Hurricane Matthew Resiliency Redevelopment Plan.
PER17	Establish a county-wide Mosquito Abatement Program.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	ES	County Public Works	To Be Determined	General Fund	2 to 3 years	New	This strategy was defined within the Hurricane Matthew Resiliency Redevelopment Plan.
PER18	Undertake a county-wide campaign to snag and clear all arterial creeks and canals of beaver dams and other problematic blockages.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	<ul style="list-style-type: none"> County Public Works County Board of Commissioners 	To Be Determined	General Fund, NCDPS, NCDEQ	2 to 3 years	New	This strategy was defined within the Hurricane Matthew Resiliency Redevelopment Plan.
PER19	Support planning for improvements to the Perquimans County regional transportation systems to provide for safe traffic flow and evacuation. These efforts should include the identification of location for the use of electrical highways signs intended to provide warning regarding inclement weather and/or hazardous road conditions.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	High	1.1	P	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations NCDOT 	Staff Time	General Fund, NCDOT	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work closely with NCDOT, as well as the Regional Transportation organization to carry out this strategy.
PER20	Update/maintain the County’s current Action Plan for Wildfire Response. These efforts will include a review of inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires. This effort will also involve an education effort focused on informing home and property owners about Wildland/Urban Interface fire safety.	Perquimans County, Hertford, Winfall	Wildfire	Med	4.2	P	<ul style="list-style-type: none"> County Emergency Management County Manager Volunteer Fire Depts. US Forestry Service 	Staff Time	General Fund, US Forest Service	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work with citizens in conjunction with the US Forestry Service to carry out this strategy.
Town of Hertford												
HRT1	Update the CAMA Land Use Plan in conjunction with the County’s Core Land Use Plan.	Town of Hertford	All Hazards	Med	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
HRT2	Consider revising Hertford’s Zoning Ordinance and Subdivision Regulations to improve stormwater management practices in developments to better address Mitigation Goals and Objectives.	Town of Hertford	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
HRT3	Work in conjunction with NCDOT and other agencies to ensure that stormwater facilities are maintained to allow for reasonable flows.	Town of Hertford	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	Med	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
Town of Winfall												
WIN1	Review the Town’s Land Use Plan, Land Development Regulations, and Water and Sewer Ordinances and ensure that hazard mitigation objectives are addressed.	Town of Winfall	All Hazards	Med	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
WIN2	Minimize construction of impervious surfaces adjacent to floodplains or near storm water drainage routes that empty into the river.	Town of Winfall	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	High	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Priority	Goal & Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
WIN3	Continue to encourage efforts toward county-wide water systems with Perquimans County.	Town of Winfall	Drought	Med	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will continue to work with the County to ensure the availability of water system resources.
WIN4	Continue to evaluate those businesses with potential hazardous liquids for adequate protection of the public.	Town of Winfall	All Hazards	Low	4.2	ES	Town Council	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	This effort is also addressed through the County’s standing Local Emergency Planning Committee (LEPC).

8 Plan Maintenance

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This section discusses how the Mitigation Action Plans will be implemented by participating jurisdictions and outlines the method and schedule for monitoring, updating, and evaluating the plan. This section also discusses incorporating the plan into existing planning mechanisms and how the public will continue to be involved in the planning process. It consists of the following three subsections:

- 8.1 Implementation
- 8.2 Monitoring, Evaluation, and Enhancement
- 8.3 Continued Public Involvement

8.1 IMPLEMENTATION

Each jurisdiction participating in this plan update is responsible for implementing specific mitigation actions as prescribed in their Mitigation Action Plan (found in Section 7). In each Mitigation Action Plan, every proposed action is assigned to a specific local department or agency to ensure responsibility and accountability and increase the likelihood of subsequent implementation. This approach enables individual jurisdictions to update their own unique mitigation action list as needed without altering the broader focus of the regional plan.

In addition to the assignment of a local lead department or agency, an implementation timeline or a specific implementation date or window has been assigned to each mitigation action to help assess whether reasonable progress is being made toward implementation. The participating jurisdictions 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 for proposed actions listed in the Mitigation Action Plan.

An important implementation mechanism that is highly effective and low-cost is incorporation of the Hazard Mitigation Plan recommendations and their underlying principles into other plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement the Mitigation Action Plan. It will be the responsibility of the HMPC representatives from each participating jurisdiction to determine and pursue opportunities for integrating the requirements of this plan with other local planning documents and ensure that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the Hazard Mitigation Plan and will not contribute to increased hazard vulnerability in the Plan Area. Methods for integration may include:

- ▶ Monitoring other planning/program agendas;
- ▶ Attending other planning/program meetings;
- ▶ Participating in other planning processes; and
- ▶ Monitoring community budget meetings for other community program opportunities.

Table 8.1 details each jurisdiction's integration of the 2015 Albemarle Regional Hazard Mitigation Plan into other local planning efforts as well as any identified opportunities for integration of this plan update.

SECTION 8: PLAN MAINTENANCE

Table 8.1 – Integration Efforts

Jurisdiction	Integration of 2015 plan	Intended integration of this plan update
Camden County	Strategies defined within the plan were utilized in the implementation of the County’s CRS Program.	The County will continue to utilize the plan in this manner and to guide capital expenditures that will involve projects outlined in this plan.
Chowan County	Chowan County referenced this plan during the development of the 2018 Chowan-Edenton Land Use Plan. The recommendations outlined within the mitigation plan were integral to the development of current land use policy.	The updated plan will be utilized in concert with the 2018 Land Use Plan to make determinations regarding amendments to land development regulations.
Edenton	Strategies defined within the plan were utilized in the implementation of the Town’s Community Rating System Program.	The Town will continue to utilize the plan in this manner, as well as for guidance regarding capital expenditures that will involve projects outlined in this plan.
Gates County	The existing mitigation plan was utilized during the development of the Hurricane Matthew Resilient Redevelopment Plan and update of the County’s CAMA Land Use Plan (adopted 12/2016)	Integration will be pursued as opportunities arise.
Gatesville	No integration occurred.	Integration will be pursued as opportunities arise.
Hertford County	Information outlined within the current Hazard Mitigation Plan was utilized during development of the County’s current Zoning Ordinance, adopted July 2015.	The County will continue to utilize the Hazard Mitigation Plan to make decisions regarding future amendments to Zoning and Subdivision Regulations.
Ahoskie	No integration occurred.	Integration will be pursued as opportunities arise.
Cofield	No integration occurred.	Integration will be pursued as opportunities arise.
Como	No integration occurred.	Integration will be pursued as opportunities arise.
Harrellsville	No integration occurred.	Integration will be pursued as opportunities arise.
Murfreesboro	No integration occurred.	Integration will be pursued as opportunities arise.
Winton	No integration occurred.	Integration will be pursued as opportunities arise.
Pasquotank County	Pasquotank County has utilized the Hazard Mitigation Plan to make decisions relating to recovery efforts for Hurricanes Matthew and Florence.	The County will continue to utilize the mitigation plan as a guide for future recovery efforts.
Elizabeth City	Elizabeth City utilized the Hazard Mitigation Plan in the development of the Elizabeth City Waterfront Master Plan.	Integration will be pursued as opportunities arise.
Perquimans County	Perquimans County utilized the Hazard Mitigation Plan in the development of the County’s recertified joint CAMA Land Use Plan in 2017.	The County will continue to utilize the Hazard Mitigation Plan to make land use policy decisions.
Hertford	No integration occurred.	Integration will be pursued as opportunities arise.
Winfall	No integration occurred.	Integration will be pursued as opportunities arise.

Opportunities to integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the HMPC and through the five-year review process described herein. 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 HMPC to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

8.2 MONITORING, EVALUATION, AND ENHANCEMENT

8.2.1 Role of HMPC in Implementation, Monitoring and Maintenance

With adoption of this plan, each jurisdiction will be responsible for the implementation and maintenance of their mitigation actions. The County Emergency Managers or County Managers will take the lead in all plan monitoring and update procedures. As such, the County Emergency Managers/County Managers agree to continue their relationship with the HMPC and:

- ▶ Act as a forum for hazard mitigation issues;
- ▶ Disseminate hazard mitigation ideas and activities to all participants;
- ▶ Pursue the implementation of high-priority, low/no-cost recommended actions;
- ▶ Ensure hazard mitigation remains a consideration for community decision makers;
- ▶ Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the communities implement the plan's recommended actions for which no current funding exists;
- ▶ Monitor and assist in implementation and update of this plan;
- ▶ Report on plan progress and recommended revisions to their County Boards of Commissioners;
- ▶ Support local jurisdictions in reporting on plan progress and recommended revisions to their local governing bodies; and
- ▶ Inform and solicit input from the public.

The HMPC's primary duty moving forward is to see the plan successfully carried out and report to the individual County Boards of Commissioners, Town and City Councils, NCEM, FEMA, and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about flood mitigation, passing concerns on to appropriate entities, and providing relevant information for posting on each County and local community websites (and others as appropriate).

Simultaneous to these efforts, it will be important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the costlier recommended actions. This task will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the Region, individual counties, and participating jurisdictions will be positioned to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

8.2.2 Maintenance Schedule

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized. The County Emergency Managers/County Managers will be responsible for convening the HMPC and initiating regular reviews. Regular maintenance will take place through quarterly conference calls and an annual meeting of the HMPC. The HMPC will also convene to review the plan after significant hazard events. If determined appropriate or as requested, an annual report on the plan will be developed and presented to local governing bodies of participating jurisdictions to report on implementation progress and recommended changes.

The five-year written update to this plan will be submitted to the NCEM and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be adopted and fully approved by 2020, the next plan update for the Albemarle Region will be completed by 2025.

8.2.3 Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to project implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to Regional inventories; and
- Incorporate new project recommendations or changes in project prioritization.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the HMPC will follow the following process:

- ▶ The HMPC representatives from each jurisdiction will be responsible for tracking and reporting on their mitigation actions. Jurisdictional representatives should provide input on whether the action as implemented met the defined objectives and/or is likely to be successful in reducing vulnerabilities.
- ▶ If the action does not meet identified objectives, the jurisdictional representatives will determine what additional measures may be implemented and will make any required modifications to the plan.
- ▶ All monitoring and implementation information will be reported to the full HMPC, led by the County Emergency Managers/County Managers, during quarterly meetings. An annual plan maintenance report may be drafted as deemed necessary.

Changes will be made to the plan as needed to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the mitigation action plans will be by written changes and submissions, as is appropriate and necessary, and as approved by the appropriate jurisdiction's local governing body.

Following a disaster declaration, the plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. It will be the responsibility of the County Emergency Managers/County Managers to reconvene the HMPC and ensure the appropriate stakeholders are invited to participate in the plan revision and update process following declared disaster events.

Criteria for Quarterly Reviews in Preparation for 5-Year Update

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan. More specifically, quarterly reviews will monitor changes to the following information:

- ▶ Community growth or change in the past quarter.
- ▶ The number of substantially damaged or substantially improved structures by flood zone.

SECTION 8: PLAN MAINTENANCE

- ▶ The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- ▶ Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether the event resulted in a presidential disaster declaration.
- ▶ Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- ▶ The dates of hazard events descriptions.
- ▶ Documented damages due to the event.
- ▶ Closures of places of employment or schools and the number of days closed.
- ▶ Road or bridge closures due to the hazard and the length of time closed.
- ▶ Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- ▶ Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Hazard Mitigation Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

8.3 CONTINUED PUBLIC INVOLVEMENT

Continued public involvement is imperative to the overall success of the plan's implementation. The quarterly review process will provide an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. Efforts to involve the public in the maintenance, evaluation, and revision process may include:

- ▶ Advertising HMPC meetings in the local newspaper, public bulletin boards and/or City and County office buildings;
- ▶ Designating willing citizens and private sector representatives as official members of the HMPC;
- ▶ Utilizing local media to update the public of any maintenance and/or review activities;
- ▶ Utilizing City and County websites to advertise any maintenance and/or review activities;
- ▶ Maintaining copies of the plan in public libraries or other appropriate venues;
- ▶ Posting annual progress reports on the Plan to County, City, and Town websites;
- ▶ Heavy publicity of the plan and potential ways for the public to be involved after significant hazard events, tailored to the event that has just happened;
- ▶ Keeping websites, social media outlets, etc. updated;
- ▶ Drafting articles for the local community newspapers/newsletters;
- ▶ Utilizing social media accounts (e.g. Twitter, Facebook).

Public Involvement for Five-year Update

When the HMPC reconvenes for the five-year update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the HMPC will be responsible for coordinating the activities necessary to involve the greater public, including disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public meetings will be held and public comments will be solicited on the plan update draft.

9 Plan Adoption

Requirement §201.6(c)(5): [The plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 (Adopt the Plan) of the 10-step planning process, in accordance with the requirements of DMA 2000. **FEMA Approval Letters and community adoption resolutions are provided below.**

Annex A Camden County

A.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Camden County, including information on population, asset exposure, housing, and economy. Camden County is a participant in the CRS program, therefore, additional material is presented in this section per CRS planning requirements.

Geography

Camden County’s total land area is 310 square miles. Figure A.1 on the following page shows a base map of Camden County.

Population and Demographics

Table A.1 provides population counts and growth estimates for Camden County. Table A.2 provides demographic information for the County.

Table A.1 – Population Counts, Camden County, 2000-2017

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Camden County	6,885	9,980	10,336	45.0%	3.6%	50.1%

Source: US Census Bureau American Community Survey.

Table A.2 – Racial Demographics, Camden County, 2017

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Camden County	82.3%	14.3%	1.9%	0.6%	0.9%	2.7%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Figure A.1 – Jurisdictional Locations, Camden County



Future Growth and Development

This section provides an explanation of anticipated development trends for Camden County, which is a participant in the CRS. Evaluating future growth and development decisions in relation to known hazard areas can lead to better growth management and more effective risk reduction strategies.

Camden County

Camden County is located directly south of the Tidewater Virginia Area which includes the Cities of Chesapeake, Norfolk, and Virginia Beach. This portion of the country is one of the most densely populated and fastest growing areas in the nation. It is also home to several major military installations, including the nation's largest naval yard. Thus, Camden County has experienced a surge in development pressure. In order to address these concerns, the County has engaged in comprehensive planning efforts focused on directing growth into appropriate areas, while preserving the County's pastoral/rural landscape. The Future Land Use Map provided below depicts how this growth is expected to transpire. This map takes into account the information and directives outlined in former hazard mitigation planning efforts.

Camden County 2035 Comprehensive Plan

The Camden County 2035 Comprehensive Plan was adopted by the Camden County Board of Commissioners in October of 2012. The plan defines eleven future land use districts including:

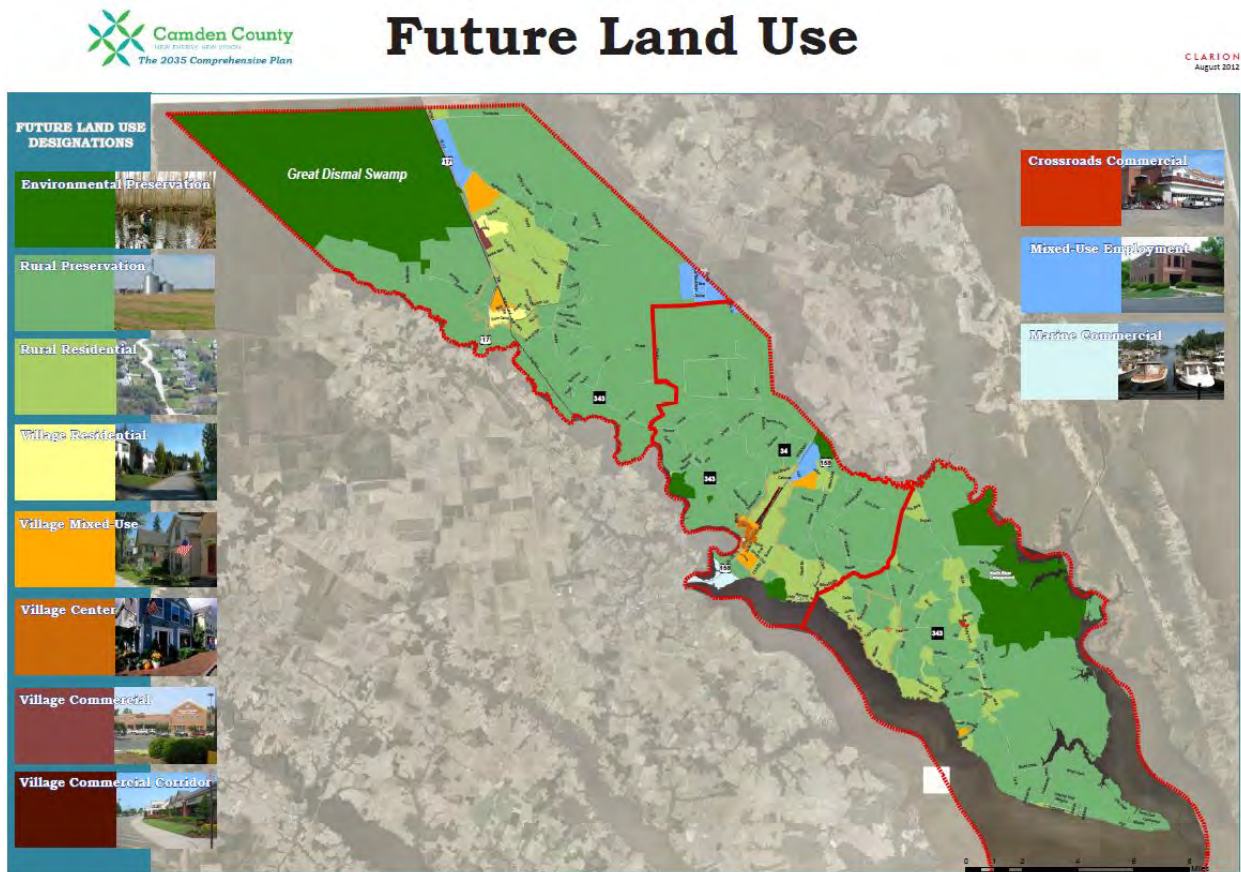
- ▶ Environmental Preservation
- ▶ Rural Preservation
- ▶ Rural Residential
- ▶ Village Residential
- ▶ Village Mixed-Use
- ▶ Village Center
- ▶ Village Commercial
- ▶ Village Commercial Corridor
- ▶ Crossroads Commercial
- ▶ Mixed-Use Employment
- ▶ Marine Commercial

These districts are defined in detail under Part 4, Plan Framework pages 38-40 of the Camden County Comprehensive Plan:

<https://www.camdencountync.gov/government/comprehensive-plan/2035-comprehensive-plan>

Figure A.2 provides the delineation of each Future Land Use District for Camden County.

Figure A.2 – Camden County Future Land Use



Asset Inventory

The following tables summarize the asset inventory for Camden County unincorporated areas in order to estimate the total physical exposure to hazards in this area. The locations of critical facilities are shown in Figure A.3. Critical facilities are a subset of identified assets from the Critical Infrastructure & Key Resources dataset. Note that the counts are by building; where a critical facility comprises a cluster of buildings, each building is counted and displayed.

Table A.3 – Critical Infrastructure & Key Resources by Type

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Camden County	1,028	2	2	274	0	36	0	224	10	0	0	0	6	36	2	6	0	1,626

Source: NCEM Risk Management Tool

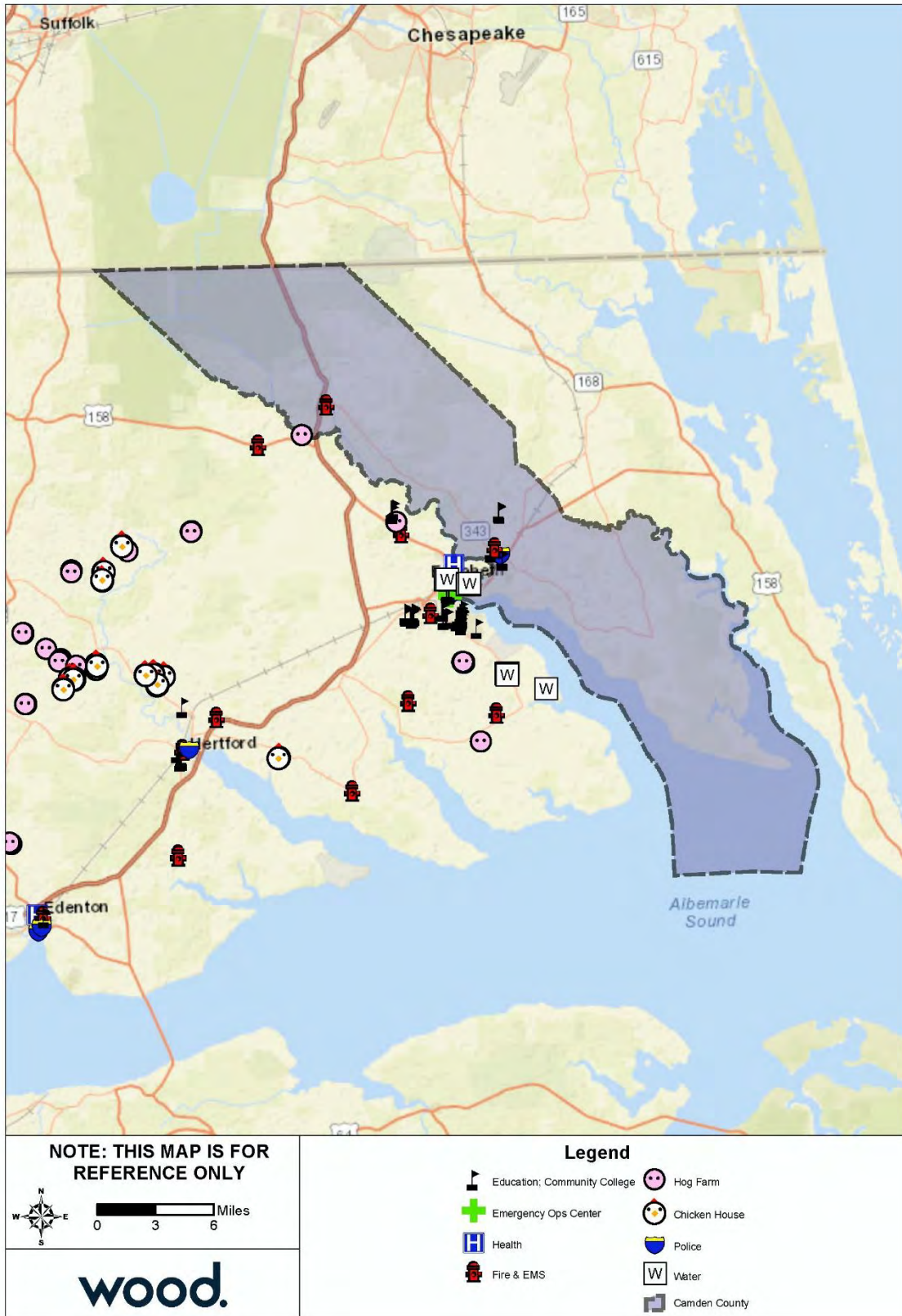
Table A.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Camden County	4	0	0	16	0	0	0	20

Source: NCEM Risk Management Tool

Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

Figure A.3 – Critical Facilities, Camden County



Source: NCEM IRISK Database, GIS Analysis

ANNEX A: CAMDEN COUNTY

Housing

The table below details key housing statistics for Camden County. As a percent of growth from 2010 housing, Camden County's housing stock has grown by 2.3%.

Table A.5 – Housing Statistics, Camden County, 2010-2017

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Camden County	4,104	4,197	2.3%	80.1%	9.6%

Source: US Census Bureau American Community Survey.

Economy

The following tables present key economic statistics for Camden County.

Table A.6 – Economic Indicators, Camden County, 2017

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Camden County	62.4%	55.5%	5.4%	37.6%	8.9%

Source: US Census Bureau American Community Survey.

Table A.7 – Employment by Industry, Camden County, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Camden County	37.4%	21.5%	19.4%	11.8%	9.8%

Source: US Census Bureau American Community Survey.

A.2 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority in Camden County than for the Albemarle Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have variations in risk that could be evaluated quantitatively on a jurisdictional level. The hazards included in this section are flood and wildfire.

A.2.1 Flood

Table A.8 details the acreage of Camden County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, over 56 percent of the County is within mapped 1%-annual-chance floodplain.

Table A.8 – Flood Zone Acreage by Jurisdiction, Camden County

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Camden County	32,143	79,702	7,385	79,354	0	198,584	56.3%

Source: FEMA Effective DFIRM; U.S. Census Bureau

Figure A.4 reflects the effective mapped flood hazard zones for Camden County and Figure A.5 displays the depth of flooding estimated to occur during the 1%-annual-chance flood.

ANNEX A: CAMDEN COUNTY

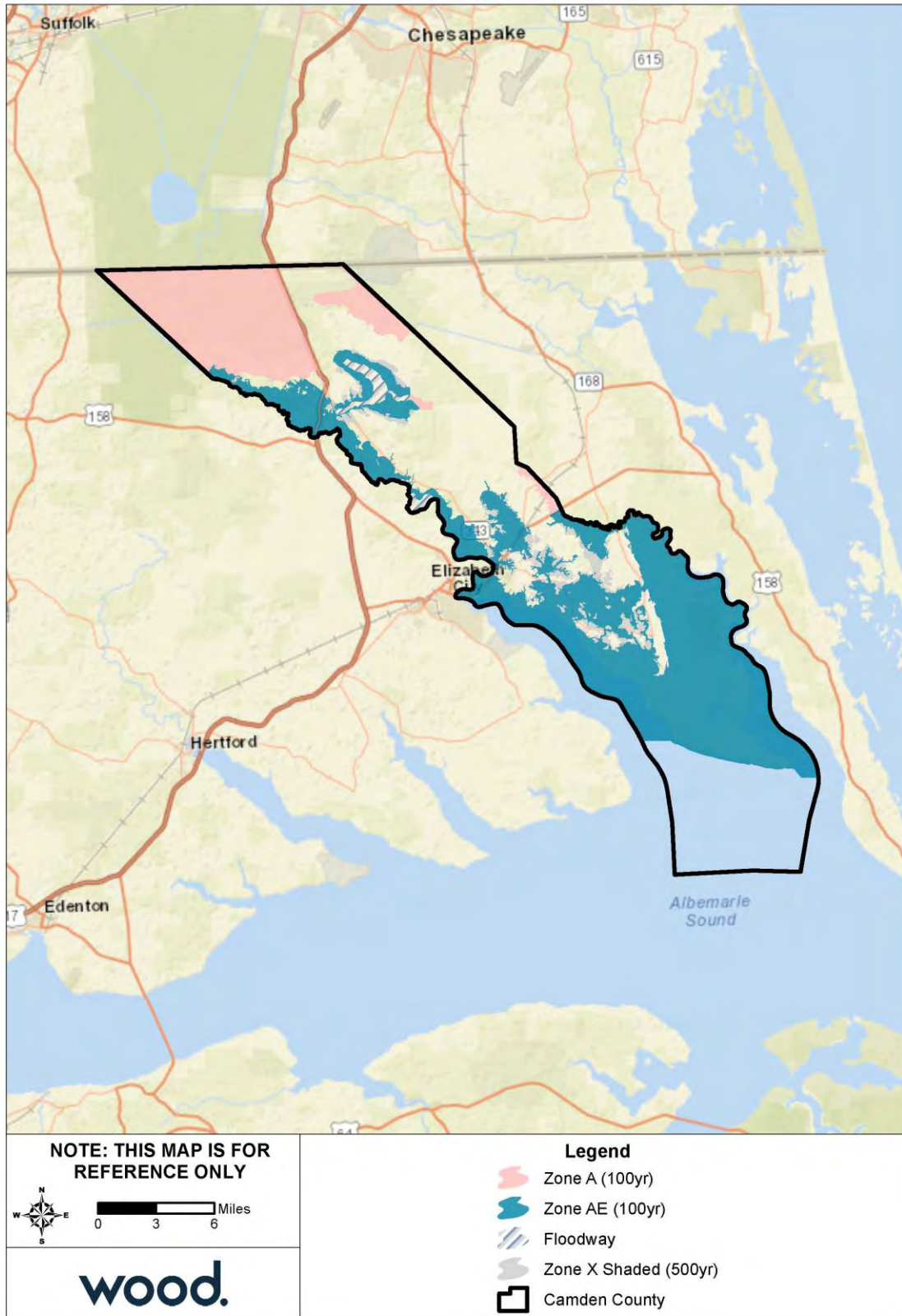
Table A.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Camden County.

Table A.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Commercial Facilities	100 Year	18	\$106,175
Critical Manufacturing	100 Year	4	\$9,941
Food and Agriculture	100 Year	18	\$45,926
Government Facilities	100 Year	1	\$636
Transportation Systems	100 Year	3	\$7,171
All Categories	100 Year	44	\$169,849

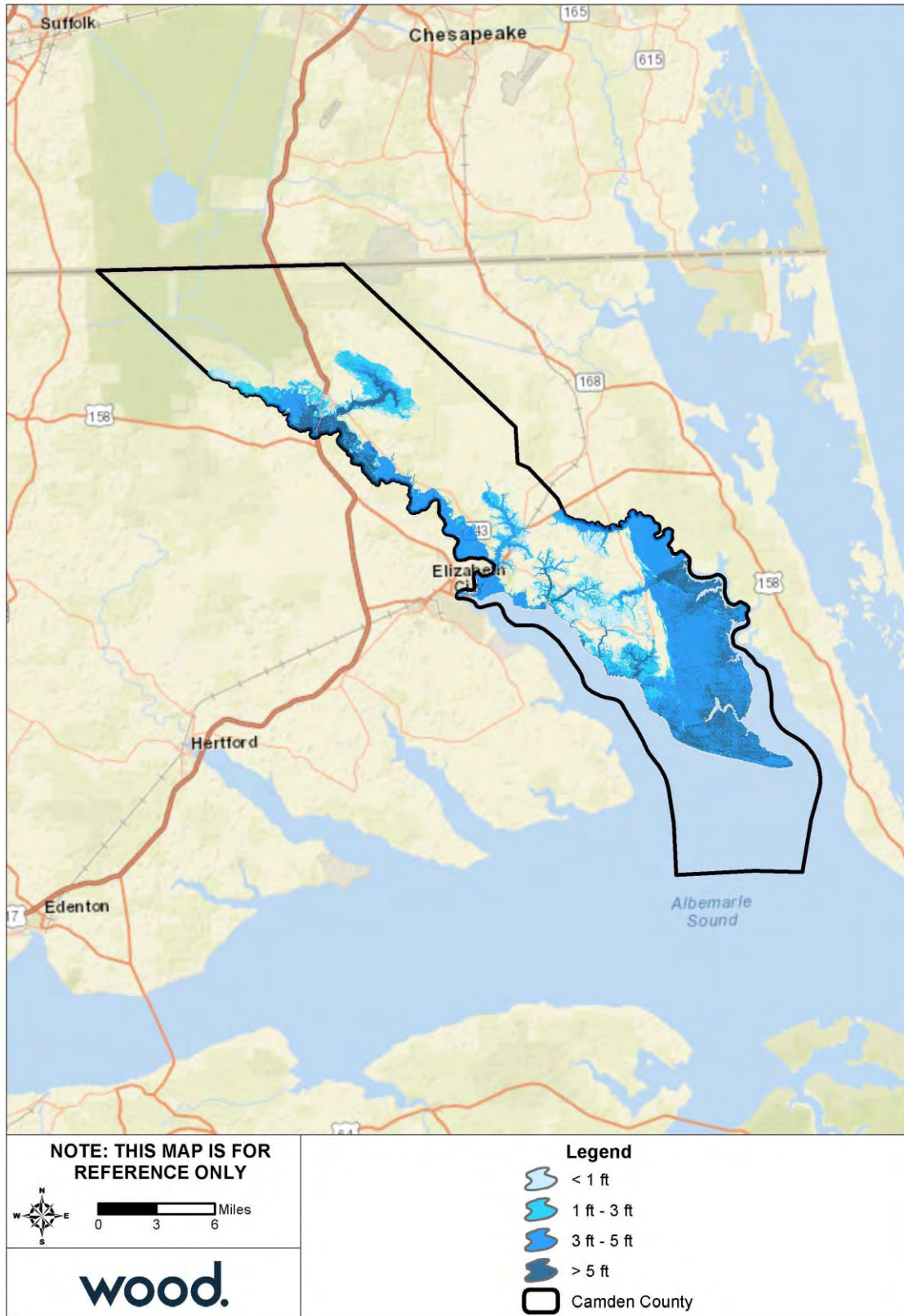
Source: NCEM Risk Management Tool

Figure A.4 – FEMA Flood Hazard Areas, Camden County



Source: FEMA Effective DFIRM

Figure A.5 – Flood Depth, 1%-Annual-Chance Floodplain, Camden County



Source: FEMA Effective DFIRM

A.2.2 Wildfire

Table A.10 summarizes the acreage in Camden County that falls within the Wildland Urban Interface (WUI), categorized by housing density. Areas in the WUI are those where development may intermix with flammable vegetation. Over 76 percent of Camden County is not included in the WUI.

Table A.10 – Wildland Urban Interface Acreage, Camden County

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	148,681.35	76.1%
	LT 1hs/40ac	15,713.04	8.0%
	1hs/40ac to 1hs/20ac	10,805.30	5.5%
	1hs/20ac to 1hs/10ac	9,188.11	4.7%
	1hs/10ac to 1hs/5ac	6,390.34	3.3%
	1hs/5ac to 1hs/2ac	3,531.76	1.8%
	1hs/2ac to 3hs/1ac	1,074.90	0.6%
	GT 3hs/1ac	0.0	0.0%
	Total	195,384.80	

Source: Southern Wildfire Risk Assessment

Figure A.6 depicts the WUI for Camden County. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure A.7 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure A.8 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Potential fire intensity is highest in the parks and game lands in Camden County, with significant concentrations of land with higher potential intensity in the northwest near the Virginia border and in the southeast along the North River and the Albemarle Sound. Burn probability is low throughout the County, except for some area of moderate probability in the Dismal Swamp State Park along the Virginia border. Despite some overlap of moderate burn probability and fire intensity, these areas are largely outside the WUI, especially where they occur with a significant concentration. A fire in these areas would not likely pose a significant risk to human settlement and the built environment.

Table A.11 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Camden County. Table A.12 provides counts and estimated damages for High Potential Loss Properties in these areas.

Table A.11 – Critical Facilities Exposed to Wildfire by Jurisdiction, Camden County

Sector	Number of Buildings at Risk	Estimated Damages
Banking and Finance	1	\$294,809
Commercial Facilities	76	\$21,905,269
Critical Manufacturing	14	\$2,601,058
Emergency Services	3	\$2,250,299
Food and Agriculture	255	\$10,418,871
Government Facilities	57	\$44,088,872
Healthcare and Public Health	5	\$2,477,776

ANNEX A: CAMDEN COUNTY

Sector	Number of Buildings at Risk	Estimated Damages
Transportation Systems	15	\$4,335,819
All Categories	426	\$88,372,773

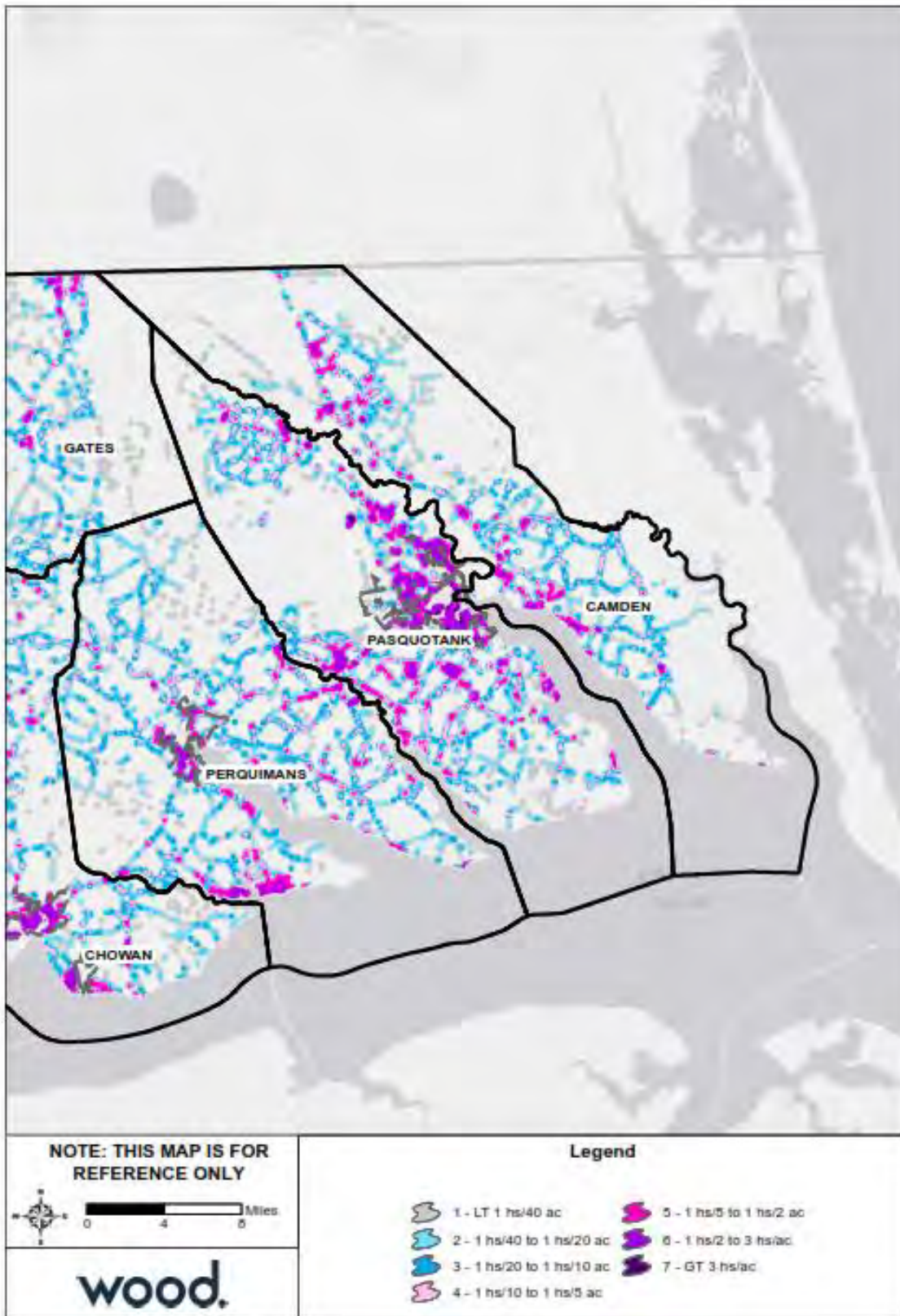
Source: NCEM Risk Management Tool

Table A.12 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Camden County

Category	Number of Buildings at Risk	Estimated Damages
Government	7	\$28,922,549
Residential	2	\$3,103,995
All Categories	9	\$32,026,544

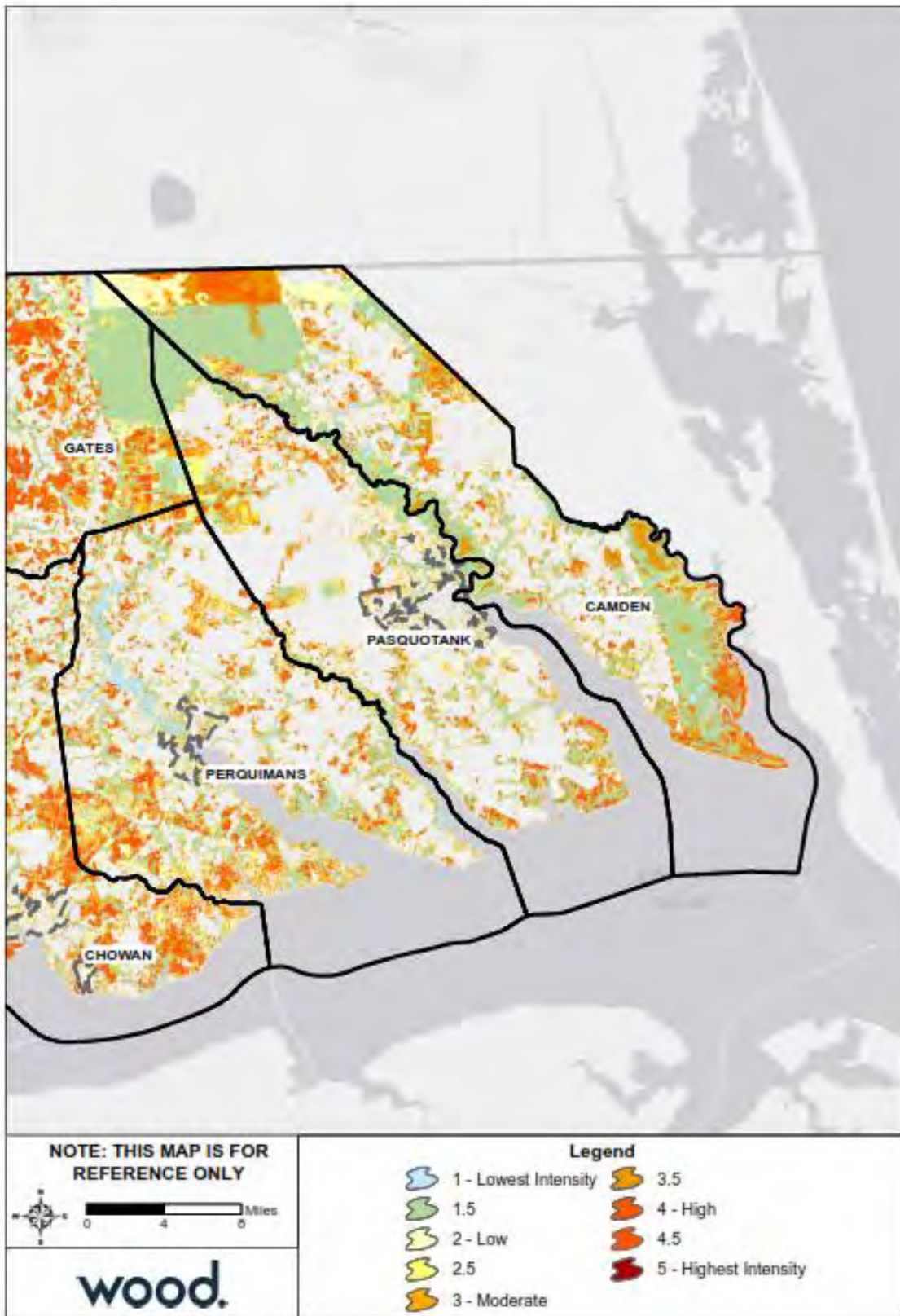
Source: NCEM Risk Management Tool

Figure A.6 – Wildland Urban Interface, Camden County



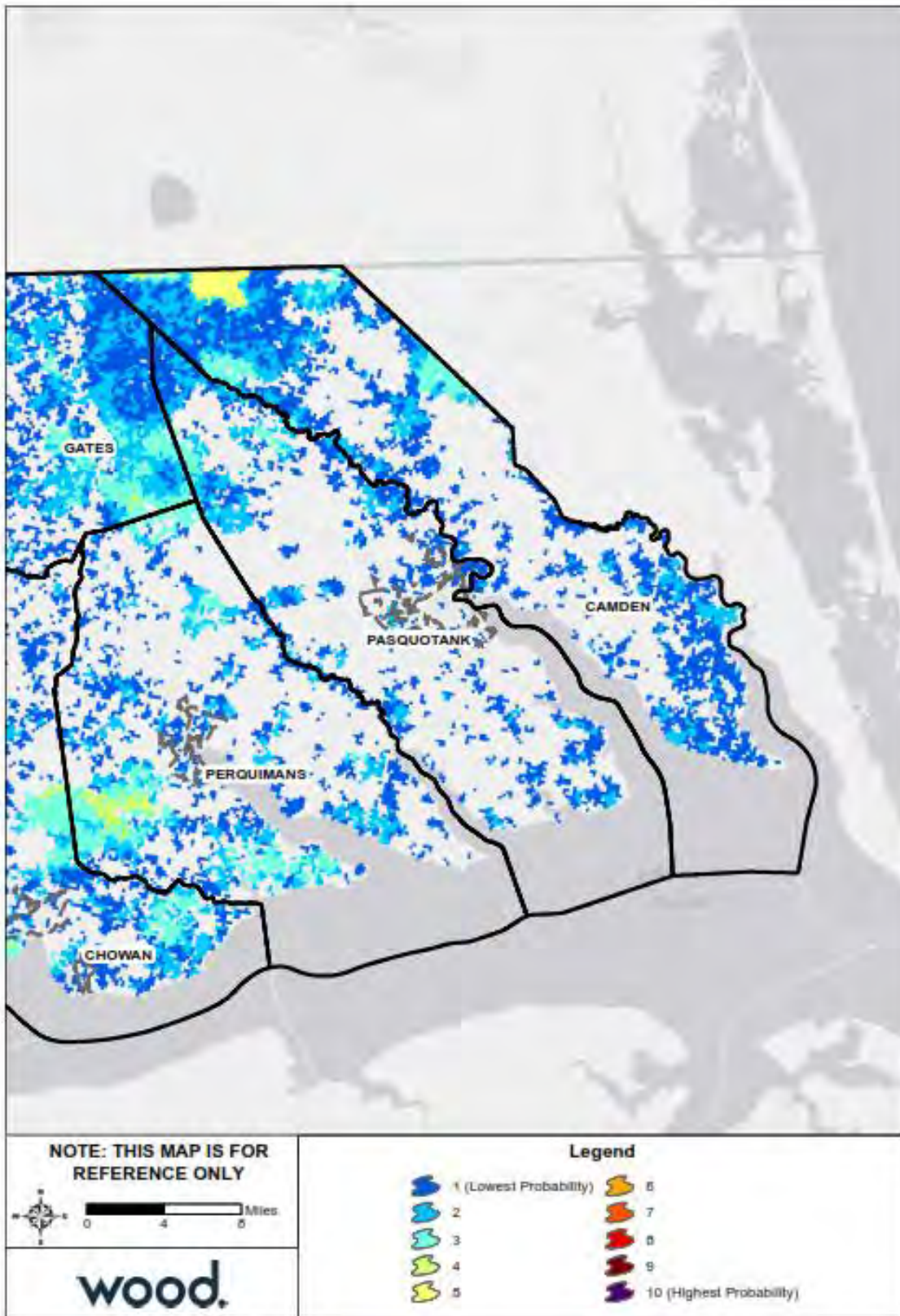
Source: Southern Wildfire Risk Assessment

Figure A.7 – Fire Intensity Scale, Camden County



Source: Southern Wildfire Risk Assessment

Figure A.8 – Burn Probability, Camden County



Source: Southern Wildfire Risk Assessment

A.3 CAPABILITY ASSESSMENT

A.3.1 Overall Capability

Details on the tools and resources in place and available to Camden County were provided by the County’s HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Camden County has an overall capability rating of High. The County’s Self-Assessment of key capability areas is summarized in Table A.13 below.

Table A.13 – Capability Self-Assessment, Camden County

Capability Area	Rating
Plans, Ordinances, Codes and Programs	High
Administrative and Technical Capability	High
Fiscal Capability	High
Education and Outreach Capability	High
Mitigation Capability	High
Political Capability	High
Overall Capability	High

A.3.2 Floodplain Management

Camden County joined the NFIP on December 4, 1985. The following tables reflect NFIP entry dates as well as policy and claims data for Camden County and incorporated categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

Table A.14 – NFIP Policy and Claims Data by Structure Type

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Camden County Unincorporated Area					
Single Family	765	\$408,546	\$191,106,400	189	\$2,577,635.53
2-4 Family	0	\$0	\$0	1	\$3,539.06
All Other Residential	9	\$3,118	\$2,171,700	7	\$234,639.99
Non Residential	23	\$67,338	\$6,759,000	14	\$353,272.29
Total	797	\$479,002	\$200,037,100	211	\$3,169,086.87

Source: FEMA Community Information System, accessed November 2019

Table A.15 – NFIP Policy and Claims Data by Flood Zone

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Camden County Unincorporated Area					
A01-30 & AE Zones	543	\$360,343	\$124,859,300	168	\$2,549,890.78
A Zones	16	\$17,232	\$3,762,600	29	\$393,436.17
B, C & X Zone					
Standard	12	\$7,867	\$2,684,000	5	\$96,591.80
Preferred	218	\$88,760	\$68,452,000	4	\$91,178.54
Total	789	\$474,202	\$199,757,900	206	\$3,131,097.29

Source: FEMA Community Information System, accessed November 2019

Table A.16 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Camden County Unincorporated Area					
A01-30 & AE Zones	144	\$176,058	\$27,993,600	81	\$1,100,707.34
A Zones	1	\$867	\$83,000	21	\$278,515.30
B, C & X Zone	58	\$23,551	\$16,081,400	5	\$102,252.70
Standard	6	\$3,129	\$1,346,400	4	\$93,104.90
Preferred	52	\$20,422	\$14,735,000	1	\$9,147.80
Total	203	\$200,476	\$44,158,000	107	\$1,481,475.34

Source: FEMA Community Information System, accessed November 2019

Table A.17 – NFIP Policy and Claims Data Post-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Camden County Unincorporated Area					
A01-30 & AE Zones	399	\$184,285	\$96,865,700	85	\$1,400,107.19
A Zones	15	\$16,365	\$3,679,600	8	\$114,920.87
B, C & X Zone	172	\$73,076	\$55,054,600	4	\$85,517.64
Standard	6	\$4,738	\$1,337,600	1	\$3,486.90
Preferred	166	\$68,338	\$53,717,000	3	\$82,030.74
Total	586	\$273,726	\$155,599,900	97	\$1,600,545.70

Source: FEMA Community Information System, accessed November 2019

A.4 MITIGATION STRATEGY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CAM1	Maintain "Storm Ready Community" Status	Camden County	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	2	2.1	ES	County Emergency Management	\$20,000	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Camden County continues to maintain the County's Storm Ready Status and will continue to do so through implementation of this plan.
CAM2	Minimize economic and property losses due to flooding through continued compliance in the National Flood Insurance Program (NFIS).	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	PP	<ul style="list-style-type: none"> County Planning & Zoning County Emergency Management County Board of Commissioners 	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Camden County continues to be an active participant of the NFIP program and will continue to do so through the planning period.
CAM3	Continue to participate in the Community Rating System (CRS) and carry out required activities to maintain the County's Class 7 rating.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2		<ul style="list-style-type: none"> County Planning & Zoning County Emergency Management County Board of Commissioners 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Camden County is one of only two communities in the Albemarle region that participates in the CRS Program. This plan update will be incorporated into the County's next five-year audit and potentially improve its rating.
CAM4	Develop and maintain comprehensive water management policies for the County considering the connections between land-use, urban growth, and surface water and ground water issues.	Camden County	Drought	3	3.2	NRP	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners County Emergency Management NCDCM – Coastal Area Management Act 	Staff Time	General Fund, NCDEQ, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Camden County continues to monitor its water resources and will maintain a water shortage management plan to ensure the availability of resources during drought conditions.
CAM5	Encourage critical facilities to apply structural hazard mitigation and sustainability concepts when building or remodeling their facilities; to include back-up power sources.	Camden County	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	1	1.1	ES	<ul style="list-style-type: none"> County Emergency Management County Planning County Board of Commissioners 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to promote the integration of these concepts into the design consideration of new or renovated critical facilities.
CAM6	Acquire generators or other forms of redundant power supply to ensure that critical facilities and infrastructure remain operational where normal power supply is not available.	Camden County	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	1	1.1	ES	County Emergency Management	To Be Determined	General Fund, NCDPS	2 to 3 years	In Progress – Carry Forward	The County will continue to work on establishing backup power supplies at all critical facilities. This will be undertaken as funding becomes available.
CAM7	Maintain Debris Removal and Monitoring Services Contracts	Camden County	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.1	ES	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning County Board of Commissioners 	To Be Determined	NCDPS, FEMA	Other – As necessary	In Progress – Carry Forward	Camden County maintains a pre-disaster debris management contract and reviews and renews this contract on an annual basis.
CAM8	Encourage the use of weather radios/severe weather warning apps especially in schools, rest homes, convalescent homes, retirement centers and other locations where people congregate to inform them of the approach of severe weather.	Camden County	All Hazards	2	2.1	PIO	County Emergency Management	Staff Time	General Fund, Staff Time	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work with the American Red Cross to promote this program through the planning process.

ANNEX A: CAMDEN COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CAM9	Review the Pasquotank-Camden-Elizabeth City Multi-Hazard Operations Plan annually and update the plan as necessary. Ensure all departments establish guidelines for response to emergencies and to maintain departmental operations. Work with County departments to ensure each department possesses a clear understanding of department responsibilities as outlined in the Pasquotank-Camden- Elizabeth City Multi-Hazard Operations Plan.	Camden County	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Camden County reviews its Emergency Operations Plan annually and specifically addresses issues identified through past storm experiences.
CAM10	Continue efforts to develop continuity of operations plans (COOP) for county departments. Continuity of operations planning has been completed by several departments and additional planning efforts are currently underway. These efforts will also be promoted for community businesses private facilities.	Camden County	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Camden County reviews its Continuity of Operations Plan annually and specifically addresses issues identified through past storm experiences.
CAM11	Record all tax parcel information and floodplain locations in a GIS system including repetitive loss areas, areas of greatest risk, and vulnerable populations.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County GIS County Emergency Management 	Staff Time	General Fund, Staff Time, NCDPS	Maintain annually	In Progress – Carry Forward	Camden County maintains all GIS data through its tax department. These efforts will continue through this plan update.
CAM12	In conjunction with NCEM, produce an up-to-date flood map of Camden County that can be utilized to reduce development in the floodplain. This map should be independent of the County Flood Insurance Rate Maps and reflect the actual extent of past flood events.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	PP	<ul style="list-style-type: none"> County GIS County Emergency Management 	Staff Time	General Fund, Staff Time, NCDPS	1 to 2 Years	Not Started – Carry Forward	The alternate flood impact map has not been completed; however, the County will work to compile this information and incorporate the impacts of both Hurricanes Matthew and Florence.
CAM13	Minimize economic and property losses due to flooding through continued compliance with NFIP and participation in the Community Rating System (CRS).	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2	P	County Planning and Zoning	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County, through implementation of this plan, will continue to carry out the requirements of the NFIP Community Rating System.
CAM14	Minimize the impacts of lightning strikes. Continue to educate the public on severe thunderstorm safety and the safety measures to be taken from lightening injuries.	Camden County	Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	2	2.2	PIO	County Emergency Management	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Camden County will work closely with electric service providers to identify an effective and cost effective solution to this problem.
CAM15	Reduce the impact of wind on trees near county structures and critical facilities. Monitor trees and branches at risk of breaking or falling in windstorms. Prune or thin trees or branches on county/city property when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the county.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	1	1.1	P	<ul style="list-style-type: none"> County Public Works County Manager 	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Camden County factors this aspect of emergency management and mitigation into its day-to-day operations. The County will continue to coordinate efforts with utility service providers.
CAM16	Continue the Stormwater Advisory Committee’s work in identifying major drainage issues in the four stormwater districts and work to identify what level of maintenance is needed in these areas.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	1	1.3	P	<ul style="list-style-type: none"> Stormwater Advisory Committee County Public Works County Planning & Zoning 	Staff Time	General Fund, NCDWR	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to identify ongoing stormwater hot spots, and where practicable and feasible establish a solution to these issues.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CAM17	Update/maintain the County's current Action Plan for Wildfire Response. These efforts will include a review of inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires. This effort will also involve an education effort focused on informing home and property owners about Wildland/Urban Interface fire safety.	Camden County	Wildfire	4	4.1	P	<ul style="list-style-type: none"> County Emergency Management County Manager Volunteer Fire Depts. US Forestry Service 	Staff Time	General Fund, US Forest Service	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work with the US Forest Service to address the issue of Wildfire safety throughout the County.
CAM18	Engage in comprehensive pre- and post-storm planning efforts utilizing the most accurate and thorough data available. These efforts will involve the review and incorporation of all existing policy and regulatory tools currently in place in an effort to identify cost effective and environmentally sound mitigation projects for implementation.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	3	3.2	ES	<ul style="list-style-type: none"> County Planning & Zoning County Emergency Management 	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	The information provided in the current Hazard Mitigation Plan, as well as the plan update will be utilized during the review of all local emergency management documents and procedures.
CAM19	Continue to utilize annual, as well as post-disaster Federal (FEMA) and State mitigation funds, to acquire and elevate structures impact by excessive flooding.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2	SP	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	To Be Determined	NCDPS, FEMA	Annually – As Needed	In Progress – Carry Forward	The County continues to utilize mitigation funding to address the impacts of recent natural hazard events including both Hurricanes Matthew and Florence.
CAM20	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses, contractors, realtors, developers and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both person and property.	Camden County	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to carry out these efforts through implementation of its local Community Rating System (CRS) Program.
CAM21	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Camden County	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	
CAM22	Engage in a comprehensive planning process aimed at establishing a management plan for all county-owned mitigation properties.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.2	PP	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund	Ongoing – next 5 years	New	N/A
CAM23	Undertake efforts to reestablish hydrologic connections between the Perquimans River and the Great Dismal Swamp.	Camden County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County Manager County Emergency Management County Board of Commissioners 	To Be Determined	General Fund, NCDOT	2 to 3 years	New	N/A

Annex B Chowan County

B.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Chowan County, including information on population, asset exposure, housing, and economy. Throughout the section, information will be reported at the jurisdictional level. In some cases, information will only be reported for communities participating in the Community Rating System (CRS).

Table B.1 – CRS Participation by Jurisdiction, Chowan County

Jurisdiction	CRS Participant
Unincorporated Chowan County	No
Town of Edenton	Yes

Geography

Figure B.1 shows a base map of Chowan County and participating jurisdictions.

Figure B.1 – Jurisdictional Locations, Chowan County



Population and Demographics

Table B.2 provides population counts and growth estimates for unincorporated Chowan County and the Town of Edenton as compared to the County overall. Table B.3 provides demographic information for the County.

Table B.2 – Population Counts, Chowan County, 2000-2017

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Edenton	5,364	5,004	4,800	-6.7%	-4.1%	-10.5%
Unincorporated Areas	14,526	14,793	14,370	1.8%	-2.9%	-1.1%
Chowan County	19,890	19,797	19,170	-0.5%	-3.2%	-3.6%

Source: US Census Bureau American Community Survey.

Table B.3 – Racial Demographics, Chowan County, 2017

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Edenton	35.9%	60.9%	0.5%	1.2%	1.4%	1.0%
Chowan County	62.5%	33.9%	0.2%	2.0%	1.4%	3.6%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Future Growth and Development

Town of Edenton & Chowan County Joint Land Use Plan

The Town of Edenton is the only incorporated municipality in Chowan County and serves as the County seat. As noted earlier in the plan, Chowan County is the smallest NC county in geographical size. Development within the Town of Edenton takes on a similar characteristic to other eastern North Carolina communities. It is centered around a downtown core, with development density fading toward the edges of the corporate limits and ultimately the extraterritorial jurisdiction (ETJ). One unique aspect of the Town is that within the ETJ the minimum lot size is five acres. The minimum lot size within the County is one acre. This fact essentially establishes a growth ring around the Town that limits the encroachment of development between rural Chowan County and the Town of Edenton.

The Chowan County & Town of Edenton Joint Land Use Plan was adopted by the Edenton Town Council in August of 2018. The Land Use Plan defines seven primary future land use districts including:

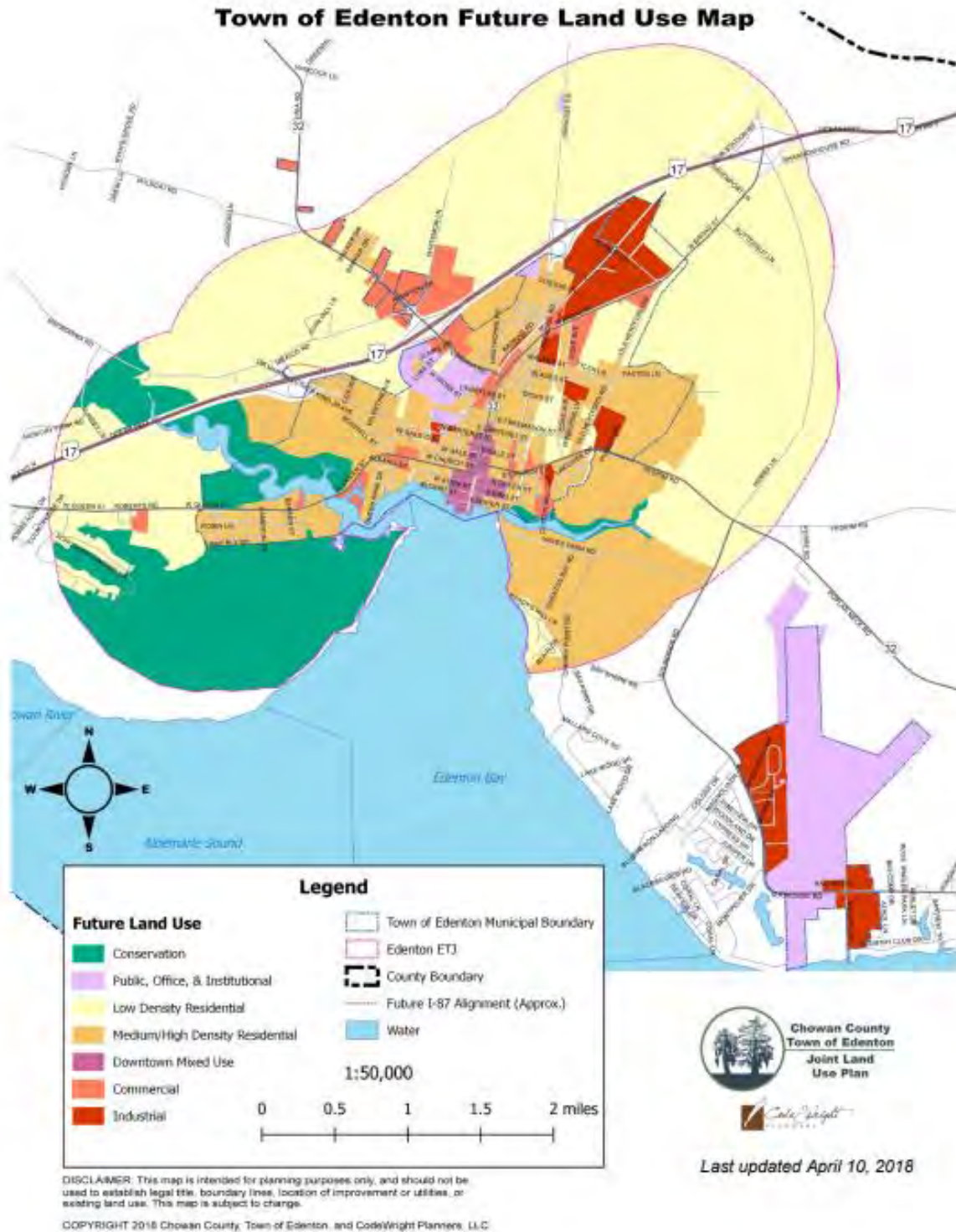
- ▶ Conservation
- ▶ Public, Office & Institutional
- ▶ Low Density Residential
- ▶ Medium/High Density Residential
- ▶ Downtown Mixed Use
- ▶ Commercial
- ▶ Industrial

These districts are defined in detail under Section 2.3.D (Pages 2-26 to 2-30) of the Chowan County & Town of Edenton Joint Land Use Plan available through the following URL:

https://www.chowancounty-nc.gov/vertical/sites/%7B10E82D50-AAE0-43D7-A98A-42E82683885E%7D/uploads/Chowan-Edenton_LUP_Updated_10-25-18_Plan_and_Appendices_11-19-2018.pdf.

The following map provides the delineation of each Future land Use District.

Figure B.2 – Town of Edenton Future Land Use



ANNEX B: CHOWAN COUNTY

Asset Inventory

The following tables summarize the asset inventory for Chowan County unincorporated and incorporated areas in order to estimate the total physical exposure to hazards in this area. The locations of critical facilities are shown in Figure B.3 and Figure B.4. Critical facilities are a subset of identified assets from the Critical Infrastructure & Key Resources dataset. Note that the counts are by building; where a critical facility comprises a cluster of buildings, each building is counted and displayed.

Table B.4 – Critical Infrastructure & Key Resources by Type

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Unincorporated Chowan County	782	1	0	201	1	70	0	24	7	0	0	0	0	57	0	1	3	1,147
Town of Edenton	94	24	0	482	4	140	0	106	92	0	0	0	0	90	6	6	2	1,046
Chowan County Total	876	25	0	683	5	210	0	130	99	0	0	0	0	147	6	7	5	2,193

Source: NCEM Risk Management Tool

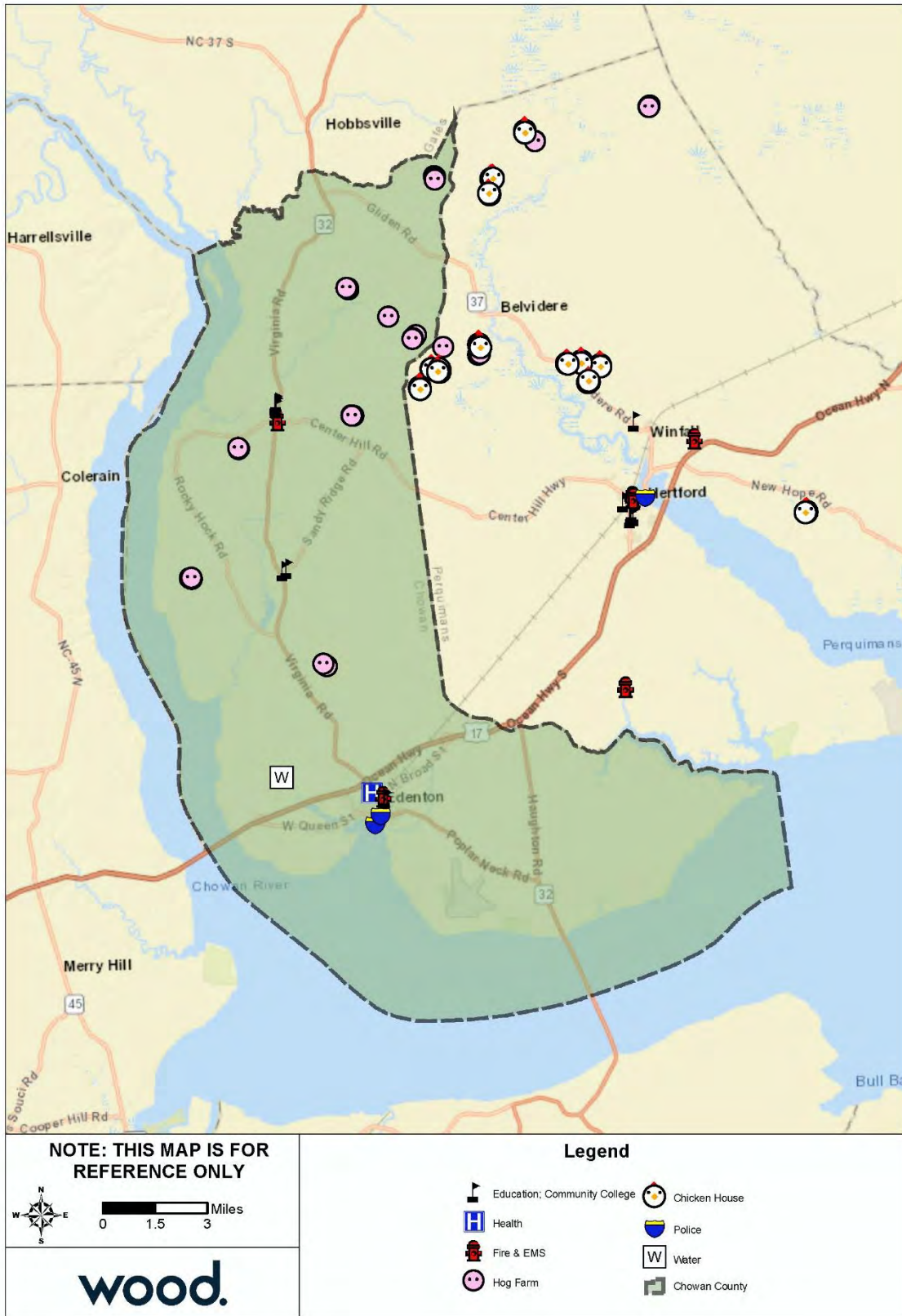
Table B.5 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Unincorporated Chowan County	2	1	1	6	0	4	0	14
Town of Edenton	14	30	8	24	0	16	0	92
Chowan County Total	16	31	9	30	0	20	0	106

Source: NCEM Risk Management Tool

Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

Figure B.3 – Critical Facilities, Chowan County



Source: NCEM IRISK Database, GIS Analysis

Figure B.4 – Critical Facilities, Town of Edenton



Source: NCEM IRISK Database, GIS Analysis

ANNEX B: CHOWAN COUNTY

Housing

The table below details key housing statistics for Chowan County and the Town of Edenton. Compared to 2010 housing, Chowan County's housing stock has remained fairly stable.

Table B.6 – Housing Statistics, Chowan County, 2010-2017

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Edenton	2,411	2,610	8.3%	45.8%	10.7%
Chowan County	7,289	7,294	0.1%	73.0%	19.1%

Source: US Census Bureau American Community Survey.

Economy

The following tables present key economic statistics for Chowan County.

Table B.7 – Economic Indicators, Chowan County, 2017

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Edenton	56.0%	43.3%	11.2%	44.0%	20.6%
Chowan County	53.2%	46.5%	6.3%	46.8%	11.9%

Source: US Census Bureau American Community Survey.

Table B.8 – Employment by Industry, Chowan County, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Edenton	28.9%	30.1%	21.9%	1.7%	17.3%
Chowan County	29.6%	25.4%	19.8%	7.4%	17.7%

Source: US Census Bureau American Community Survey.

B.2 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority by jurisdiction in Chowan County than for the Albemarle Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have variations in risk that could be evaluated quantitatively on a jurisdictional level. The hazards included in this section are flood and wildfire.

B.2.1 Flood

Table B.9 details the acreage of Chowan County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, over 32 percent of the unincorporated areas of Chowan County are within the mapped 1%-annual-chance floodplain and 16 percent of the Town of Edenton are in the 1%-annual-chance floodplain. Overall, over 32 percent of Chowan County is in the SFHA.

Table B.9 – Flood Zone Acreage by Jurisdiction, Chowan County

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Chowan							
Unincorporated County	164	47,189	1,644	88,129	8,837	145,963	32.4%
Edenton	0	571	54	2,937	0	3,562	16.0%

Source: FEMA Effective DFIRM

Figure B.5 and Figure B.6 reflect the effective mapped flood hazard zones for Chowan County and the Town of Edenton, and Figure B.7 and Figure B.8 display the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

Table B.10 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Chowan County and the Town of Edenton.

Table B.10 – Critical Facilities Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Chowan County Unincorporated Areas			
Commercial Facilities	100 Year	2	\$39,736
Critical Manufacturing	100 Year	5	\$38,245
Food and Agriculture	100 Year	4	\$2,385
All Categories	100 Year	11	\$80,366
Town of Edenton			
Commercial Facilities	100 Year	9	\$59,764
Government Facilities	100 Year	3	\$32,617
All Categories	100 Year	12	\$92,381

Source: NCEM Risk Management Tool

Figure B.5 – FEMA Flood Hazard Areas, Unincorporated Chowan County



Source: FEMA Effective DFIRM

Figure B.6 – FEMA Flood Hazard Areas, Town of Edenton



Source: FEMA Effective DFIRM

Figure B.7 – Flood Depth, 1%-Annual-Chance Floodplain, Unincorporated Chowan County



Source: FEMA Effective DFIRM

Figure B.8 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Edenton



Source: FEMA Effective DFIRM

B.2.2 Wildfire

Table B.11 summarizes the acreage in Chowan County that falls within the Wildland Urban Interface (WUI), categorized by housing density. Areas in the WUI are those where development may intermix with flammable vegetation. Over 64 percent of Chowan County is not included in the WUI.

Table B.11 – Wildland Urban Interface Acreage, Chowan County

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	96,299.94	64.5%
	LT 1hs/40ac	14,577.88	9.8%
	1hs/40ac to 1hs/20ac	11,686.63	7.8%
	1hs/20ac to 1hs/10ac	11,655.15	7.8%
	1hs/10ac to 1hs/5ac	8,228.89	5.5%
	1hs/5ac to 1hs/2ac	4,143.98	2.8%
	1hs/2ac to 3hs/1ac	2,764.37	1.9%
	GT 3hs/1ac	14.90	0.0%
	Total	149,371.74	

Source: Southern Wildfire Risk Assessment

Figure B.9 depicts the WUI for Chowan County and all participating jurisdictions. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure B.10 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure B.11 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Areas of moderate to high potential fire intensity are scattered throughout the county, with higher concentrations northeast of Edenton along the Perquimans County border and southwest along the Chowan River. Burn probability is also slightly higher in these areas but is otherwise generally low throughout the county. While the area around the Perquimans County border has high burn probability and fire intensity, it is outside the WUI, therefore impacts to buildings and people would be minimal. Risk is higher along the Chowan River west of Edenton, where moderate burn probability and fire intensity coincide with WUI.

Table B.12 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Chowan County and the Town of Edenton. Table B.13 provides counts and estimated damages for High Potential Loss Properties in these areas.

Table B.12 – Critical Facilities Exposed to Wildfire by Jurisdiction, Chowan County

Sector	Number of Buildings at Risk	Estimated Damages
Chowan County Unincorporated Area		
Commercial Facilities	136	\$59,796,752
Communications	1	\$216,399
Critical Manufacturing	36	\$12,193,530
Emergency Services	1	\$2,261,971
Food and Agriculture	426	\$41,592,136
Government Facilities	21	\$33,195,759

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Sector	Number of Buildings at Risk	Estimated Damages
Healthcare and Public Health	6	\$3,009,893
Transportation Systems	33	\$10,964,760
Water	1	\$300,000
All Categories	661	\$163,531,200
Town of Edenton		
Banking and Finance	2	\$1,992,473
Commercial Facilities	93	\$47,434,721
Critical Manufacturing	30	\$39,302,904
Emergency Services	1	\$439,693
Energy	1	\$2,395,950
Food and Agriculture	28	\$1,262,127
Government Facilities	16	\$34,559,490
Healthcare and Public Health	14	\$29,661,419
Transportation Systems	10	\$3,428,217
All Categories	195	\$160,476,994

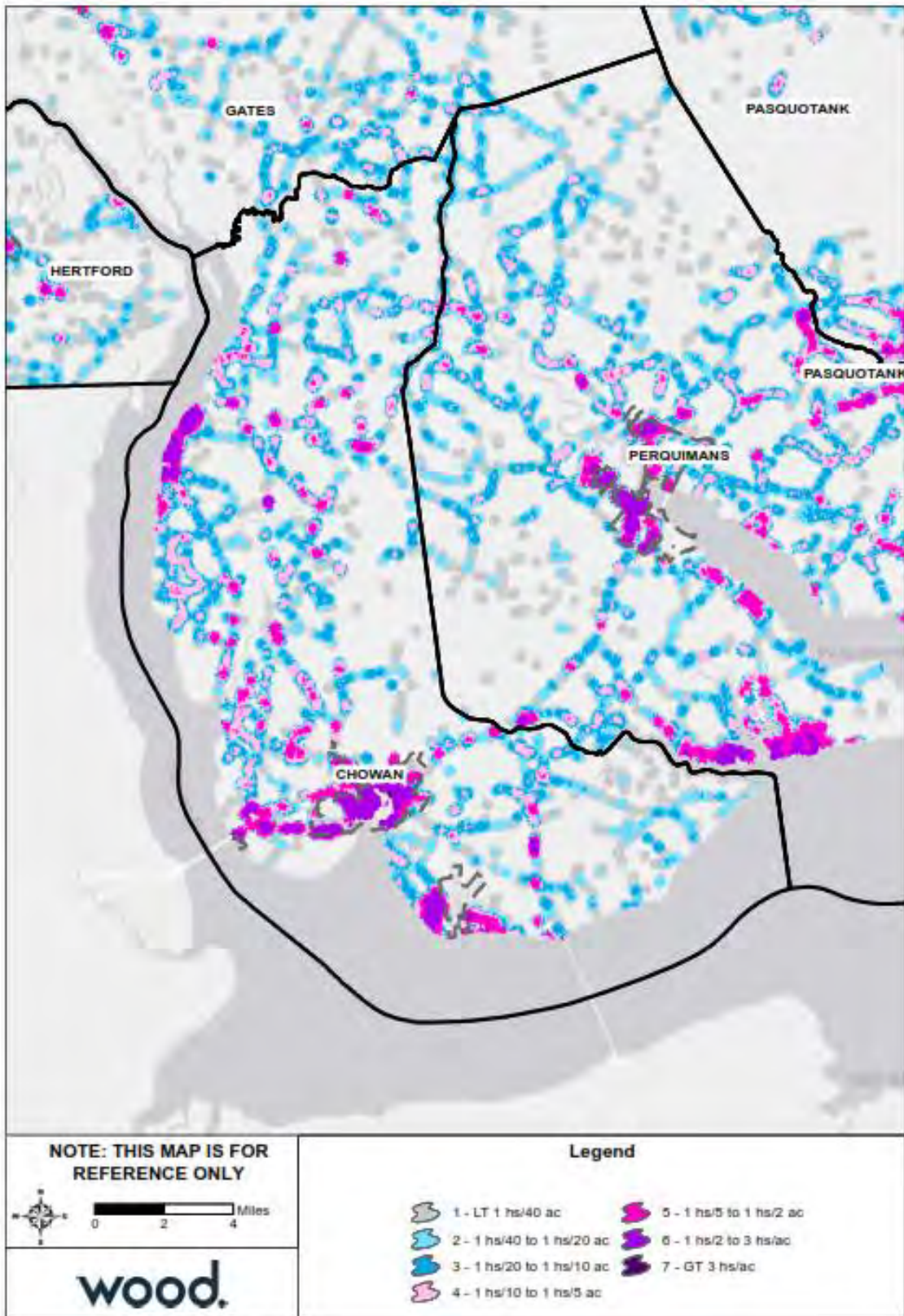
Source: NCEM Risk Management Tool

Table B.13 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Chowan County

Category	Number of Buildings at Risk	Estimated Damages
Chowan County Unincorporated Area		
Commercial	1	\$5,660,644
Government	5	\$30,313,753
Industrial	1	\$2,320,628
Religious	4	\$10,929,961
Residential	1	\$1,042,798
All Categories	12	\$50,267,784
Town of Edenton		
Commercial	4	\$29,116,404
Government	4	\$32,295,356
Industrial	1	\$2,762,747
Religious	5	\$7,541,137
Residential	5	\$8,336,201
All Categories	19	\$80,051,845

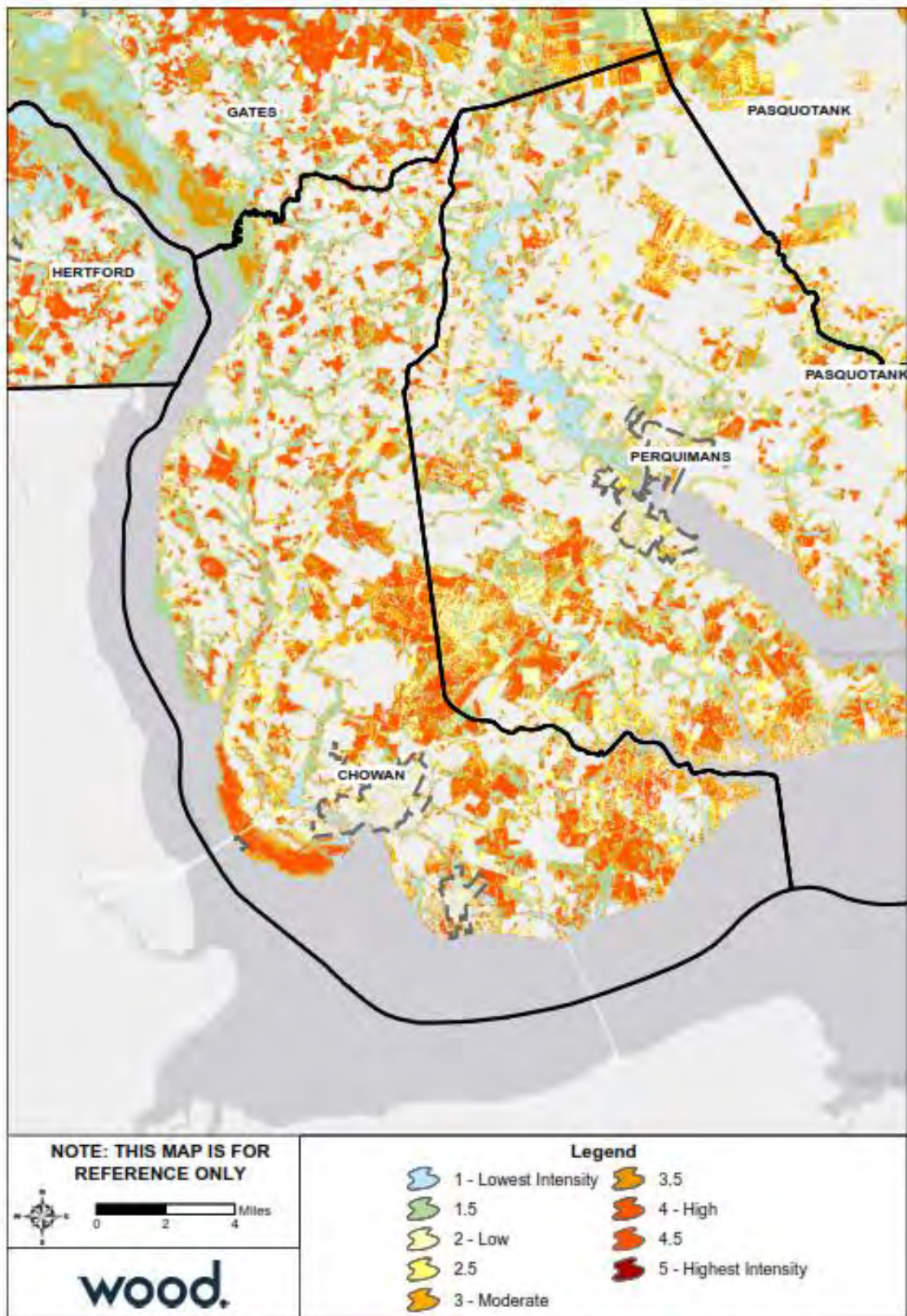
Source: NCEM Risk Management Tool

Figure B.9 – Wildland Urban Interface, Chowan County



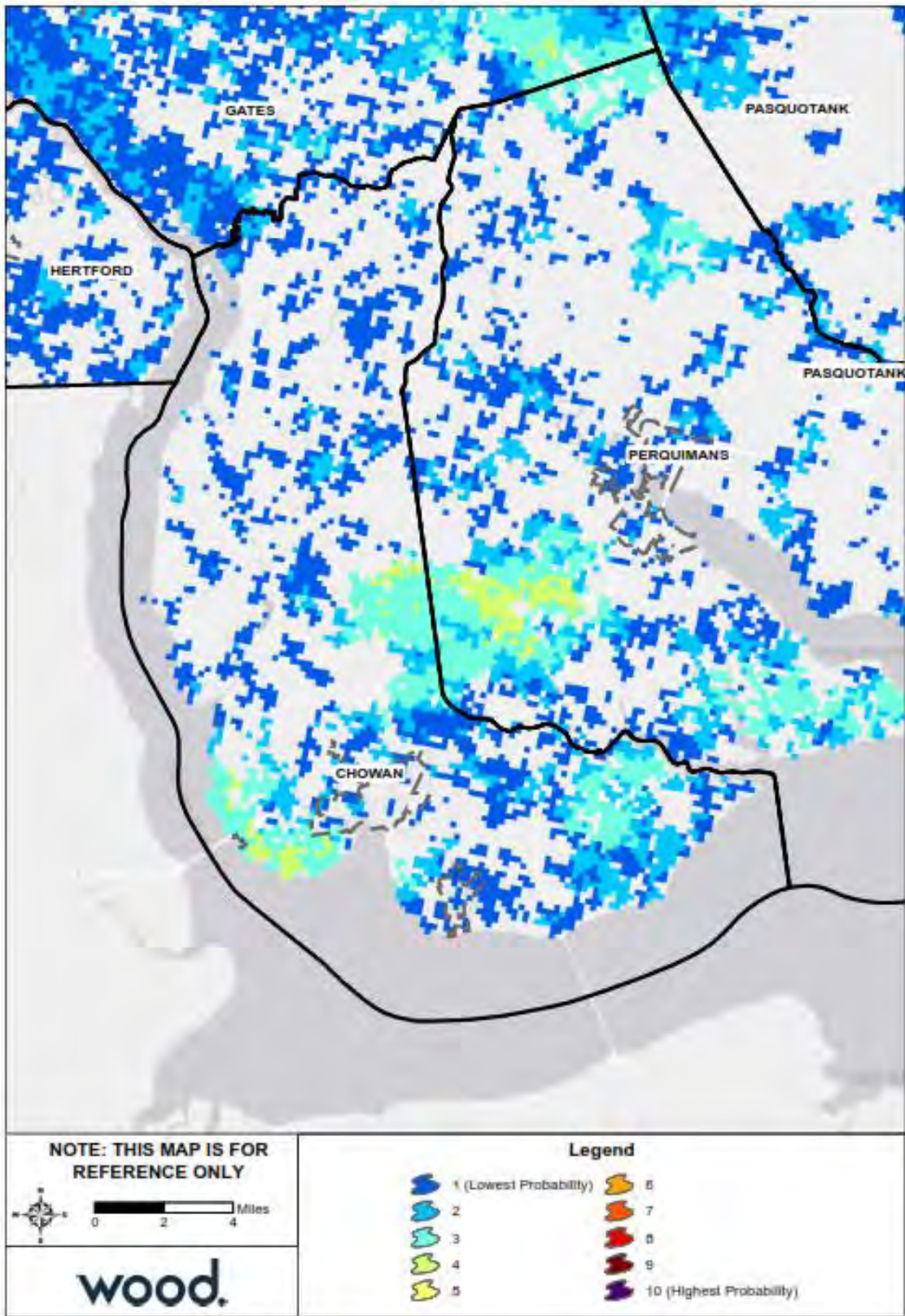
Source: Southern Wildfire Risk Assessment

Figure B.10 – Fire Intensity Scale, Chowan County



Source: Southern Wildfire Risk Assessment

Figure B.11 – Burn Probability, Chowan County



Source: Southern Wildfire Risk Assessment

B.3 CAPABILITY ASSESSMENT

B.3.1 Overall Capability

Details on the tools and resources in place and available to Chowan County were provided by the County’s HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Chowan County has an overall capability rating of High. The County provides resources for Edenton and the mitigation projects in this plan are regional in nature; therefore, the County’s capability is also an indicator for its incorporated areas. The County’s Self-Assessment of key capability areas is summarized in Table B.14 below.

Table B.14 – Capability Self-Assessment, Chowan County

Capability Area	Rating
Plans, Ordinances, Codes and Programs	High
Administrative and Technical Capability	High
Fiscal Capability	High
Education and Outreach Capability	High
Mitigation Capability	High
Political Capability	High
Overall Capability	High

B.3.2 Floodplain Management

The following tables reflect NFIP entry dates as well as policy and claims data for Chowan County and the Town of Edenton, categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

Table B.15 – NFIP Program Entry Dates

Community	Regular Program Entry
Chowan County (Unincorporated Area)	July 3, 1985
Town of Edenton	September 15, 1977

Source: FEMA Community Information System

Table B.16 – NFIP Policy and Claims Data by Structure Type

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Chowan County Unincorporated Area					
Single Family	202	\$101,303	\$56,629,600	81	\$1,298,190.52
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	30	\$13,635	\$7,500,000	0	\$0.00
Non Residential	7	\$15,989	\$1,895,500	1	\$48,000.00
Total	239	\$130,927	\$66,025,100	82	\$1,346,190.52
Town of Edenton					
Single Family	137	\$87,411	\$37,377,900	129	\$3,520,910.75
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	54	\$14,097	\$14,543,000	0	\$0.00
Non Residential	21	\$61,965	\$7,010,800	17	\$775,414.15
Total	212	\$163,473	\$58,931,700	146	\$4,296,324.90

Source: FEMA Community Information System, accessed November 2019

ANNEX B: CHOWAN COUNTY

Table B.17 – NFIP Policy and Claims Data by Flood Zone

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Chowan County Unincorporated Area					
A01-30 & AE Zones	110	\$73,199	\$26,221,100	64	\$1,181,374.78
B, C & X Zone					
Standard	5	\$8,712	\$1,901,000	4	\$52,181.13
Preferred	124	\$49,016	\$37,903,000	12	\$110,448.24
Total	239	\$130,927	\$66,025,100	80	\$1,344,004.15
Town of Edenton					
A01-30 & AE Zones	123	\$112,371	\$33,218,400	118	\$3,359,046.57
A Zones	1	\$1,283	\$500,000	3	\$149,353.38
B, C & X Zone					
Standard	9	\$13,685	\$2,273,300	14	\$462,839.45
Preferred	79	\$36,134	\$22,940,000	11	\$325,085.50
Total	212	\$163,473	\$58,931,700	146	\$4,296,324.90

Source: FEMA Community Information System, accessed November 2019

Table B.18 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Chowan County Unincorporated Area					
A01-30 & AE Zones	31	\$26,176	\$6,482,800	35	\$910,555.91
B, C & X Zone					
Standard	3	\$6,781	\$1,489,400	3	\$47,239.77
Preferred	59	\$21,446	\$16,073,000	8	\$81,386.77
Total	93	\$54,403	\$24,045,200	46	\$1,039,182.45
Town of Edenton					
A01-30 & AE Zones	74	\$88,297	\$20,440,500	86	\$2,921,682.88
A Zones	1	\$1,283	\$500,000	3	\$149,353.38
B, C & X Zone					
Standard	4	\$3,746	\$1,147,600	5	\$49,169.16
Preferred	44	\$20,082	\$11,424,000	8	\$256,425.99
Total	123	\$113,408	\$33,512,100	102	\$3,376,631.41

Source: FEMA Community Information System, accessed November 2019

Table B.19 – NFIP Policy and Claims Data Post-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Chowan County Unincorporated Area					
A01-30 & AE Zones	79	\$47,023	\$19,738,300	29	\$270,818.87
B, C & X Zone					
Standard	2	\$1,931	\$411,600	1	\$4,941.36
Preferred	65	\$27,570	\$21,830,000	4	\$29,061.47
Total	146	\$76,524	\$41,979,900	34	\$304,821.70
Town of Edenton					
A01-30 & AE Zones	49	\$24,074	\$12,777,900	32	\$437,363.69
B, C & X Zone					
Standard	5	\$9,939	\$1,125,700	9	\$413,670.29

Albemarle Region

ANNEX B: CHOWAN COUNTY

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Preferred	35	\$16,052	\$11,516,000	3	\$68,659.51
Total	89	\$50,065	\$25,419,600	44	\$919,693.49

Source: FEMA Community Information System, accessed November 2019

B.4 MITIGATION STRATEGY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CHO/EDN1	Map facilities and areas impacted by natural disasters through their respective GIS systems. Mapping efforts will include the location of all critical facilities, housing, businesses, and infrastructure impacted by past natural hazard events. Priority will be given to the mapping of homes impacted by flooding events, specifically those located within the defined flood hazard area. Mapping will be utilized to make a determination regarding potential mitigation funding.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PIO	<ul style="list-style-type: none"> County GIS Municipal Planning 	Staff Time	General Fund NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County GIS Department will continue to maintain this data and incorporate new information as natural disasters occur.
CHO/EDN2	Work to improve drainage conditions throughout the County through the identification and implementation of capital improvements projects. A variety of funding mechanisms will be utilized to carry out these efforts and when possible grant funding will be utilized. These efforts should initially focus on the following issues: <ul style="list-style-type: none"> Filberts Creek culvert replacement Clearing and snagging of drainage ditches and canals Potential drainage improvements to Pembroke Circle Potential drainage improvements to Dillard Mill Potential drainage improvements to Woodlawn Park 	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	To Be Determined	General Fund, NCDPS, HMGP, NCDENR	3 to 5 years	New	N/A
CHO/EDN3	Repair and upgrade all facilities and equipment associated with both Bennett and Dillard Millpond.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	SP	<ul style="list-style-type: none"> County Administration Municipal Administration 	To Be Determined	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Completed – Carry Forward	The County has not initiated these efforts but will do so through implementation of this plan.
CHO/EDN4	Compile a map reflecting the “true” extent of past flooding events. This effort should document the flooding associated with each respective flooding event, and document flooding that coincides with defined NFIP Flood Hazard Areas. Additionally, impacted critical facilities, businesses, homes, and infrastructure should be catalogued.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.2	P	<ul style="list-style-type: none"> County GIS Municipal Planning 	Staff Time	General Fund NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will conduct this mapping efforts in an attempt to accurately reflect the impacts of both Hurricanes Matthew and Florence.
CHO/EDN5	Continue to utilize annual, as well as post-disaster Federal (FEMA) and State mitigation funds, to both acquire and elevate structures impacted by excessive flooding. These efforts should focus on the following portions of the County: <ul style="list-style-type: none"> Downtown Edenton Cape Colony Subdivision The Haughton Road Area 	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	SP	<ul style="list-style-type: none"> County Administration Municipal Administration 	To Be Determined	HMGP, FMA, General Fund	Ongoing – As needed	In Progress – Carry Forward	The County will work to address the impacts associated with Hurricane Matthew, as well as any future disaster events.
CHO/EDN6	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLP’s) from future flooding events. The County will maintain a list of RLP’s, and on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. These efforts will be carried out in coordination with the Town of Edenton.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather	1	1.3	SP	<ul style="list-style-type: none"> County Administration Municipal Administration 	To Be Determined	HMGP, FMA, General Fund	Ongoing – As needed	In Progress – Carry Forward	The County will work to address the impacts associated with Hurricane Matthew, as well as any future disaster events.
CHO/EDN7	Continue to maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development. This information will also provide material outlining sound techniques for floodplain development and floodproofing of existing structures. The County will also maintain staff educated in these issues to work with prospective builders.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PIO	<ul style="list-style-type: none"> County Planning and Inspections Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – As needed	In Progress – Carry Forward	The County Building Inspections Department will continue to provide this information, as well as be available to address questions and inquiries as necessary.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CHO/EDN8	Work to educate and inform local residents about current and potential threats associated with natural hazard events through the use of social media, news media outlets, County and Town distribution list, and television media. These efforts will include providing information regarding the dangers associated with residing within defined flood hazard areas.	Chowan County, Edenton	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Planning and Inspections Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – As needed	In Progress – Carry Forward	The County Building Inspections Department will continue to provide this information, as well as be available to address questions and inquiries as necessary.
CHO/EDN9	Continue to maintain a formal notification system to alert local residents when water conservation measures have been put in place stemming from prolonged drought conditions. Notification will follow the water use restriction schedule defined by the County Board of Commissioners and Town Council.	Chowan County, Edenton	Drought	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – As needed	In Progress – Carry Forward	The County will continue to institute measures associated with the County's Water Shortage Management Plan.
CHO/EDN10	Advocate the use of existing State and Federal regulatory programs for protecting and preserving coastal wetland Areas of Environmental Concern.	Chowan County, Edenton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.1	NRP	<ul style="list-style-type: none"> County Planning Municipal Administration NCDEQ EPA 	Staff Time	General Fund, NCDEQ	Ongoing – As needed	New	N/A
CHO/EDN11	Support planning for improvements to the Chowan County/ Edenton regional transportation systems to provide for safe traffic flow and evacuation. These efforts should include the identification of location for the use of electrical highways signs intended to provide warning regarding inclement weather and/or hazardous road conditions.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.1	P	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations NCDOT 	Staff Time	General Fund, NCDOT	Ongoing – next 5 years	New	N/A
CHO/EDN12	Work with the curriculum directors of both the public and private schools to add all mitigation hazards prevention and preparedness information.	Chowan County, Edenton	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration County Board of Education 	Staff Time	General Fund	Ongoing – Annually	Not Started – Carry Forward	Chowan County will initiate this program through the implementation of this plan.
CHO/EDN13	Require all public utility companies as well as County- and Town-owned utilities to inspect and repair damage due to hurricanes within a 5-year time frame.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.1	P	<ul style="list-style-type: none"> County Administration Municipal Administration Utility Providers 	Staff Time	General Fund, Utility Providers	2 to 3 years	Not Started – Carry Forward	Chowan County will work with the Town of Edenton, as well as other Electric Service Providers to enact this policy.
CHO/EDN14	Work with local charities such as Baptist Men and/or Habitat for Humanity chapters, to apply non-structural mitigation measures to the homes of low-income senior citizens in the Flood Hazard Area.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	4	4.2	PP	<ul style="list-style-type: none"> County Administration Municipal Administration Local Non-Profits 	To Be Determined	General Fund, Local Non-Profits	Ongoing – next 5 years	In Progress – Carry Forward	These efforts are currently underway at the local level.
CHO/EDN15	Maintain information on the County website relating to evacuation and sheltering. Emergency information on the website will include: evacuation routes, sheltering, delays and closures, pet sheltering options, and special needs information.	Chowan County, Edenton	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A
CHO/EDN16	Maintain, and where necessary, establish backup generators at all identified critical facilities. Additionally, County Emergency Management will evaluate the equipment on a regular basis to assure it continues to meet operational demands at county facilities.	Chowan County, Edenton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	To Be Determined	General Fund, NCDPS	2 to 3 years	In Progress – Carry Forward	The County will continue to identify need regarding the installation of backup generators and where necessary work with NCDPS to implement this strategy.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
CHO/EDN17	Increase efforts to educate the public and increase agency capabilities in regards to wildfire response. These efforts will include a review of inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires. This effort will also involve an education effort focused on informing home and property owners about Wildland/Urban Interface fire safety.	Chowan County, Edenton	Wildfire	4	4.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A
CHO/EDN18	Annually review and update the County's Emergency Operations Plan (EOP) to ensure compliance with all NCEM and NCOEMS procedures and policies. Through these updates, the County will work closely with the Town of Edenton to ensure that all jurisdictions continue to be educated and prepared for activation of the EOP in the event of a disaster event.	Chowan County, Edenton	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners Town of Edenton 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Chowan County, in conjunction with the Town of Edenton will review its Emergency Operations Plan annually, specifically the County addresses issues identified through past storm experiences.
CHO/EDN19	Improve awareness regarding the intensity of natural hazard events as they materialize through: <ul style="list-style-type: none"> Establishing an emergency radio broadcast frequency that runs a recorded message pre- and post-hazard to communicate critical time-sensitive information. It could include routes/bridges that are open or closed, weather/hazard forecasts, location of emergency shelters. More fully utilizing County/Town websites to provide pre-hazard and post-hazard recovery information (debris pick-up schedule, critical dates, forms, phone numbers, housing availability, etc.). 	Chowan County, Edenton	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration 	\$10,000	General Fund, NCDPS	2 to 3 Years	New	N/A

Annex C Gates County

C.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Gates County, including information on population, asset exposure, housing, and economy.

Geography

Figure C.1 shows a base map of Gates County and participating jurisdictions.

Population and Demographics

Table C.1 provides population counts and growth estimates for unincorporated Gates County and the Town of Gatesville as compared to Gates County overall. Table C.2 provides demographic information for the County.

Table C.1 – Population Counts, Gates County, 2000-2017

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Gatesville	281	321	313	14.2%	-2.5%	11.4%
Unincorporated Areas	10,516	12,197	11,601	16.0%	-4.9%	10.3%
Gates County	10,797	12,518	11,914	15.9%	-4.8%	10.3%

Source: US Census Bureau American Community Survey.

Table C.2 – Racial Demographics, Gates County, 2017

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Gatesville	90.4%	8.0%	0.3%	0.6%	0.6%	0.6%
Gates County	63.1%	32.9%	0.4%	1.3%	2.3%	0.7%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Figure C.1 – Jurisdictional Locations, Gates County



ANNEX C: GATES COUNTY

Asset Inventory

The following tables summarize the asset inventory for Gates County unincorporated and incorporated areas in order to estimate the total physical exposure to hazards in this area. Note that the counts are by building.

Table C.3 – Critical Infrastructure & Key Resources by Type

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Unincorporated Gates County	3,184	2	0	482	0	92	0	118	14	0	0	0	0	60	0	0	4	3,956
Town of Gatesville	14	0	0	64	0	16	0	40	2	0	0	0	0	8	0	0	0	144
Chowan County Total	3,198	2	0	546	0	108	0	158	16	0	0	0	0	68	0	0	4	4,100

Source: NCEM Risk Management Tool

Table C.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Unincorporated Gates County	0	10	0	8	2	2	4	26
Town of Gatesville	0	0	0	2	0	0	0	2
Gates County Total	0	10	0	10	2	2	4	28

Source: NCEM Risk Management Tool

Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

Housing

The table below details key housing statistics for Gates County. As a percent of growth from 2010 housing, Gates County's housing stock has grown by 4.9%.

Table C.5 – Housing Statistics, Gates County, 2010-2017

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Gatesville	171	184	7.6%	71.3%	19.9%
Gates County	5,046	5,305	5.1%	79.9%	16.3%

Source: US Census Bureau American Community Survey.

Economy

The following tables present key economic statistics for Gates County.

Table C.6 – Economic Indicators, Gates County, 2017

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Gatesville	60.5%	56.2%	3.4%	39.5%	5.8%
Gates County	58.5%	53.1%	5.1%	41.5%	8.8%

Source: US Census Bureau American Community Survey.

Table C.7 – Employment by Industry, Gates County, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Gatesville	32.1%	22.1%	19.8%	16.8%	9.2%
Gates County	29.2%	16.6%	19.2%	12.0%	23.0%

Source: US Census Bureau American Community Survey.

C.2 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority by jurisdiction in Gates County than for the Albemarle Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have variations in risk that could be evaluated quantitatively on a jurisdictional level. The hazards included in this section are flood and wildfire.

C.2.1 Flood

Table B.9 details the acreage of Gates County’s total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, over 32 percent of the unincorporated County is within the SFHA and over 5 percent of Gatesville is within the SFHA.

Table C.8 – Flood Zone Acreage by Jurisdiction, Gates County

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Gates							
Unincorporated County	22,829	48,560	1,311	148,334	0	221,034	32.3%
Gatesville	0	14	0	244	0	258	5.4%

Source: FEMA Effective DFIRM

Figure C.2 and Figure C.3 reflect the effective mapped flood hazard zones for Gates County and Gatesville, and Figure C.4 and Figure C.5 display the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

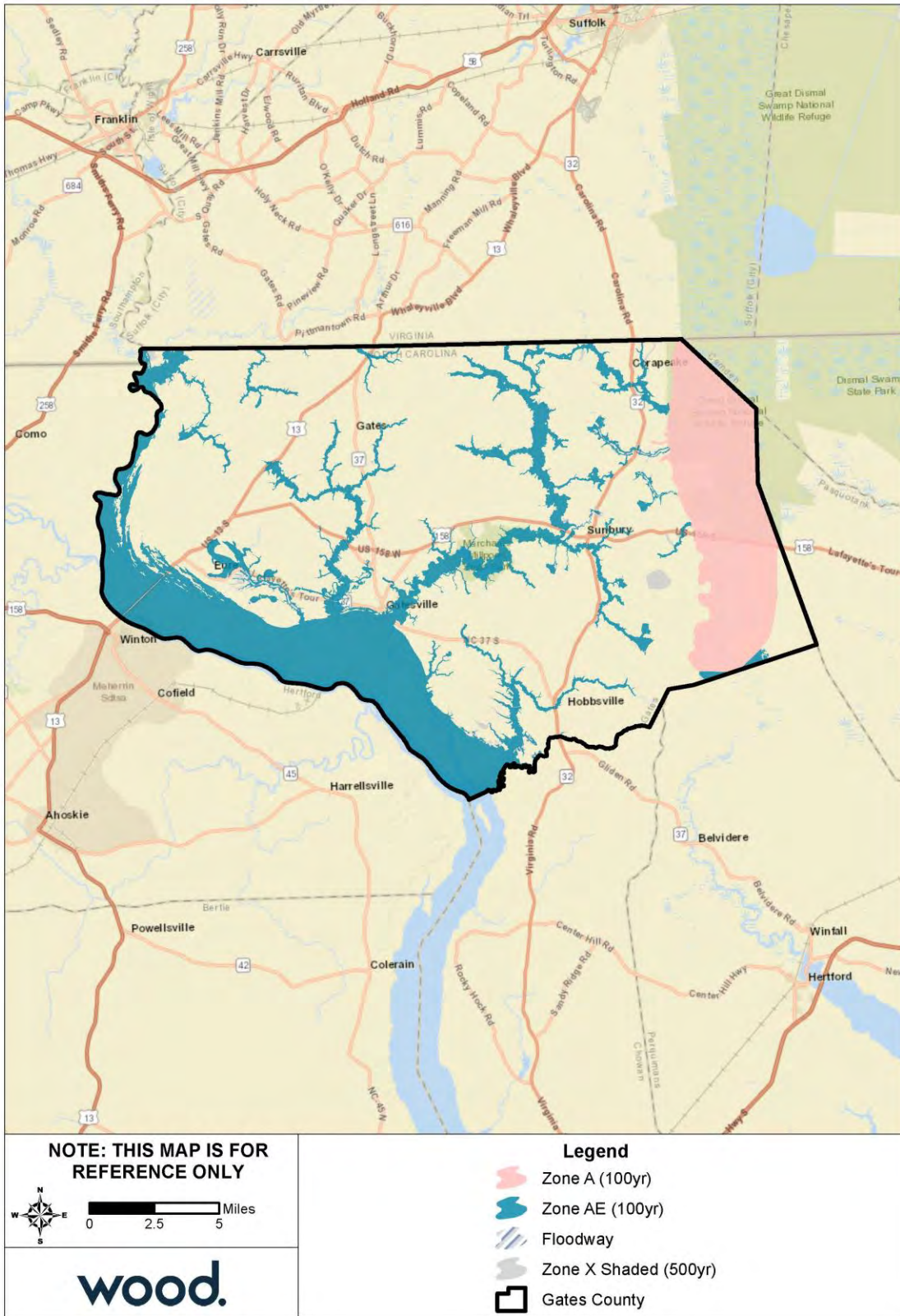
Table C.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Gates County and Gatesville.

Table C.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Gates County Unincorporated Areas			
Commercial Facilities	10 Year	1	\$2,490
	25 Year	1	\$2,490
	50 Year	1	\$2,490
	100 Year	1	\$2,490
Critical Manufacturing	10 Year	1	\$39,291
	25 Year	1	\$39,291
	50 Year	1	\$39,291
	100 Year	1	\$39,291
Food and Agriculture	10 Year	4	\$4,795
	25 Year	4	\$4,795
	50 Year	4	\$4,795
	100 Year	4	\$4,795
All Categories	10 Year	6	\$46,576
	25 Year	6	\$46,576
	50 Year	6	\$46,576
	100 Year	6	\$46,576
Town of Gatesville			
Food and Agriculture	10 Year	3	\$7,499
	25 Year	3	\$7,499
	50 Year	3	\$7,499
	100 Year	3	\$7,499

Source: NCEM Risk Management Tool

Figure C.2 – FEMA Flood Hazard Areas, Unincorporated Gates County



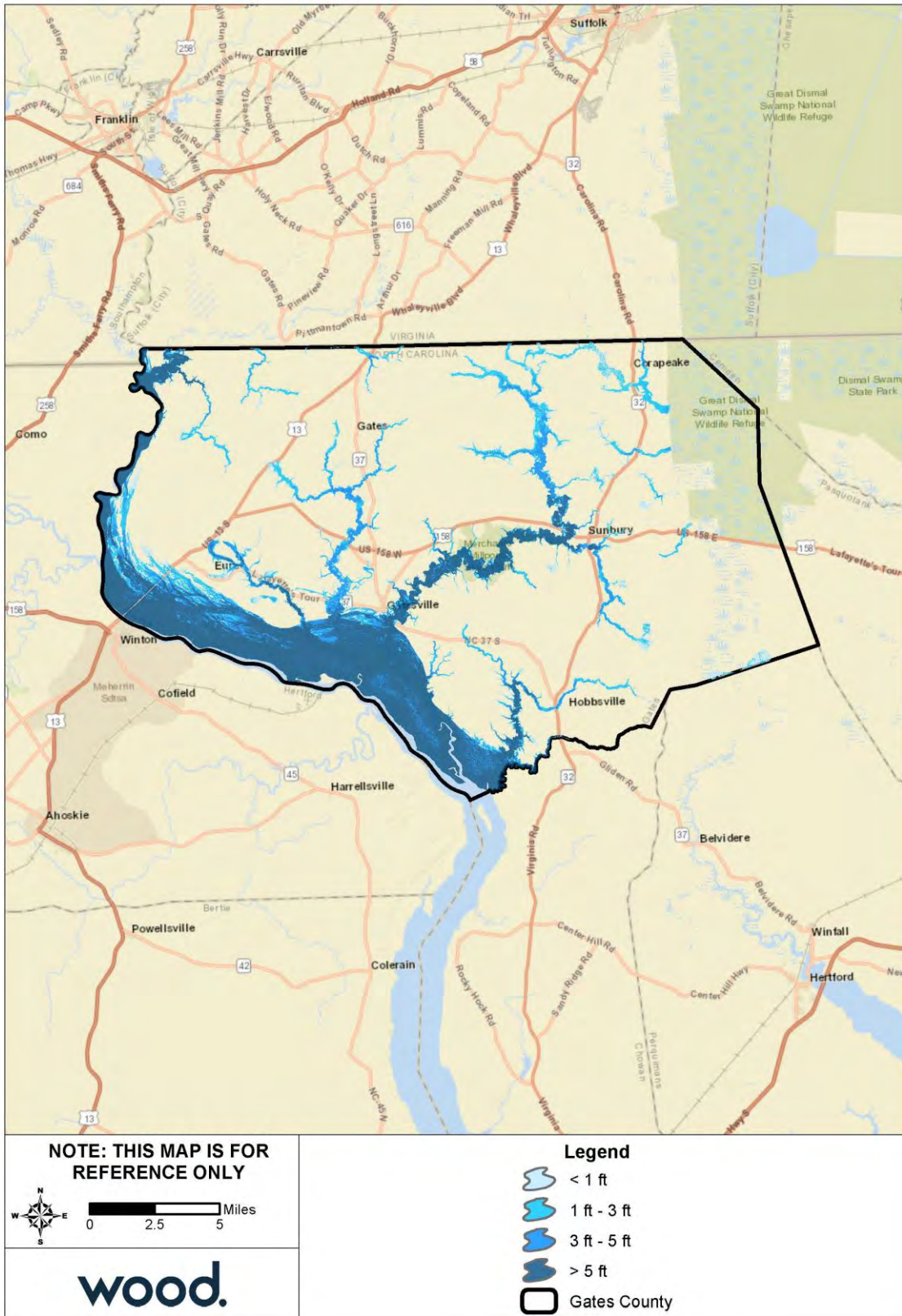
Source: FEMA Effective DFIRM

Figure C.3 – FEMA Flood Hazard Areas, Town of Gatesville



Source: FEMA Effective DFIRM

Figure C.4 – Flood Depth, 1%-Annual-Chance Floodplain, Unincorporated Gates County



Source: FEMA Effective DFIRM

Figure C.5 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Gatesville



Source: FEMA Effective DFIRM

C.2.2 Wildfire

Table C.10 summarizes the acreage in Gates County that falls within the Wildland Urban Interface (WUI), categorized by housing density. Areas in the WUI are those where development may intermix with flammable vegetation. Over 60 percent of Gates County is not included in the WUI.

Table C.10 – Wildland Urban Interface Acreage, Gates County

Housing Density	Total Acreage	Percent of Total Acreage
<i>Not in WUI</i>	133,692.1	60.4%
LT 1hs/40ac	38,152.7	17.2%
1hs/40ac to 1hs/20ac	18,125.7	8.2%
1hs/20ac to 1hs/10ac	17,632.3	8.0%
1hs/10ac to 1hs/5ac	9,267.2	4.2%
1hs/5ac to 1hs/2ac	3,702.6	1.7%
1hs/2ac to 3hs/1ac	607.5	0.3%
GT 3hs/1ac	0.0	0.0%
Total	221,180.0	

Source: Southern Wildfire Risk Assessment

Figure C.6 depicts the WUI for Gates County and all participating jurisdictions. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure C.7 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure C.8 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Areas of high potential fire intensity are spread throughout Gates County; however, with the exception of an area in western central Gates County, burn probability is low throughout most of the county. WUI is limited, but there is some overlap throughout unincorporated areas between WUI, burn probability, and high potential fire intensity.

Table C.11 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Gates County and participating jurisdictions. Table C.12 provides counts and estimated damages for High Potential Loss Properties in these areas.

Table C.11 – Critical Facilities Exposed to Wildfire by Jurisdiction, Gates County

Sector	Number of Buildings at Risk	Estimated Damages
Gates County Unincorporated Area		
Banking and Finance	1	\$457,132
Commercial Facilities	204	\$168,566,999
Critical Manufacturing	38	\$21,415,893
Food and Agriculture	1,263	\$79,719,466
Government Facilities	47	\$70,560,066
Healthcare and Public Health	6	\$16,768,782
Transportation Systems	26	\$16,886,816
Water	2	\$30,000,000
All Categories	1,587	\$404,375,154

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Sector	Number of Buildings at Risk	Estimated Damages
Town of Gatesville		
Commercial Facilities	28	\$8,884,746
Critical Manufacturing	7	\$4,289,232
Food and Agriculture	7	\$941,513
Government Facilities	18	\$23,178,523
Healthcare and Public Health	1	\$504,794
Transportation Systems	1	\$1,307,550
All Categories	62	\$39,106,358

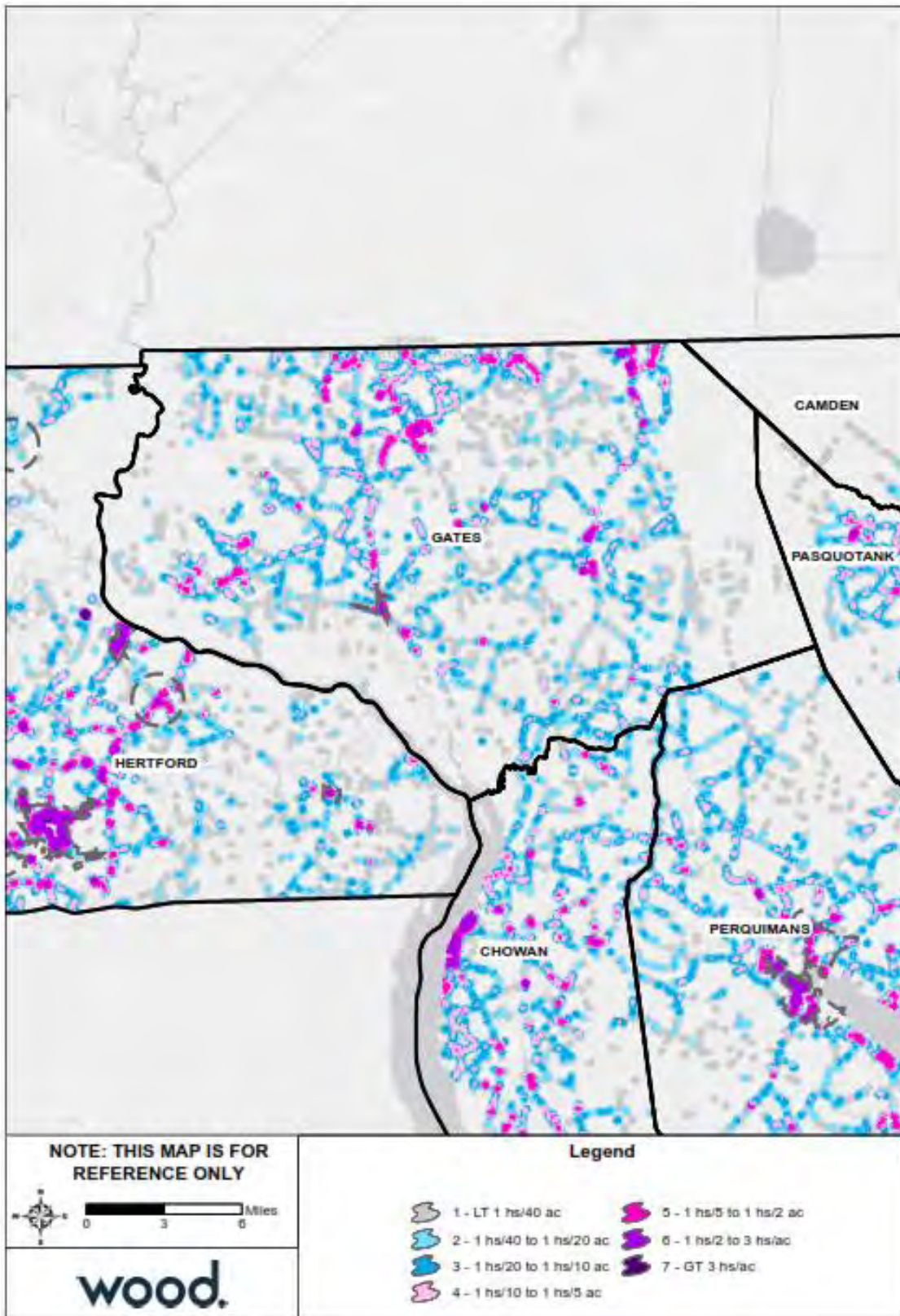
Source: NCEM Risk Management Tool

Table C.12 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Gates County

Category	Number of Buildings at Risk	Estimated Damages
Gates County Unincorporated Area		
Agricultural	1	\$1,119,566
Commercial	4	\$15,240,374
Government	4	\$38,768,129
Religious	1	\$1,546,585
Utilities	2	\$30,000,000
All Categories	12	\$86,674,654
Town of Gatesville		
Government	1	\$9,781,467

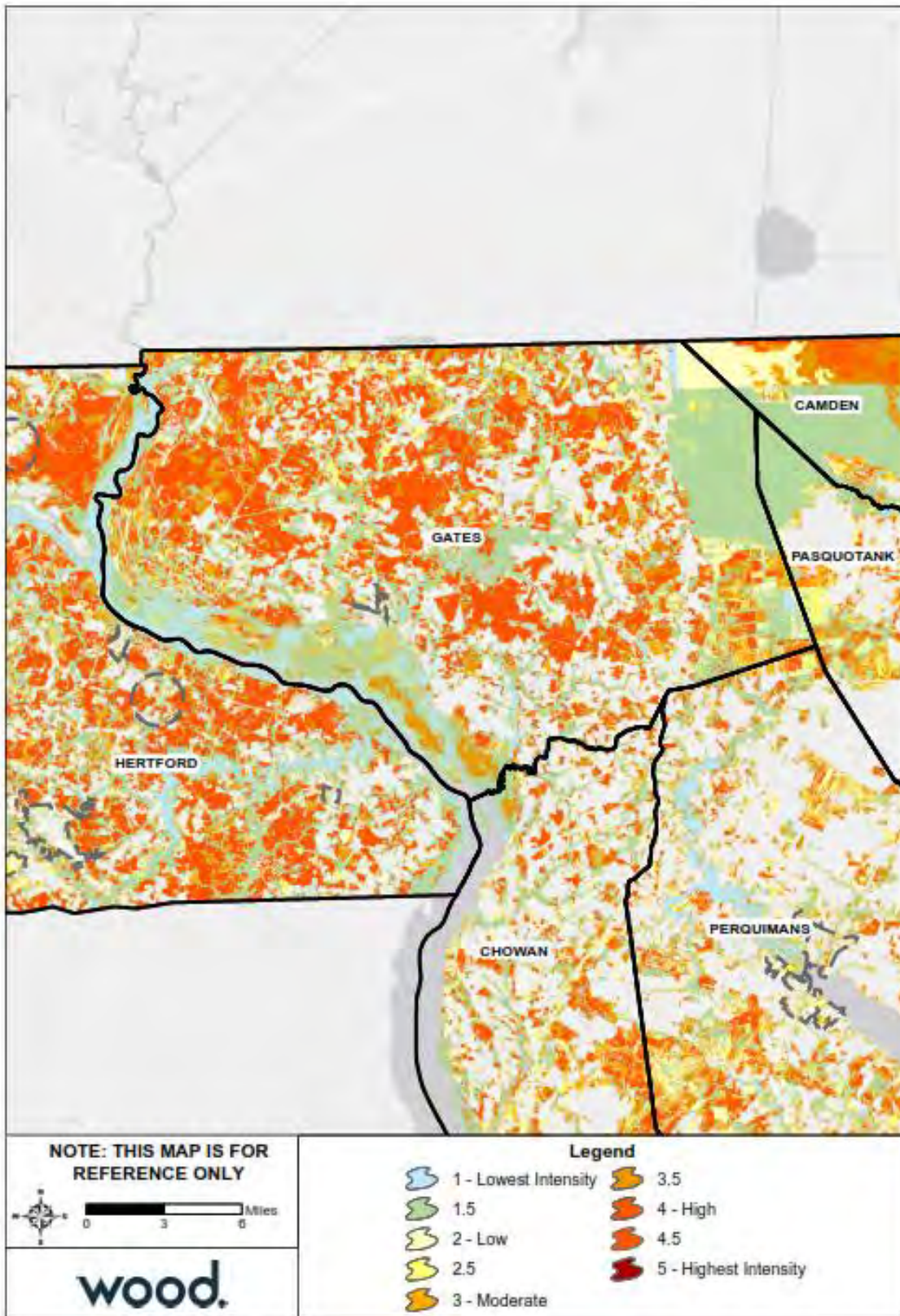
Source: NCEM Risk Management Tool

Figure C.6 – Wildland Urban Interface, Gates County



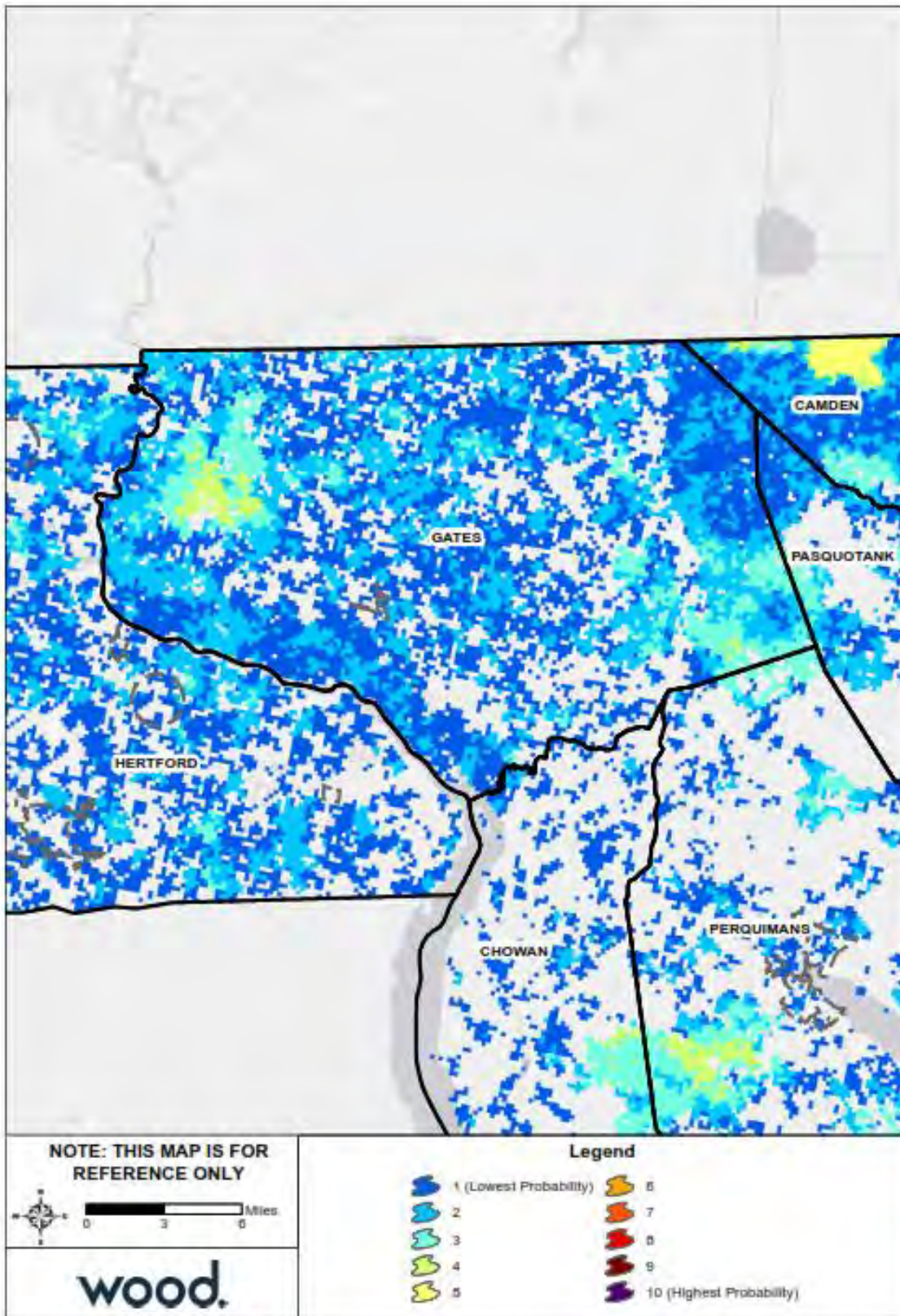
Source: Southern Wildfire Risk Assessment

Figure C.7 – Fire Intensity Scale, Gates County



Source: Southern Wildfire Risk Assessment

Figure C.8 – Burn Probability, Gates County



Source: Southern Wildfire Risk Assessment

C.3 CAPABILITY ASSESSMENT

C.3.1 Overall Capability

Details on the tools and resources in place and available to Gates County were provided by the County’s HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Gates County has an overall capability rating of High. Gates County provides many resources for its incorporated jurisdictions and many of the mitigation projects in this plan are regional in nature, with the County serving as the project lead; therefore, the County’s capability is also an indicator for its incorporated areas. The County’s Self-Assessment of key capability areas is summarized in Table C.13 below.

Table C.13 – Capability Self-Assessment, Gates County

Capability Area	Rating
Plans, Ordinances, Codes and Programs	High
Administrative and Technical Capability	High
Fiscal Capability	High
Education and Outreach Capability	High
Mitigation Capability	High
Political Capability	High
Overall Capability	High

C.3.2 Floodplain Management

The following tables reflect NFIP entry dates as well as policy and claims data for Gates County and Gatesville, categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

Table C.14 – NFIP Program Entry Dates

Community	Regular Entry Date
Gates County (Unincorporated Area)	July 16, 1991
Town of Gatesville	May 13, 1977

Source: FEMA Community Information System

Table C.15 – NFIP Policy and Claims Data by Structure Type

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Gates County Unincorporated Area					
Single Family	68	\$38,305	\$15,485,700	16	\$223,065.84
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	15	\$35,491	\$4,670,400	2	\$33,638.32
Total	83	\$73,796	\$20,156,100	18	\$256,704.16
Town of Gatesville					
Single Family	1	\$320	\$210,000	0	\$0.00
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	3	\$7,273	\$1,370,000	3	\$159,447.25
Total	4	\$7,593	\$1,580,000	3	\$159,447.25

Source: FEMA Community Information System, accessed November 2019

ANNEX C: GATES COUNTY

Table C.16 – NFIP Policy and Claims Data by Flood Zone

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Gates County Unincorporated Area					
A01-30 & AE Zones	38	\$51,925	\$7,992,200	4	\$20,946.89
A Zones	2	\$3,346	\$1,000,000	5	\$145,827.36
B, C & X Zone					
Standard	10	\$4,834	\$1,727,000	3	\$49,142.58
Preferred	32	\$13,091	\$9,402,000	6	\$40,787.33
Total	82	\$73,196	\$20,121,200	18	\$256,704.16
Town of Gatesville					
B, C & X Zone					
Standard	3	\$7,273	\$1,370,000	2	\$154,342.81
Preferred	1	\$320	\$210,000	1	\$5,104.44
Total	4	\$7,593	\$1,580,000	3	\$159,447.25

Source: FEMA Community Information System, accessed November 2019

Table C.17 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Gates County Unincorporated Area					
A01-30 & AE Zones	12	\$19,203	\$1,668,600	1	\$5,830.97
A Zones	0	\$0	\$0	5	\$145,827.36
B, C & X Zone					
Standard	5	\$1,982	\$742,000	3	\$49,142.58
Preferred	16	\$5,810	\$4,417,000	2	\$14,639.65
Total	33	\$26,995	\$6,827,600	11	\$215,440.56
Town of Gatesville					
B, C & X Zone					
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$320	\$210,000	0	\$0.00
Total	1	\$320	\$210,000	0	\$0.00

Source: FEMA Community Information System, accessed November 2019

Table C.18 – NFIP Policy and Claims Data Post-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Gates County Unincorporated Area					
A01-30 & AE Zones	26	\$32,722	\$6,323,600	3	\$15,115.92
A Zones	2	\$3,346	\$1,000,000	0	\$0.00
B, C & X Zone					
Standard	5	\$2,852	\$985,000	0	\$0.00
Preferred	16	\$7,281	\$4,985,000	4	\$26,147.68
Total	49	\$46,201	\$13,293,600	7	\$41,263.60
Town of Gatesville					
B, C & X Zone					
Standard	3	\$7,273	\$1,370,000	3	\$159,447.25
Preferred	0	\$0	\$0	1	\$5,104.44
Total	3	\$7,273	\$1,370,000	3	\$159,447.25

Source: FEMA Community Information System, accessed November 2019

Albemarle Region

C.4 MITIGATION STRATEGY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
GAT1	Establish a county-wide program focused on clearing and snagging watercourses and arterial ditches to open waterways by clearing debris throughout the county to minimize localized flooding.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDEQ, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	Gates County carries this effort out annually and will continue to do so through implementation of this plan.
GAT2	Support the expansion of US Highway 13/158 to facilitate greater evacuation capacity.	Gates County, Gatesville	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	1	1.1	ES	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Function of NCDOT Regional Transportation Improvement Program	GF, NCDOT	Ongoing – As Funds Become Available	Not Started – Carry Forward	The County continues to support this strategy and will do so until the project is funded and constructed through efforts associated with the County Transportation Improvement Plan.
GAT3	Expand efforts to provide public awareness of local hazard mitigation planning and emergency response procedures through the use of social media, local news outlets, and public meetings.	Gates County, Gatesville	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County currently undertakes these efforts and will continue to expand upon these efforts through implementation of this plan.
GAT4	Annually, or as deemed necessary, review and amend when necessary the flood damage prevention ordinance and ensure regulations are in place to mitigate potential losses from events.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS	Ongoing – As necessary	In Progress – Carry Forward	The County will amend the County Flood Damage Prevention Ordinance as necessary.
GAT5	Annually review hazard mitigation plan strategies and actions as they pertain to the County’s Land Use Plan and Land Development Regulations, including incorporation of floodplain mapping.	Gates County, Gatesville	All Hazards	1	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDEQ, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County will continue to utilize the Hazard Mitigation Plan when making determinations and decisions regarding Land Use Policy.
GAT6	Increase emergency management training opportunities for local government personnel.	Gates County, Gatesville	All Hazards	4	4.2	ES	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County carries out this strategy; however, through implementation of this plan, the County will work to improve upon these efforts.
GAT7	Increase community awareness of wildlife-related issues and wildland fire safety by utilizing the Firewise program and its resources (www.firewise.org).	Gates County, Gatesville	Wildfire	4	4.1	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NC Forest Service, NCDPS	Ongoing - Annually	In Progress – Not Started	The County, through implementation of this plan, will work to incorporate Firewise recommendations into existing land development regulations, as well as land use policy.
GAT8	Further educate the public regarding methods to address structural mitigation and residing within the floodplain through public meetings and ongoing outreach efforts.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PP	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, NCDPS, FEMA	Ongoing - Annually	In Progress – Carry Forward	The County currently undertakes these efforts but will improve upon this program through implementation of this plan.
GAT9	Increase EMS and law enforcement personnel resources through the County’s annual capital improvement budgeting process.	Gates County, Gatesville	All Hazards	1	1.1	ES	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDPS	2 to 3 years	Not Started – Carry Forward	The County will consider increasing these staffing levels in association with annual budget deliberations.

ANNEX C: GATES COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
GAT1 0	Work closely with utility service providers to keep power/utility right-of-way clear by routinely pruning trees and clearing tree limbs.	Gates County, Gatesville	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado, Radiological Incident	1	1.1	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	Staff Time	GF, Utility Service Providers, NCDPS	Ongoing - Annually	In Progress – Carry Forward	This effort will continue to be carried out by the County in an effort to minimize the impacts of natural disasters on central services, most importantly the electrical grid.
GAT1 1	Investigate the potential advantages and disadvantages, if any, of joining the NFIP's Community Rating System (CRS). Consider making application to the CRS program during the five year implementation of this plan.	Gates County, Gatesville	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	GF, NCDPS, FEMA	2 to 3 years	Not Started – Carry Forward	The County, as well as the Town of Gatesville will consider joining the Community Rating System program through implementation of this plan.
GAT1 2	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Gates County, Gatesville	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A
GAT1 3	Continue to work towards the Implementation of all projects defined within the Hurricane Matthew Resilient Redevelopment Plan	Gates County, Gatesville	Dam & Levee Failure, Drought, Earthquake, Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.3	P	<ul style="list-style-type: none"> County Administration County Board of Commissioners Municipal Administration 	To Be Determined	General Fund, NCDPS, NCDEQ, NCDOT	Ongoing – As funding is available	New	N/A

Annex D Hertford County

D.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Hertford County, including information on population, asset exposure, housing, and economy.

Geography

Figure D.1 on the following page shows a base map of Hertford County and participating jurisdictions.

Population and Demographics

Table D.1 provides population counts and growth estimates for Hertford County and participating jurisdictions as compared to the County overall. Table D.2 provides demographic information for the County.

Table D.1 – Population Counts, Hertford County, 2000-2017

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Ahoskie	4739	5039	4895	6.3%	-2.9%	3.3%
Cofield	347	413	331	19.0%	-19.9%	-4.6%
Como	78	91	86	16.7%	-5.5%	10.3%
Harrellsville	102	106	113	3.9%	6.6%	10.8%
Murfreesboro	2,045	2,835	2,952	38.6%	4.1%	44.4%
Winton	956	769	947	-19.6%	23.1%	-0.9%
Municipalities	8267	9253	9324	11.9%	0.8%	12.8%
Unincorporated Areas	22,601	24,669	24,262	9.2%	-1.6%	7.3%
Hertford County	30,868	33,922	33,586	9.9%	-1.0%	8.8%

Source: US Census Bureau American Community Survey.

Table D.2 – Racial Demographics, Hertford County, 2017

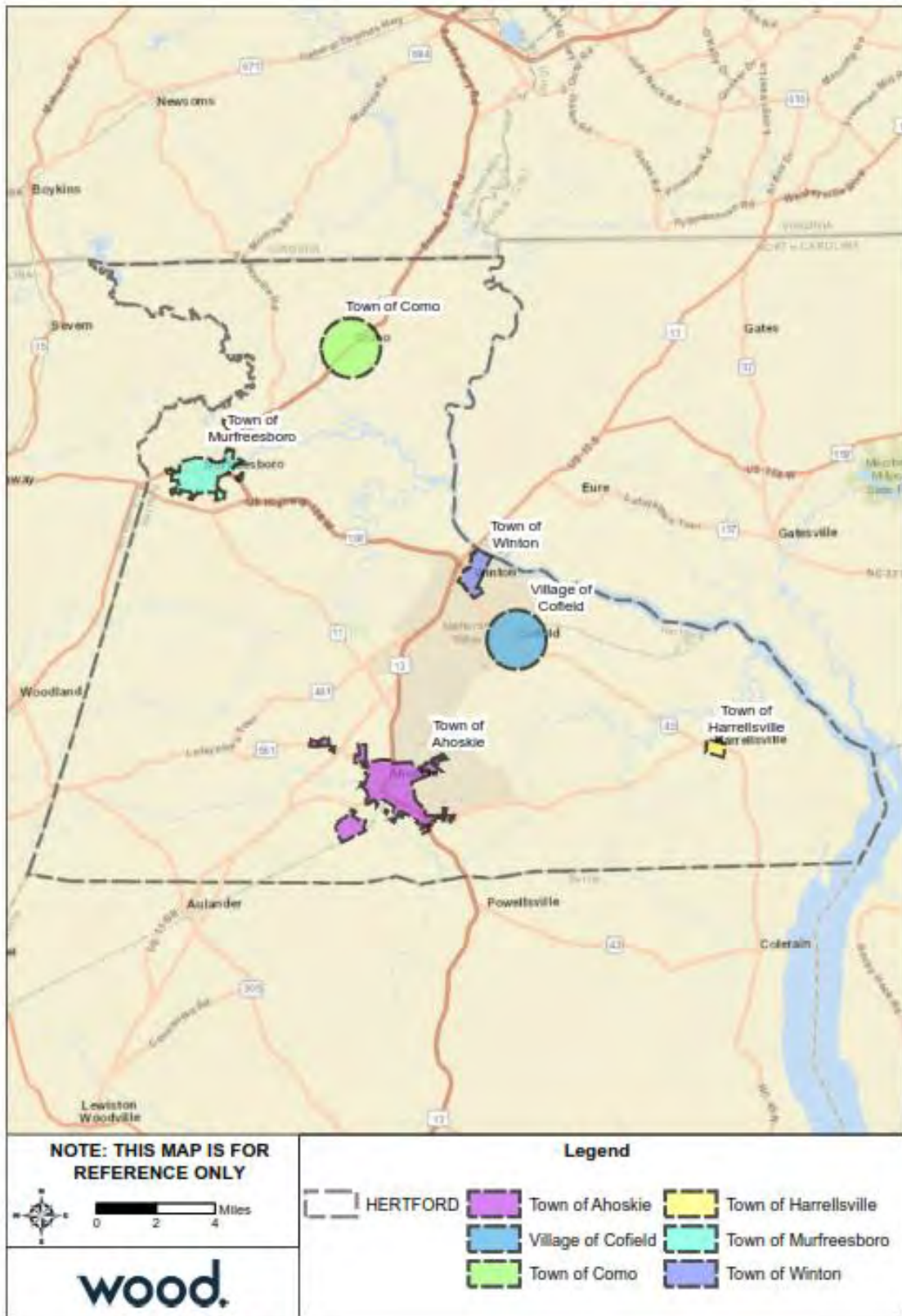
Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Ahoskie	27.9%	65.6%	0.8%	3.6%	2.0%	4.6%
Cofield	16.3%	81.9%	0.0%	1.8%	0.0%	0.0%
Como	66.3%	25.6%	0.0%	0.0%	8.1%	0.0%
Harrellsville	64.6%	35.4%	0.0%	0.0%	0.0%	1.8%
Murfreesboro	46.6%	51.1%	0.2%	0.0%	2.1%	4.8%
Winton	27.6%	66.3%	0.0%	0.4%	5.7%	1.5%
Hertford County	35.5%	58.0%	0.7%	2.3%	3.4%	3.7%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Figure D.1 – Jurisdictional Locations, Hertford County



ANNEX D: HERTFORD COUNTY

Asset Inventory

The following tables summarize the asset inventory for Hertford County unincorporated and incorporated areas in order to estimate the total physical exposure to hazards in this area. Note that the counts are by building.

Table D.3 – Critical Infrastructure & Key Resources by Type

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Other	Total
Unincorporated Hertford County	2,712	0	0	320	0	136	0	102	12	0	0	0	0	10	26	0	60	0	3,378
Town of Ahoskie	34	6	0	480	0	70	0	126	70	0	0	0	0	66	2	0	30	2	886
Town of Como	42	0	0	10	0	0	0	4	0	0	0	0	0	0	0	0	2	0	58
Town of Harrellsville	0	0	0	20	0	0	0	8	0	0	0	0	0	0	0	0	2	0	30
Town of Murfreesboro	120	0	0	222	0	28	0	110	12	0	0	0	0	26	0	0	14	4	536
Town of Winton	0	0	0	90	0	14	0	44	2	0	0	0	0	2	0	0	8	0	160
Village of Cofield	18	0	0	20	0	58	0	4	0	0	0	0	0	0	4	0	4	0	108
Hertford County Total	2,926	6	0	1,162	0	306	0	398	96	0	0	0	0	104	32	0	120	6	5,156

Source: NCEM Risk Management Tool

Table D.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Unincorporated Hertford County	2	0	8	12	0	0	50	72
Town of Ahoskie	6	30	2	6	0	2	18	64
Town of Como	-	-	-	-	-	-	-	-
Town of Harrellsville	-	-	-	-	-	-	-	-
Town of Murfreesboro	0	8	2	30	0	2	2	44
Town of Winton	0	0	0	6	0	0	0	6
Village of Cofield	0	0	6	0	0	0	4	10
Hertford County Total	8	38	18	54	0	4	74	196

Source: NCEM Risk Management Tool

Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

ANNEX D: HERTFORD COUNTY

Housing

The table below details key housing statistics for Hertford County. As a percent of growth from 2010 housing, Hertford County's housing stock has grown by 1.3%.

Table D.5 – Housing Statistics, Hertford County, 2010-2017

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Ahoskie	2,309	2,328	0.8%	67.2%	17.1%
Cofield	216	222	2.8%	74.8%	33.8%
Como	47	39	-17.0%	85.7%	10.3%
Harrellsville	53	58	9.4%	72.2%	20.0%
Murfreesboro	1,107	1,184	7.0%	53.7%	12.5%
Winton	393	420	6.9%	53.7%	19.3%
Hertford County	10,509	10,645	1.3%	67.2%	16.6%

Source: US Census Bureau American Community Survey.

Economy

The following tables present key economic statistics for Hertford County.

Table D.6 – Economic Indicators, Hertford County, 2017

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Ahoskie	53.7%	46.0%	7.6%	46.3%	14.2%
Cofield	48.5%	46.4%	2.0%	51.5%	4.2%
Como	58.9%	58.9%	0.0%	41.1%	0.0%
Harrellsville	69.7%	61.8%	7.9%	30.3%	11.3%
Murfreesboro	47.9%	43.5%	4.4%	52.1%	9.2%
Winton	49.0%	40.6%	8.2%	51.0%	16.8%
Hertford County	50.8%	45.5%	5.1%	49.2%	10.0%

Source: US Census Bureau American Community Survey.

Table D.7 – Employment by Industry, Hertford County, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Ahoskie	30.9%	24.6%	18.3%	5.3%	21.0%
Cofield	36.5%	30.7%	8.0%	9.5%	15.3%
Como	25.6%	16.3%	20.9%	23.3%	14.0%
Harrellsville	27.7%	10.6%	25.5%	23.4%	12.8%
Murfreesboro	38.3%	16.2%	26.6%	8.5%	10.4%
Winton	23.3%	30.5%	9.9%	7.9%	28.4%
Hertford County	29.7%	22.2%	21.0%	8.1%	19.0%

Source: US Census Bureau American Community Survey.

D.2 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority by jurisdiction in Hertford County than for the Albemarle Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have

Albemarle Region

Regional Hazard Mitigation Plan
2020

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variations in risk that could be evaluated quantitatively on a jurisdictional level. The hazards included in this section are flood and wildfire.

D.2.1 Flood

Table D.8 details the acreage of Hertford County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, at over 20 percent of the total area, the unincorporated areas of the county have the most land in the SFHA. Conversely, none of Harrellsville and less than 1 percent of Cofield are within the SFHA. Overall, over 21 percent of Hertford County falls within the SFHA.

Table D.8 – Flood Zone Acreage by Jurisdiction, Hertford County

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Hertford							
Unincorporated County	0	45,531	1,214	174,879	0	221,624	20.5%
Ahoskie	0	246	38	2,499	0	2,783	8.8%
Cofield	0	17	68	1,924	0	2,009	0.8%
Como	0	54	0	2,015	0	2,069	2.6%
Harrellsville	0	0	0	185	0	185	0.0%
Murfreesboro	0	109	54	1,302	0	1,465	7.4%
Winton	0	39	0	507	0	546	7.1%

Source: FEMA Effective DFIRM

Figure D.2 through Figure D.7 reflect the effective mapped flood hazard zones for all jurisdictions with land in the Special Flood Hazard Area in Hertford County, and Figure D.8 through Figure D.13 display the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

Table D.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and flood event in Hertford County and incorporated jurisdictions. Table D.10 provides building counts and estimated damages for High Potential Loss Structures in the 1%-annual-chance floodplain.

Table D.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Hertford County Unincorporated Areas			
Commercial Facilities	500 Year	4	\$12,096
Critical Manufacturing	10 Year	1	\$42,865
	25 Year	1	\$42,865
	50 Year	1	\$42,865
	100 Year	1	\$42,865
	500 Year	1	\$48,626
Food and Agriculture	10 Year	3	\$41,568
	25 Year	3	\$41,568
	50 Year	3	\$41,568
	100 Year	3	\$41,568
	500 Year	14	\$113,250
All Categories	10 Year	4	\$84,433
	25 Year	4	\$84,433

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	50 Year	4	\$84,433
	100 Year	4	\$84,433
	500 Year	19	\$173,972
Town of Ahoskie			
Commercial Facilities	10 Year	1	\$639
	25 Year	1	\$639
	50 Year	1	\$639
	100 Year	1	\$639
	500 Year	9	\$112,885
Healthcare and Public Health	10 Year	1	\$8,475
	25 Year	1	\$8,475
	50 Year	1	\$8,475
	100 Year	1	\$8,475
	500 Year	2	\$160,644
All Categories	10 Year	2	\$9,114
	25 Year	2	\$9,114
	50 Year	2	\$9,114
	100 Year	2	\$9,114
	500 Year	11	\$273,529
Town of Murfreesboro			
Transportation Systems	10 Year	1	\$204,202
	25 Year	1	\$204,202
	50 Year	1	\$204,202
	100 Year	1	\$204,202
	500 Year	1	\$893,848

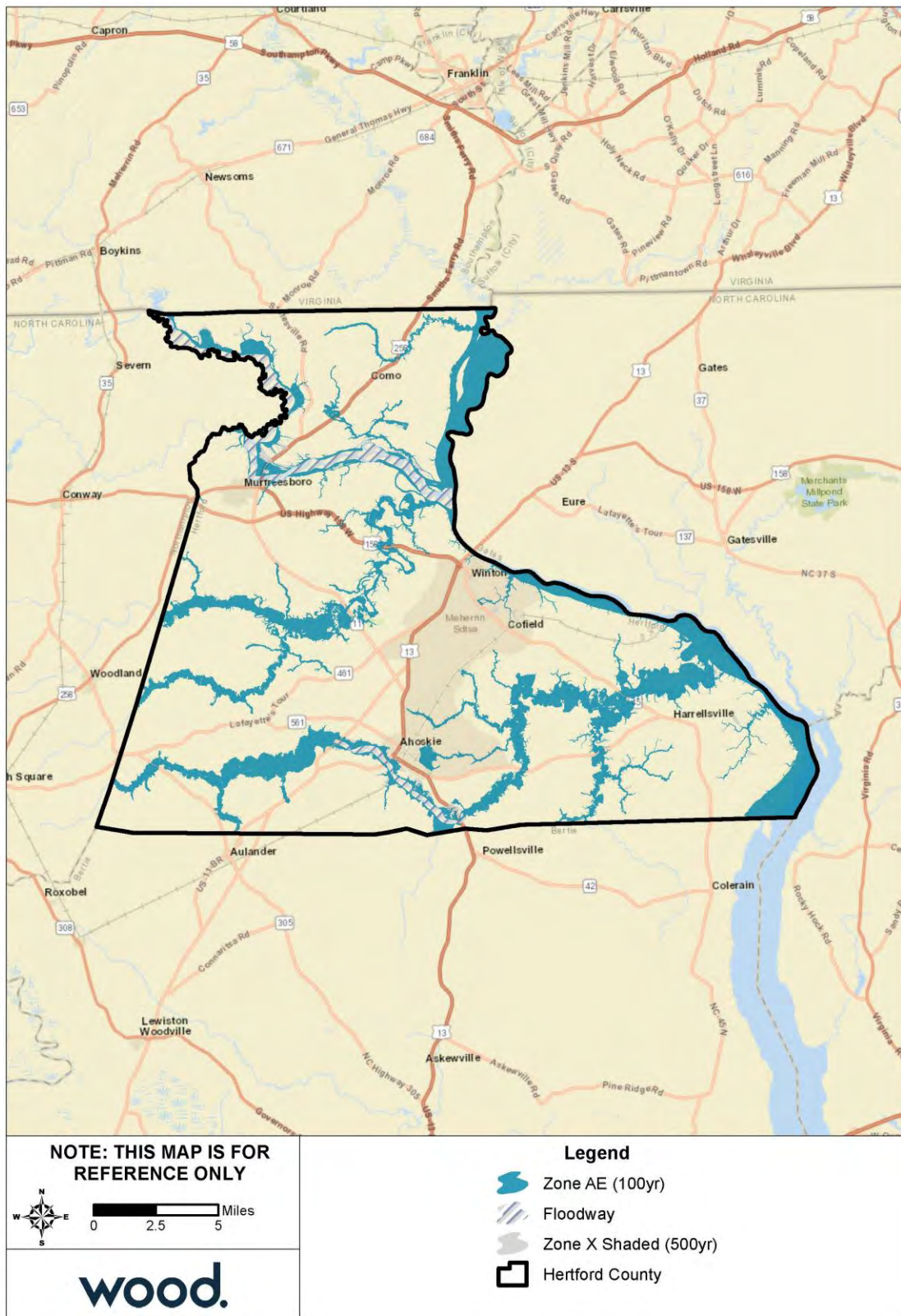
Source: NCEM Risk Management Tool

Table D.10 – High Potential Loss Properties Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Town of Ahoskie			
Residential	10 Year	1	\$45,225
	25 Year	1	\$45,225
	50 Year	1	\$45,225
	100 Year	1	\$45,225
	500 Year	1	\$81,324

Source: NCEM Risk Management Tool

Figure D.2 – FEMA Flood Hazard Areas, Unincorporated Hertford County



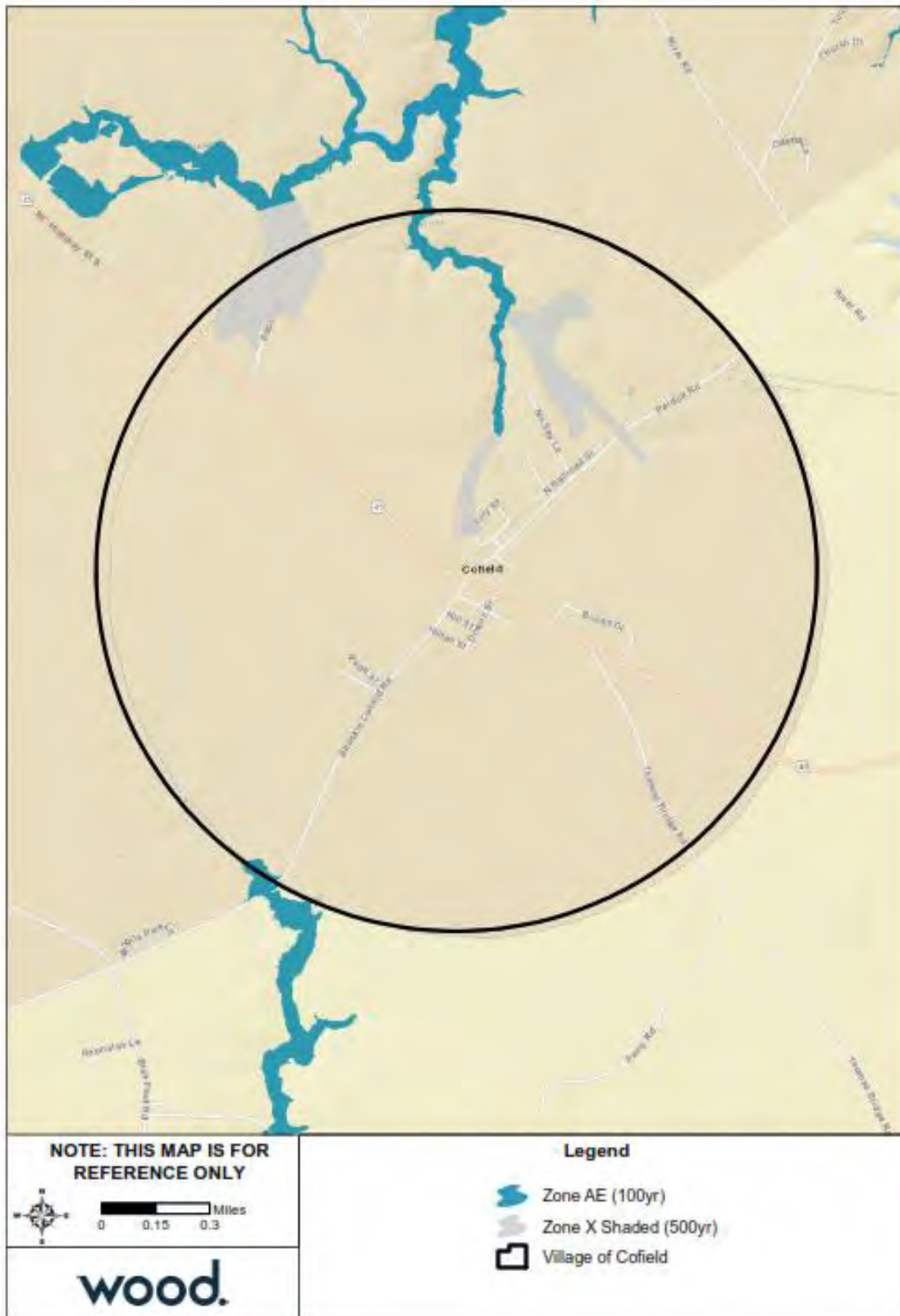
Source: FEMA Effective DFIRM

Figure D.3 – FEMA Flood Hazard Areas, Town of Ahoskie



Source: FEMA Effective DFIRM

Figure D.4 – FEMA Flood Hazard Areas, Village of Cofield



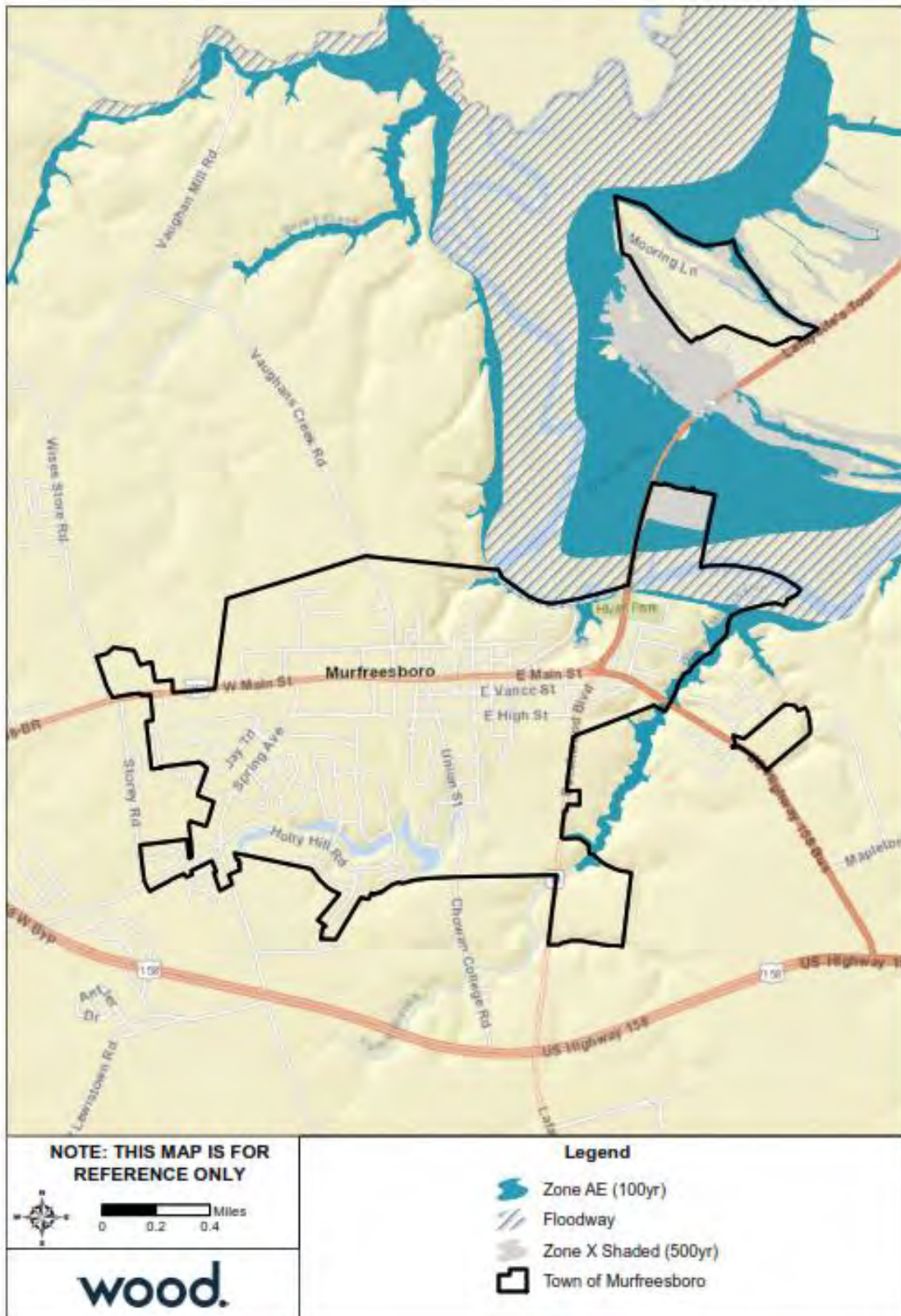
Source: FEMA Effective DFIRM

Figure D.5 – FEMA Flood Hazard Areas, Town of Como



Source: FEMA Effective DFIRM

Figure D.6 – FEMA Flood Hazard Areas, Town of Murfreesboro



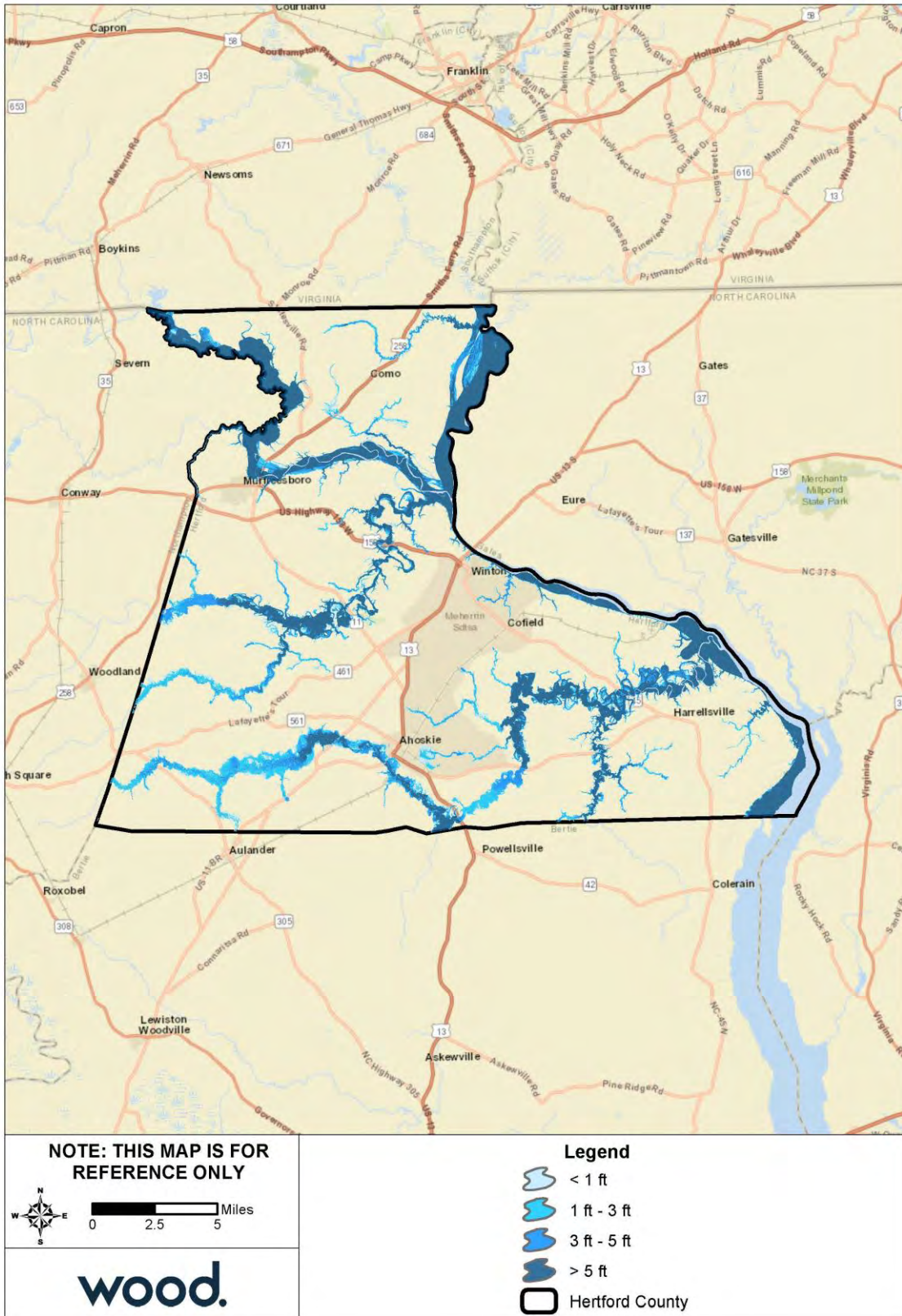
Source: FEMA Effective DFIRM

Figure D.7 – FEMA Flood Hazard Areas, Town of Winton



Source: FEMA Effective DFIRM

Figure D.8 – Flood Depth, 1%-Annual-Chance Floodplain, Unincorporated Hertford County



Source: FEMA Effective DFIRM

Figure D.9 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Ahoskie



Source: FEMA Effective DFIRM

Figure D.10 – Flood Depth, 1%-Annual-Chance Floodplain, Village of Cofield



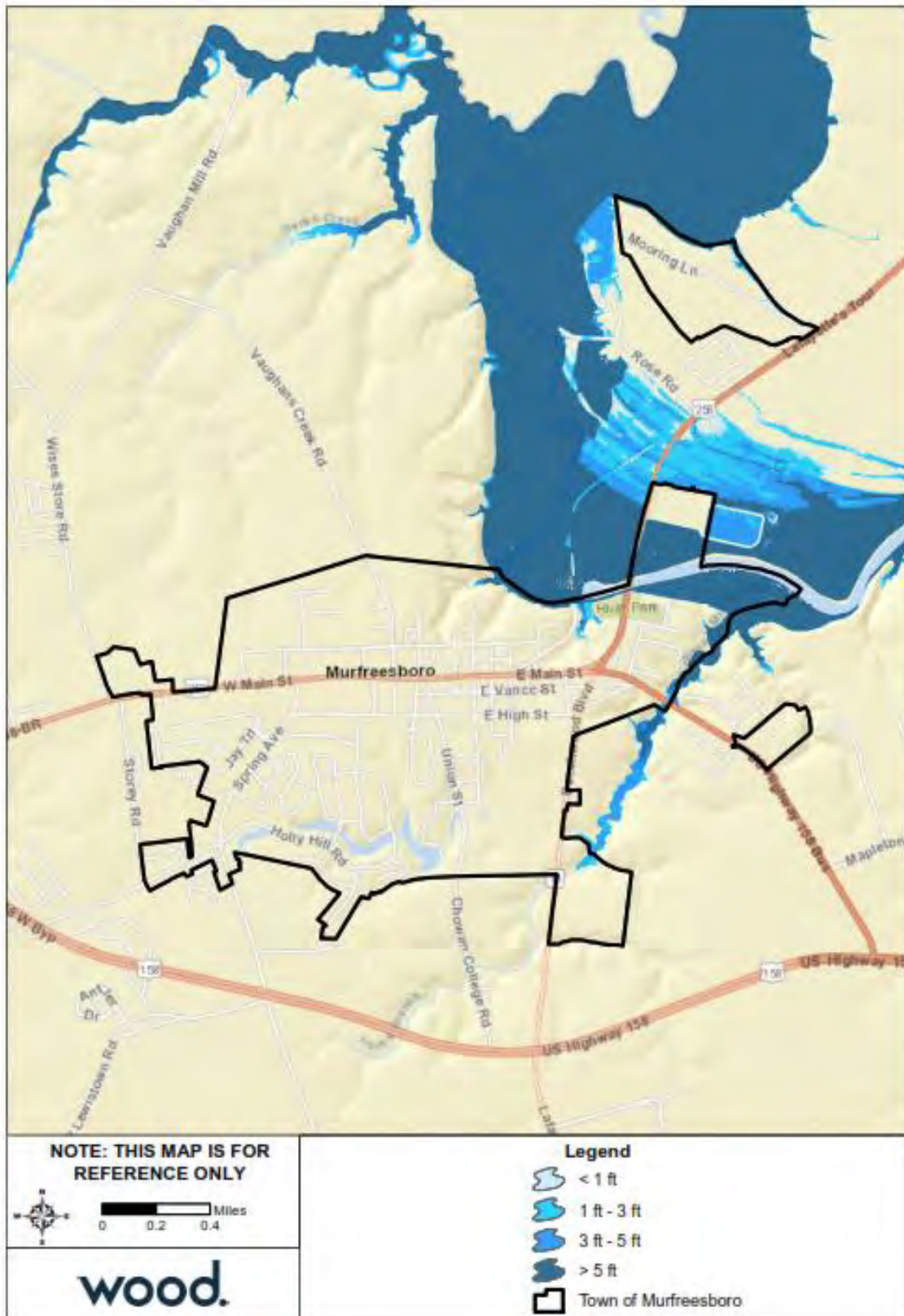
Source: FEMA Effective DFIRM

Figure D.11 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Como



Source: FEMA Effective DFIRM

Figure D.12 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Murfreesboro



Source: FEMA Effective DFIRM

Figure D.13 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Winton



Source: FEMA Effective DFIRM

D.2.2 Wildfire

Table D.11 summarizes the acreage in Hertford County that falls within the Wildland Urban Interface (WUI), categorized by housing density. Areas in the WUI are those where development may intermix with flammable vegetation. Nearly 58 percent of Hertford County is not included in the WUI.

Table D.11 – Wildland Urban Interface Acreage, Hertford County

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	133,228.74	57.8%
	LT 1hs/40ac	42,300.55	18.4%
	1hs/40ac to 1hs/20ac	18,402.94	8.0%
	1hs/20ac to 1hs/10ac	16,305.83	7.1%
	1hs/10ac to 1hs/5ac	9,757.63	4.2%
	1hs/5ac to 1hs/2ac	6,274.86	2.7%
	1hs/2ac to 3hs/1ac	4,073.11	1.8%
	GT 3hs/1ac	125.23	0.1%
	Total	230,468.88	

Source: Southern Wildfire Risk Assessment

Figure D.14 depicts the WUI for Hertford County and all participating jurisdictions. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure D.15 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure D.16 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Areas of high potential fire intensity are spread throughout Hertford County. There is a cluster of moderate burn probability along the southern border of the county, which coincides with an area of heightened potential fire intensity. Elsewhere in the county, burn probability is low. WUI is also scattered throughout the county, and there is some overlap throughout unincorporated areas between WUI, burn probability, and high potential fire intensity. Additionally, while risk is low in most incorporated areas, in Cofield there is overlap of high potential fire intensity and WUI.

Table D.12 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Hertford County and participating jurisdictions. Table D.13 provides counts and estimated damages for High Potential Loss Properties in these areas.

Table D.12 – Critical Facilities Exposed to Wildfire by Jurisdiction, Hertford County

Sector	Number of Buildings at Risk	Estimated Damages
Hertford County Unincorporated Area		
Commercial Facilities	75	\$56,286,747
Critical Manufacturing	41	\$71,841,637
Energy	8	\$140,000,001
Food and Agriculture	383	\$25,897,970
Government Facilities	33	\$31,084,522
Healthcare and Public Health	6	\$4,841,313
Transportation Systems	2	\$584,472

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Sector	Number of Buildings at Risk	Estimated Damages
Water	9	\$1,100,000
All Categories	557	\$331,636,662
Town of Ahoskie		
Banking and Finance	1	\$321,248
Commercial Facilities	129	\$103,631,514
Critical Manufacturing	18	\$17,023,036
Energy	1	\$100,000,000
Food and Agriculture	2	\$288,340
Government Facilities	29	\$24,209,486
Healthcare and Public Health	16	\$10,632,258
Other	1	\$1,543,973
Transportation Systems	22	\$26,713,869
Water	13	\$54,841,433
All Categories	232	\$339,205,157
Village of Cofield		
Commercial Facilities	9	\$2,515,921
Critical Manufacturing	15	\$10,323,663
Energy	2	\$10,000,000
Food and Agriculture	7	\$131,607
Government Facilities	2	\$350,692
Water	2	\$100,000
All Categories	37	\$23,421,883
Town of Murfreesboro		
Commercial Facilities	21	\$8,634,524
Critical Manufacturing	6	\$1,814,791
Food and Agriculture	10	\$459,600
Government Facilities	24	\$44,332,320
Healthcare and Public Health	2	\$640,900
Transportation Systems	2	\$6,617,808
Water	1	\$60,000,000
All Categories	66	\$122,499,943
Town of Winton		
Commercial Facilities	31	\$14,695,226
Critical Manufacturing	6	\$36,133,872
Government Facilities	4	\$3,911,603
Healthcare and Public Health	1	\$138,891
Water	3	\$350,000
All Categories	45	\$55,229,592

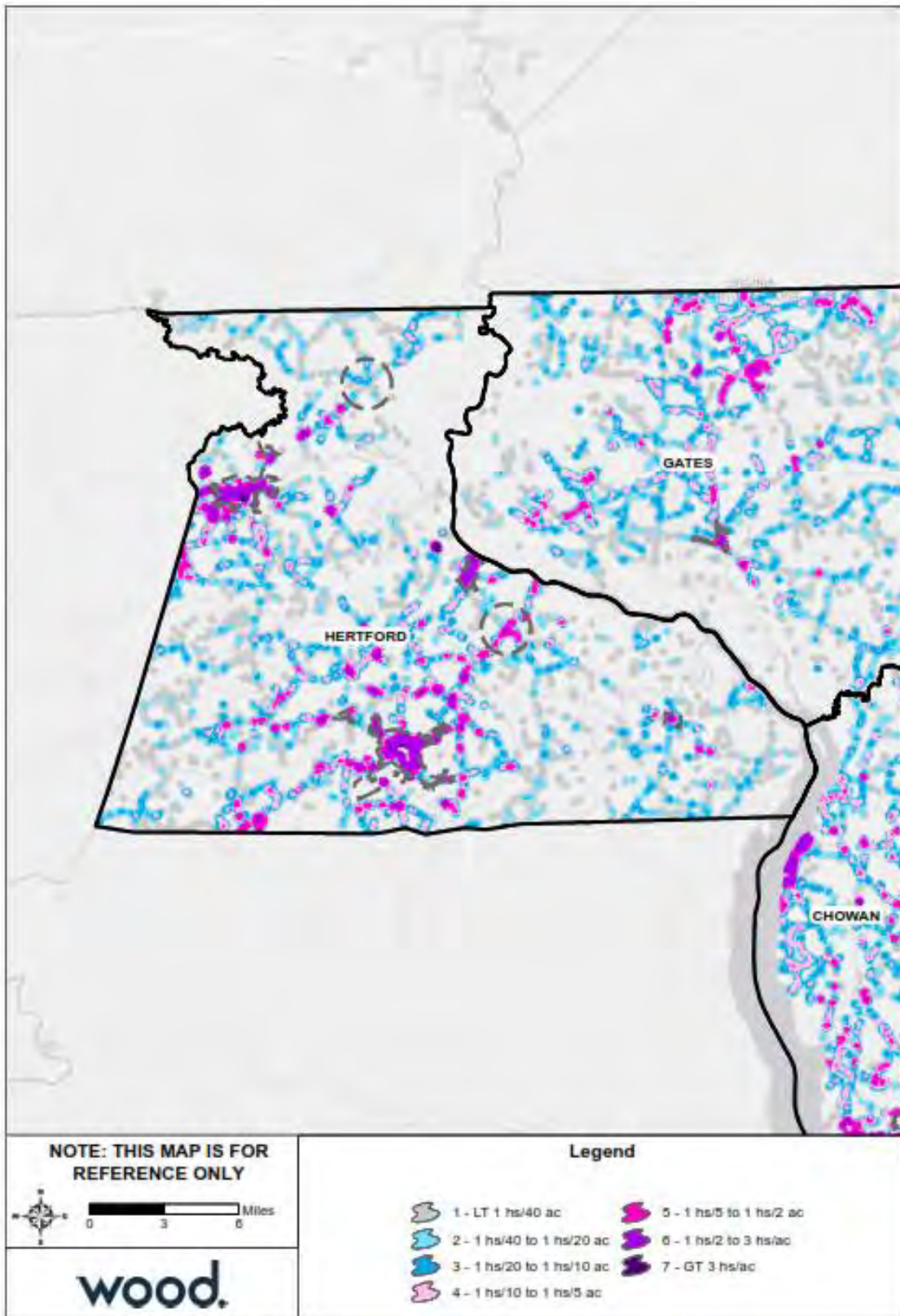
Source: NCEM Risk Management Tool

Table D.13 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Hertford County

Sector	Number of Buildings at Risk	Estimated Damages
Hertford County Unincorporated Area		
Government	5	\$18,462,433
Industrial	4	\$61,702,860
Utilities	8	\$140,000,001
All Categories	17	\$220,165,294
Town of Ahoskie		
Commercial	10	\$50,761,593
Government	2	\$9,672,466
Industrial	1	\$6,074,317
Religious	1	\$1,305,418
Residential	2	\$3,223,173
Utilities	9	\$154,410,655
All Categories	25	\$225,447,622
Village of Cofield		
Industrial	1	\$2,884,120
Utilities	2	\$10,000,000
All Categories	3	\$12,884,120
Town of Murfreesboro		
Commercial	1	\$3,816,355
Government	7	\$36,253,548
Utilities	1	\$60,000,000
All Categories	9	\$100,069,903

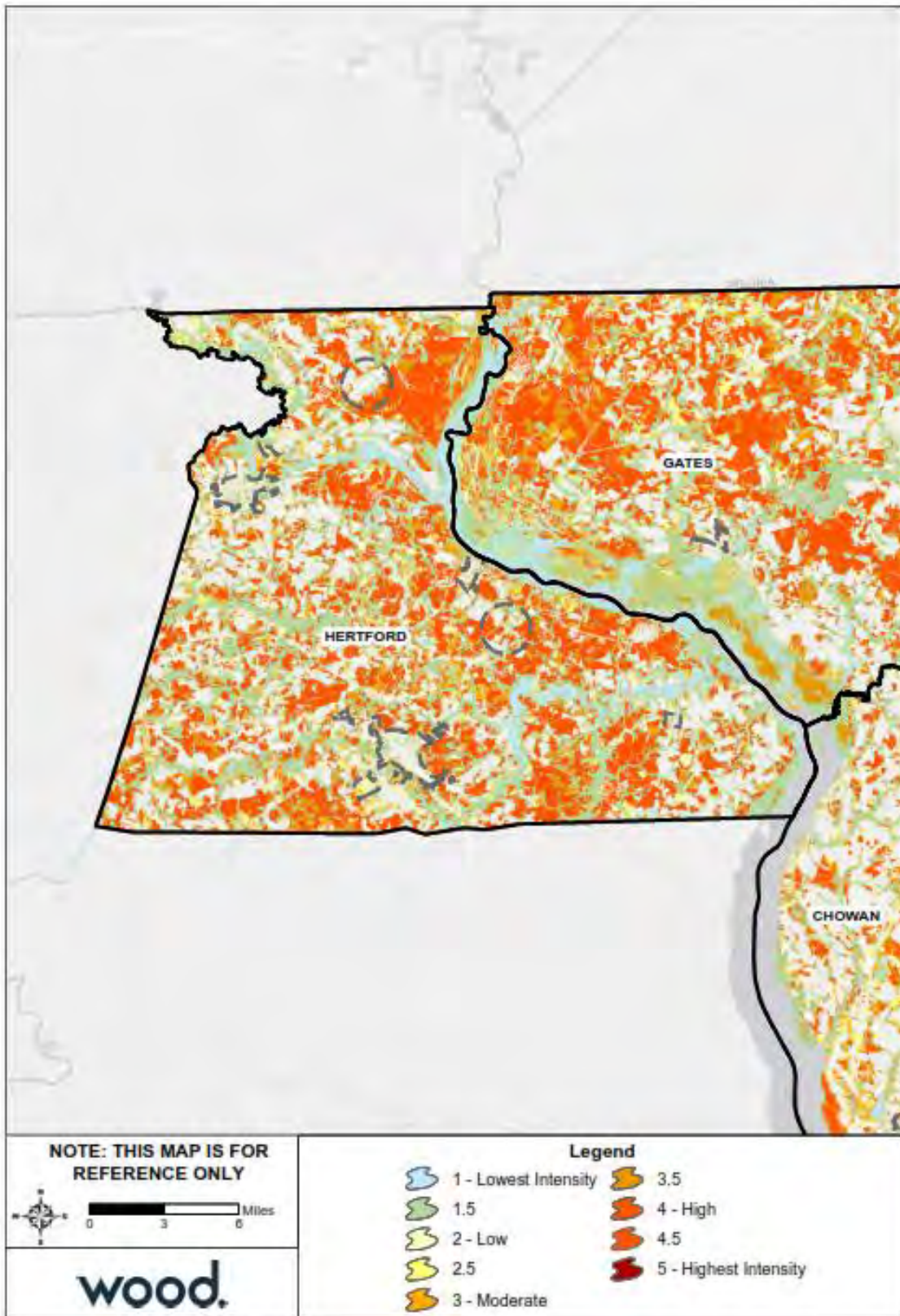
Source: NCEM Risk Management Tool

Figure D.14 – Wildland Urban Interface, Hertford County



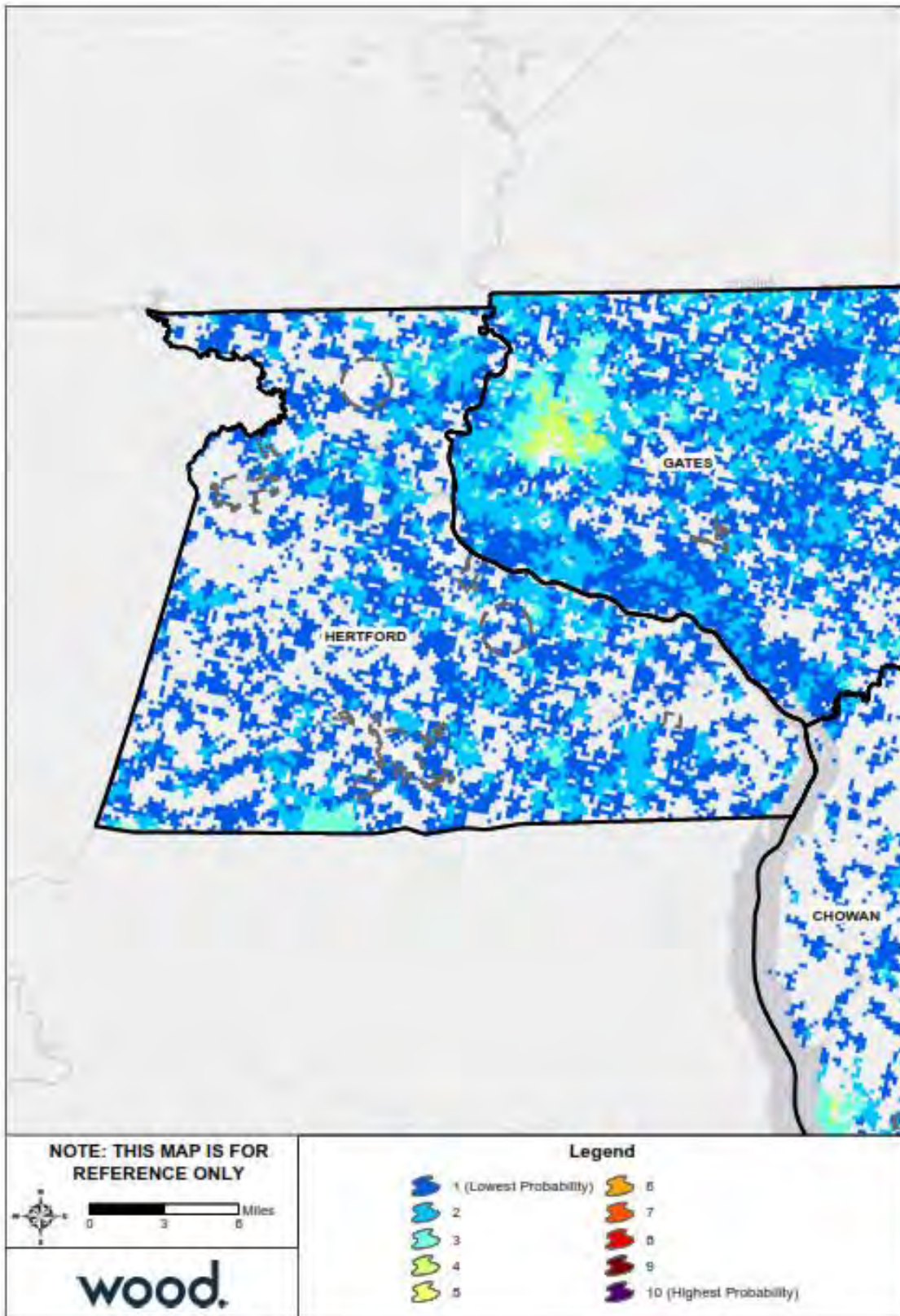
Source: Southern Wildfire Risk Assessment

Figure D.15 – Fire Intensity Scale, Hertford County



Source: Southern Wildfire Risk Assessment

Figure D.16 – Burn Probability, Hertford County



Source: Southern Wildfire Risk Assessment

D.3 CAPABILITY ASSESSMENT

D.3.1 Overall Capability

Details on the tools and resources in place and available to Hertford County were provided by the County’s HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Hertford County has an overall capability rating of High, however the County self-assessed its overall capability as Moderate. Hertford County provides many resources for its incorporated jurisdictions and many of the mitigation projects in this plan are regional in nature, with the County serving as the project lead; therefore, the County’s capability is also an indicator for its incorporated areas. The County’s Self-Assessment of key capability areas is summarized in Table D.14 below.

Table D.14 – Capability Self-Assessment, Hertford County

Capability Area	Rating
Plans, Ordinances, Codes and Programs	Moderate
Administrative and Technical Capability	Moderate
Fiscal Capability	Moderate
Education and Outreach Capability	Moderate
Mitigation Capability	Moderate
Political Capability	Moderate
Overall Capability	Moderate

D.3.2 Floodplain Management

The following tables reflect NFIP entry dates as well as policy and claims data for Hertford County and incorporated jurisdictions, categorized by structure type, flood zone, Pre-FIRM and Post-FIRM. Note: The Town of Como is a participant in the NFIP but there are no active policies or past claims in the Town.

Table D.15 – NFIP Program Entry Dates

Community	Regular Entry Date
Hertford County (Unincorporated Area)	November 11, 1999
Town of Ahoskie	May 1, 1987
Village of Cofield	August 3, 2009
Town of Como	December 12, 2007
Town of Harrellsville	Not Participating
Town of Murfreesboro	June 1, 1987
Town of Winton	July 1, 1987

Source: FEMA Community Information System

Table D.16 – NFIP Policy and Claims Data by Structure Type

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Hertford County Unincorporated Area					
Single Family	68	\$43,553	\$15,328,000	53	\$1,094,542.97
2-4 Family	1	\$307	\$140,000	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	7	\$14,480	\$1,184,200	8	\$330,971.42
Total	76	\$58,340	\$16,652,200	61	\$1,425,514.39
Town of Ahoskie					

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Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Single Family	15	\$6,823	\$3,567,000	56	\$768,958.78
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	7	\$23,014	\$3,406,300	3	\$675,634.09
Total	22	\$29,837	\$6,973,300	59	\$1,444,592.87
Village of Cofield					
Single Family	1	\$345	\$210,000	0	\$0.00
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	0	\$0	\$0	0	\$0.00
Total	1	\$345	\$210,000	0	\$0.00
Town of Murfreesboro					
Single Family	3	\$1,074	\$700,000	0	\$0.00
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	1	\$406	\$508,000	0	\$0.00
Non Residential	0	\$0	\$0	0	\$0.00
Total	4	\$1,480	\$1,208,000	0	\$0.00
Town of Winton					
Single Family	2	\$978	\$525,000	2	\$31,122.87
Total	2	\$978	\$525,000	2	\$31,122.87

Source: FEMA Community Information System, accessed November 2019

Table D.17 – NFIP Policy and Claims Data by Flood Zone

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Hertford County Unincorporated Area					
A01-30 & AE Zones	20	\$30,861	\$3,724,500	2	\$168,135.83
A Zones	7	\$5,627	\$1,319,300	18	\$458,760.38
B, C & X Zone					
Standard	7	\$6,998	\$1,031,500	5	\$175,665.88
Preferred	41	\$14,254	\$10,542,000	30	\$577,896.23
Total	75	\$57,740	\$16,617,300	55	\$1,380,458.32
Town of Ahoskie					
A01-30 & AE Zones	4	\$10,984	\$1,137,000	0	\$0.00
A Zones	0	\$0	\$0	3	\$56,821.32
B, C & X Zone					
Standard	4	\$13,438	\$2,306,300	16	\$795,089.37
Preferred	14	\$5,415	\$3,530,000	38	\$573,894.68
Total	22	\$29,837	\$6,973,300	57	\$1,425,805.37
Village of Cofield					
Preferred	1	\$345	\$210,000	0	\$0.00
Total	1	\$345	\$210,000	0	\$0.00
Town of Murfreesboro					
Preferred	4	\$1,480	\$1,208,000	0	\$0.00
Total	4	\$1,480	\$1,208,000	0	\$0.00
Town of Winton					
A01-30 & AE Zones	1	\$655	\$350,000	0	\$0.00

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Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
A Zones	0	\$0	\$0	1	\$12,000.00
B, C & X Zone					
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$323	\$175,000	1	\$19,122.87
Total	2	\$978	\$525,000	2	\$31,122.87

Source: FEMA Community Information System, accessed November 2019

Table D.18 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Hertford County Unincorporated Area					
A01-30 & AE Zones	11	\$24,037	\$1,348,200	0	\$0.00
A Zones	3	\$2,906	\$500,800	17	\$449,579.87
B, C & X Zone	37	\$16,976	\$8,493,500	27	\$559,707.70
Standard	5	\$6,196	\$751,500	5	\$175,665.88
Preferred	32	\$10,780	\$7,742,000	22	\$384,041.82
Total	51	\$43,919	\$10,342,500	44	\$1,009,287.57
Town of Ahoskie					
A01-30 & AE Zones	3	\$6,616	\$637,000	0	\$0.00
A Zones	0	\$0	\$0	3	\$56,821.32
B, C & X Zone	16	\$16,135	\$5,286,300	49	\$1,331,426.51
Standard	3	\$11,301	\$1,856,300	15	\$792,772.87
Preferred	13	\$4,834	\$3,430,000	34	\$538,653.64
Total	19	\$22,751	\$5,923,300	52	\$1,388,247.83
Village of Cofield					
B, C & X Zone	1	\$345	\$210,000	0	\$0.00
Preferred	1	\$345	\$210,000	0	\$0.00
Total	1	\$345	\$210,000	0	\$0.00
Town of Murfreesboro					
B, C & X Zone	1	\$378	\$210,000	0	\$0.00
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$378	\$210,000	0	\$0.00
Total	1	\$378	\$210,000	0	\$0.00
Town of Winton					
A Zones	0	\$0	\$0	1	\$12,000.00
B, C & X Zone	1	\$323	\$175,000	0	\$0.00
Preferred	1	\$323	\$175,000	0	\$0.00
Total	1	\$323	\$175,000	1	\$12,000.00

Source: FEMA Community Information System, accessed November 2019

Table D.19 – NFIP Policy and Claims Data Post-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Hertford County Unincorporated Area					
A01-30 & AE Zones	9	\$6,824	\$2,376,300	2	\$168,135.83
A Zones	4	\$2,721	\$818,500	1	\$9,180.51
B, C & X Zone	11	\$4,276	\$3,080,000	8	\$193,854.41

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Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Standard	2	\$802	\$280,000	0	\$0.00
Preferred	9	\$3,474	\$2,800,000	8	\$193,854.41
Total	24	\$13,821	\$6,274,800	11	\$371,170.75
Town of Ahoskie					
A01-30 & AE Zones	1	\$4,368	\$500,000	0	\$0.00
B, C & X Zone	2	\$2,718	\$550,000	5	\$37,557.54
Standard	1	\$2,137	\$450,000	1	\$2,316.50
Preferred	1	\$581	\$100,000	4	\$35,241.04
Total	3	\$7,086	\$1,050,000	5	\$37,557.54
Town of Murfreesboro					
B, C & X Zone	3	\$1,102	\$998,000	0	\$0.00
Standard	0	\$0	\$0	0	\$0.00
Preferred	3	\$1,102	\$998,000	0	\$0.00
Total	3	\$1,102	\$998,000	0	\$0.00
Town of Winton					
A01-30 & AE Zones	1	\$655	\$350,000	0	\$0.00
B, C & X Zone	0	\$0	\$0	1	\$19,122.87
Standard	0	\$0	\$0	0	\$0.00
Preferred	0	\$0	\$0	1	\$19,122.87
Total	1	\$655	\$350,000	1	\$19,122.87

Source: FEMA Community Information System, accessed November 2019

D.4 MITIGATION STRATEGY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
HER1	Improve upon efforts to inform citizens of the location and availability of shelters and evacuation routes in the event of a natural disaster. These efforts will utilize local print and television media outlets, social networking, as well as Town and County websites. The County will also evaluate all shelter facilities to ensure that they all meet American Red Cross (ARC) standards.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	2	2.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administration County Public Works Municipal Public Works 	Staff Time	GF, Grant Funds, American Red Cross	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work towards improving upon the availability and education regarding established shelter facilities throughout the County.
HER2	Maintain continuous contact/working relationship with electric service providers in the County to address the following: (1) disaster preparedness techniques (e.g. tree trimming, vegetation planting requirements, pole replacement); (2) Identify critical electrical facilities needing retrofit or upgrade and map with elevation reference marks; and (3) communication with County officials during and immediately after a natural hazard event that results in loss of electrical power.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	4	4.2	P	<ul style="list-style-type: none"> County Emergency Management Municipal Administration Electrical Utility Providers 	Staff Time	GF, Electric Service Providers	Ongoing – Annually	In Progress – Carry Forward	The County will establish a protocol to meet with Utility Service Providers annually to prepare for the impact of natural disasters, in particular tropical storms and hurricanes.
HER3	Maintain, and where necessary, establish backup generators at all identified critical facilities. Additionally, County Emergency Services will evaluate the equipment on a regular basis to assure it continues to meet operational demands at county facilities.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	1	1.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations County Public Works Municipal Public Works 	To Be Determined	GF, Grant Funds, Utility Providers	Ongoing – As Funding Becomes Available	In Progress – Carry Forward	The County will continue to establish backup generators in locations that do not currently have one as funding becomes available.
HER4	Retrofit all County and Municipal facilities for lightning protection.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail)	1	1.1	PP	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations County Public Works Municipal Public Works 	To Be Determined	GF, Grant Funds, Utility Providers	Ongoing – As Funding Becomes Available	In Progress – Carry Forward	The County will work with electric service providers to establish funding and a solution for addressing this strategy.
HER5	Support through local ordinances conservation easements on all flood-prone property and impose such easements on all properties acquired with public assistance funds.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.2	PP	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations County Public Works Municipal Public Works 	Staff Time	Acquired through donation	Ongoing – as opportunities arise	In Progress – Carry Forward	The County will continue to accept conservation easements as opportunities arise through the development process.
HER6	Provide annual review of development restrictions in floodplain areas and maintain initiatives to ensure limited residential and commercial development in the floodplain and optimal protection of critical facilities.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	1	1.3	PP	<ul style="list-style-type: none"> County Emergency Management County Administration Municipal Administrations 	Staff Time	GF, Grant Funds	Ongoing - Annually	In Progress – Carry Forward	The County will review development regulations annually in an attempt to identify methods to improve the resiliency of development in flood prone areas.
HER7	The HMPC will review "firewise" zoning and subdivision standards and recommend their appropriateness for incorporation into existing or new zoning or subdivision ordinances. (Source http://www.firewise.org)	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Wildfire	4	4.1	P	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	GF, Grant Funds, US Forest Service	2 to 3 years	Not Started – Carry Forward	The County will make it a priority to undertake this effort during the planning period.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
HER8	Review county and municipal zoning, subdivision, and flood damage prevention ordinances for improved control of flooding hazards and improvement of drainage.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	PP	<ul style="list-style-type: none"> County Inspections County Administration Municipal Administrations 	Staff Time	GF, NCDPS	Ongoing – as need arises	In Progress – Carry Forward	The County will undertake this effort as the need arises.
HER9	Adopt and annually update a capital improvements plan with an emphasis on mitigation for critical facilities.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	1	1.1	P	<ul style="list-style-type: none"> County Administration Municipal Administrations 	Staff Time	GF	Ongoing - Annually	In Progress – Carry Forward	This will be addressed through the County's annual budgeting process.
HER10	At the local government staff level, work with the North Carolina Dept. of Transportation (NCDOT) and the Regional Planning Organization to identify drainage problem areas; develop resolutions for drainage issues created by NCDOT facilities, including inspections of channels, retention basins; and, as needed, pursue debris removal.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	NRP	<ul style="list-style-type: none"> County Emergency Management County Administration Municipal Administrations NCDOT 	Staff Time	GF	Ongoing – as need arises	In Progress – Carry Forward	The County will work with NCDOT, as well as all participating municipal jurisdictions to carry out this strategy.
HER11	Apply for all available funding from the Hazard Mitigation Grant Program (HMGP) and other funds to assist with the mitigation of severe repetitive loss properties by relocating structures out of the floodplain.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2	NRP	<ul style="list-style-type: none"> County Emergency Management County Administration Municipal Administrations 	To Be Determined	GF, Grant Funding	Ongoing – As opportunities arise	In Progress – Carry Forward	The County will continue to carry out this strategy as is necessary following natural hazard events.
HER12	Inspect debris blockage problems and secure funds for the clearance of debris from rivers, streams and tributaries.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	NRP	<ul style="list-style-type: none"> County Soil and Water Conservation County Administration Municipal Administrations 	To Be Determined	GF	2 to 3 years	In Progress – Carry Forward	The County will continue these efforts. The County carries out this process through its annual capital improvements campaign.
HER13	Mail once annually a notice to all property owners whose land is located within a special flood hazard area. This notice should clearly state that the recipients' property is susceptible to flooding. The County will also maintain a flood map information service, whereby County residents can call or come by to receive information regarding their property in relation to the defined floodplain.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PIO	<ul style="list-style-type: none"> County Inspections Municipal Inspections 	\$2,500	GF	Ongoing – Annually	Not Started – Carry Forward	The County will initiate these annual mailings through implementation of this plan.
HER14	Make information regarding hazards and development regulations within the floodplain available through the following: (1) The County Planning Director will ensure that the local library maintains information relating to flooding and flood protection. (Maintain dates of distribution and librarian certification of availability); (2) The County will provide a link on their website to FEMA resources addressing flooding and flood protection. This information will be made available to citizens, realtors, developers, and contractors.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PIO	County Inspections	Staff Time	GF, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	This program is in place and will continue to be provided.
HER15	Coordinate with the Hertford County School System to establish a Hazards Awareness Educational Program for use by educators within the Hertford County School System.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administration County Board of Education 	Staff Time	General Fund	Ongoing – Annually	Not Started – Carry Forward	Hertford County will initiate this program through the implementation of this plan.
HER16	Maintain a registry of special needs individuals which has been coordinated with the Hertford County Department of Social Services. This list will include: (1) Persons on life support systems; (2) Persons dependent on electricity for medical equipment; and (3) Persons with severe mental handicap or mental illness.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	4	4.2	ES	County Emergency Management	Staff Time	GF	Ongoing – Annually	Not Started – Carry Forward	This effort is underway, and the County will continue to expand upon these efforts through implementation of this plan.

ANNEX D: HERTFORD COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
HER17	Maintain a list of all hazardous material sites or transport corridors in Hertford County. This effort will be carried out through the efforts of the County LEPC.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	4	4.2	ES	County Emergency Management	Staff Time	GF	Ongoing – next 5 years	In Progress – Carry Forward	The County maintains an active LEPC and will continue to do so through implementation of this plan.
HER18	Actively work with Federal, State, local and private partners to identify mitigation measures and secure funding via grants to alleviate flooding. These efforts should focus on the following areas: <ul style="list-style-type: none"> • US 13 at Ahoskie Creek • Harrellsville Island • Ahoskie Creek and DT Road • Murfreesboro Drainage and Culverts • Ebo Road Drainage and Culverts • Como Drainage and Culverts 	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> • County Planning & Zoning • County Board of Commissioners 	To Be Determined	General Fund, NCDPS, HMGP, NCDENR	3 to 5 years	New	N/A
HER19	Annually review and update the County's Emergency Operations Plan (EOP) to ensure compliance with all NCEM and NCOEMS procedures and policies. Through these updates, the County will work closely with participating municipal jurisdictions to ensure that all jurisdictions continue to be educated and prepared for activation of the EOP in the event of a disaster event.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> • County Emergency Management • County Board of Commissioners • Town Administrations 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	New	Chowan County, in conjunction with the Town of Edenton will reviews its Emergency Operations Plan annually, specifically the County addresses issues identified through past storm experiences.
HER20	Hertford County, and all participating jurisdictions, will work to implement all recommendations defined within the Hurricane Matthew Resiliency Redevelopment Plan	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	3	3.1	P	<ul style="list-style-type: none"> • County Emergency Management • County Board of Commissioners • Town Administrations 	Staff Time	General Fund, Staff Time, NCDPS, NCDEQ, NCDOT	Other – Once Annually	New	N/A
HER21	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both person and property.	Hertford County, Ahoskie, Cofield, Como, Harrellsville, Murfreesboro, Winton	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> • County Emergency Management • County Planning & Zoning • Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	New	N/A

Annex E Pasquotank County

E.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Pasquotank County, including information on population, asset exposure, housing, and economy.

Geography

Figure E.1 shows a base map of Pasquotank County and participating jurisdictions.

Population and Demographics

Table D.1 provides population counts and growth estimates for unincorporated Pasquotank County and Elizabeth City as compared to the County overall. Table D.2 provides demographic information for the County.

Table E.1 – Population Counts, Pasquotank County, 2000-2017

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Elizabeth City	17,243	18,683	17,732	8.4%	-5.1%	2.8%
Unincorporated Areas	34,897	40,661	39,546	16.5%	-2.7%	13.3%
Pasquotank County	52,140	59,344	57,278	13.8%	-3.5%	9.9%

Source: US Census Bureau American Community Survey.

Table E.2 – Racial Demographics, Pasquotank County, 2017

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Elizabeth City	44.2%	52.0%	0.8%	1.1%	1.9%	6.6%
Pasquotank County	58.8%	36.3%	1.7%	0.9%	2.4%	4.9%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Figure E.1 – Jurisdictional Locations, Pasquotank County



ANNEX E: PASQUOTANK COUNTY

Asset Inventory

The following tables summarize the asset inventory for Pasquotank County unincorporated and incorporated areas in order to estimate the total physical exposure to hazards in this area. The locations of critical facilities are shown in Figure E.2 and Figure E.3. Note, if there is no map for the jurisdiction, data was unavailable in iRisk. Critical facilities are a subset of identified assets from the Critical Infrastructure & Key Resources dataset. Note that the counts are by building; where a critical facility comprises a cluster of buildings, each building is counted and displayed.

Table E.3 – Critical Infrastructure & Key Resources by Type

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Unincorporated Pasquotank County	602	2	0	349	0	213	5	116	17	0	0	0	0	79	0	5	25	1,413
City of Elizabeth City	35	29	0	678	4	168	1	157	81	0	0	1	0	104	6	3	17	1,284
Pasquotank County Total	637	31	0	1,027	4	381	6	273	98	0	0	1	0	183	6	8	42	2,697

Source: NCEM Risk Management Tool

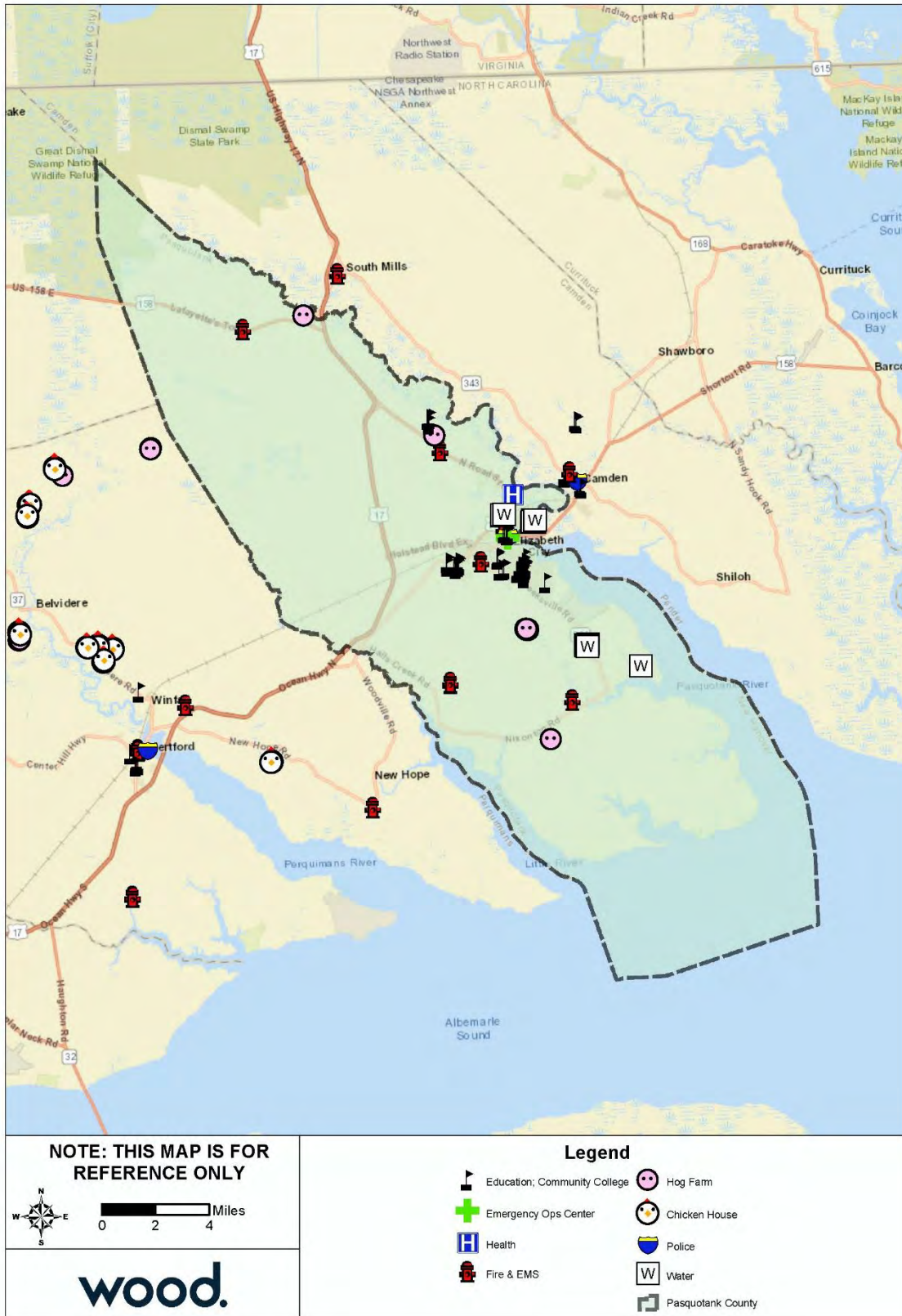
Table E.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Unincorporated Pasquotank County	0	9	2	29	0	1	0	41
City of Elizabeth City	6	40	1	50	0	11	1	109
Pasquotank County Total	6	49	3	79	0	12	1	150

Source: NCEM Risk Management Tool

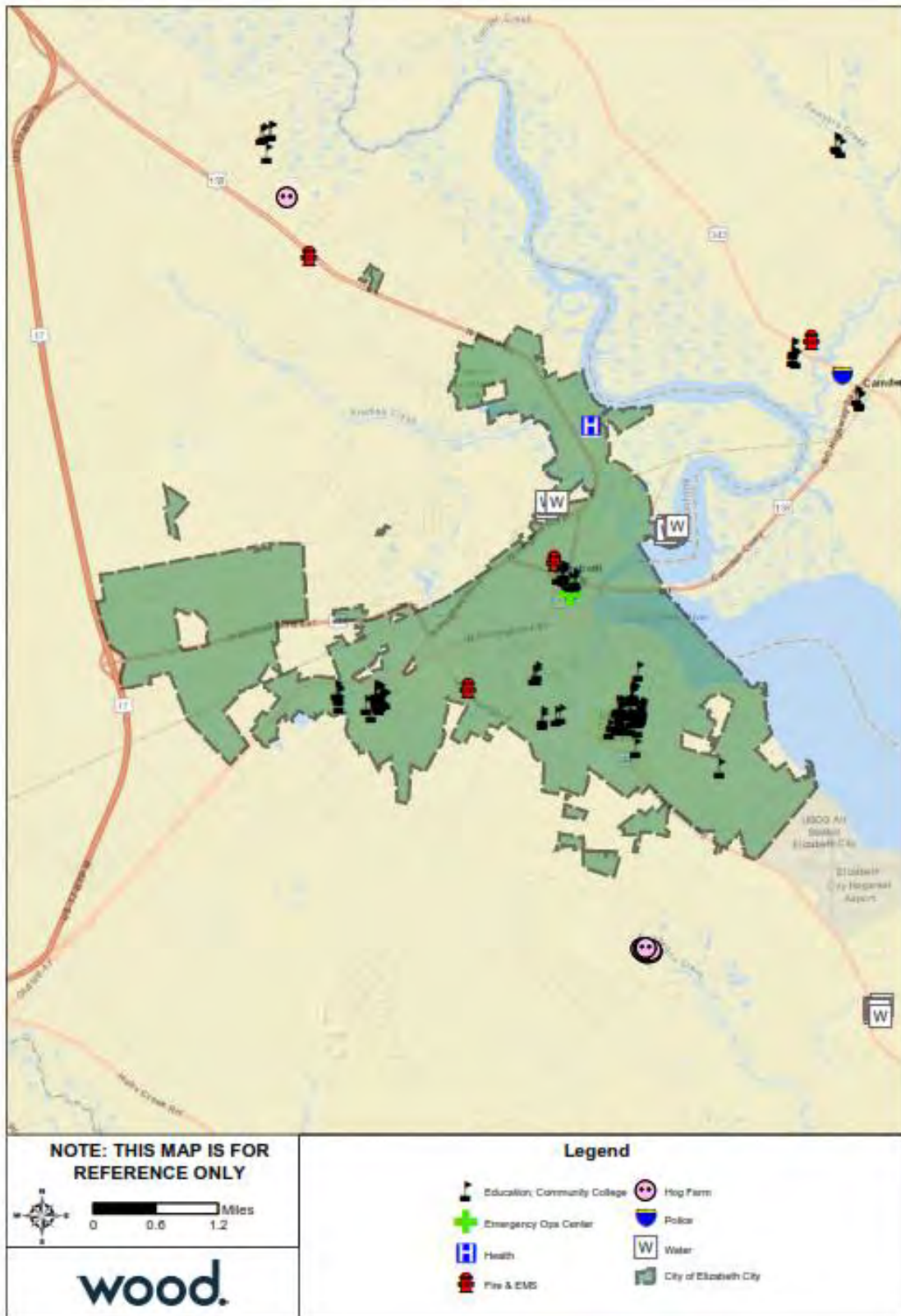
Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

Figure E.2 – Critical Facilities, Pasquotank County



Source: NCEM IRISK Database, GIS Analysis

Figure E.3 – Critical Facilities, City of Elizabeth City



Source: NCEM IRISK Database, GIS Analysis

ANNEX E: PASQUOTANK COUNTY

Housing

The table below details key housing statistics for Pasquotank County. As a percent of growth from 2010 housing, Pasquotank County's housing stock has grown by 3.3%.

Table E.5 – Housing Statistics, Pasquotank County, 2010-2017

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Elizabeth City	8,482	8,097	-4.5%	38.2%	18.7%
Pasquotank County	16,488	17,027	3.3%	60.5%	14.1%

Source: US Census Bureau American Community Survey.

Economy

The following tables present key economic statistics for Pasquotank County.

Table E.6 – Economic Indicators, Pasquotank County, 2017

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Elizabeth City	55.4%	48.6%	5.1%	44.6%	9.5%
Pasquotank County	57.5%	51.6%	3.9%	42.5%	7.0%

Source: US Census Bureau American Community Survey.

Table E.7 – Employment by Industry, Pasquotank County, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Elizabeth City	31.7%	23.1%	23.0%	10.5%	11.7%
Pasquotank County	32.6%	19.2%	24.8%	12.9%	10.5%

Source: US Census Bureau American Community Survey.

E.2 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority by jurisdiction in Pasquotank County than for the Albemarle Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have variations in risk that could be evaluated quantitatively on a jurisdictional level. The hazards included in this section are flood and wildfire.

E.2.1 Flood

Table E.8 details the acreage of Pasquotank County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment roughly a third of both unincorporated Pasquotank County and Elizabeth City are within the 1%-annual-chance floodplain.

Table E.8 – Flood Zone Acreage by Jurisdiction, Pasquotank County

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Pasquotank							
Unincorporated County	7,343	46,888	5,582	115,925	2,738	178,476	30.4%
Elizabeth City	2	2,681	752	4,421	0	7,856	34.2%

Source: FEMA Effective DFIRMs; GIS analysis

Figure E.4 and Figure E.5 reflect the effective mapped flood hazard zones for Pasquotank County and Elizabeth City, and Figure E.6 and Figure E.7 display the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

Table E.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Pasquotank County and incorporated jurisdictions. Table E.10 provides building counts and estimated damages for High Potential Loss Structures in the 1%-annual-chance floodplain.

Table E.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Pasquotank County Unincorporated Areas			
Commercial Facilities	100 Year	6	\$31,615
Critical Manufacturing	100 Year	11	\$39,024
Defense Industrial Base	100 Year	1	\$3,535
Food and Agriculture	100 Year	27	\$13,321
Government Facilities	100 Year	1	\$1,854
Healthcare and Public Health	100 Year	1	\$2,838
Transportation Systems	100 Year	2	\$6,071
All Categories	100 Year	49	\$98,258
City of Elizabeth City			
Banking and Finance	100 Year	1	\$2,050
Commercial Facilities	100 Year	36	\$186,338
Communications	100 Year	1	\$2,774
Critical Manufacturing	100 Year	22	\$34,875
Government Facilities	100 Year	1	\$4,032
Healthcare and Public Health	100 Year	4	\$15,671
Transportation Systems	100 Year	9	\$98,815
All Categories	100 Year	74	\$344,555

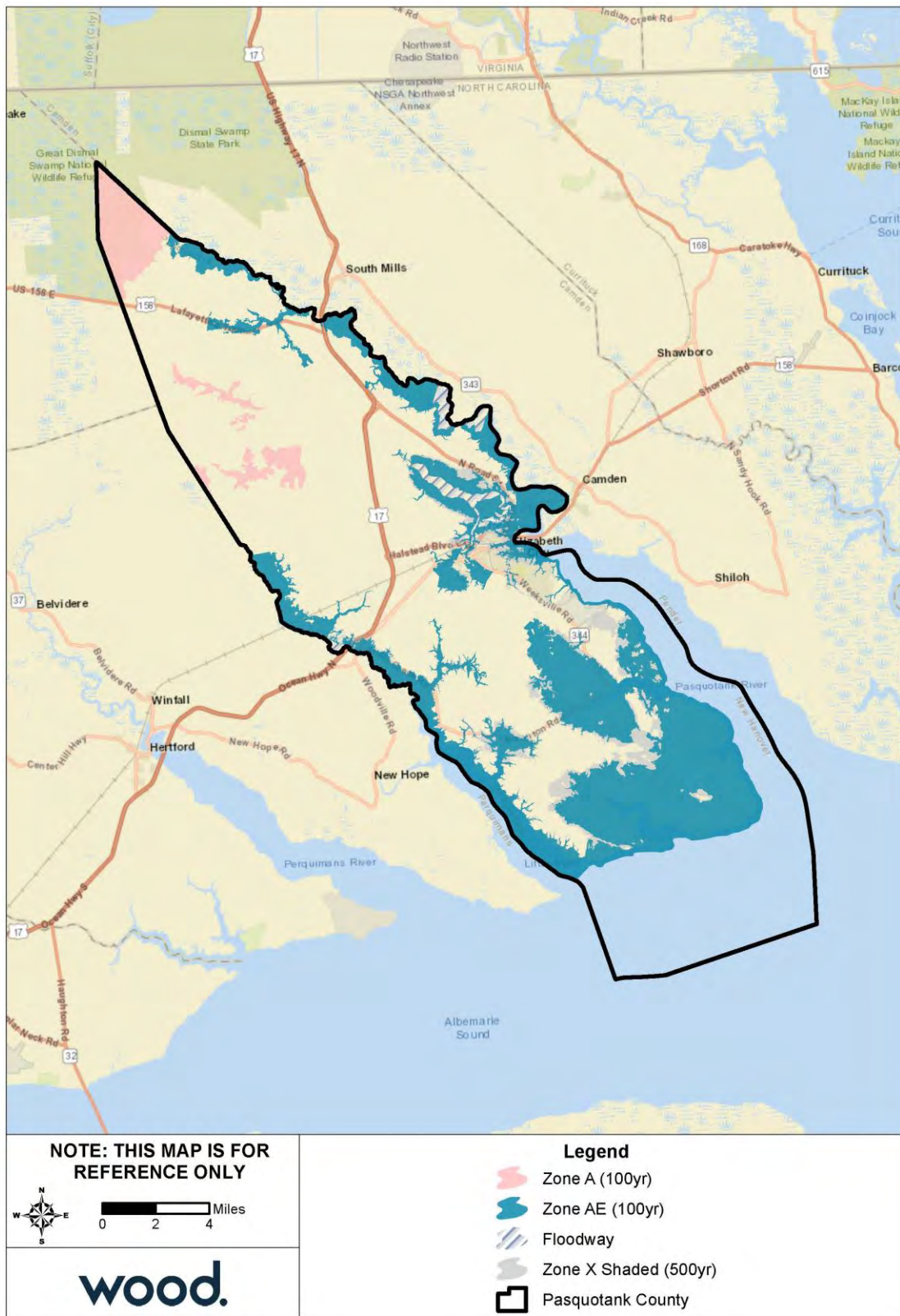
Source: NCEM Risk Management Tool

Table E.10 – High Potential Loss Properties Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
City of Elizabeth City			
Commercial	100 Year	1	\$2,774

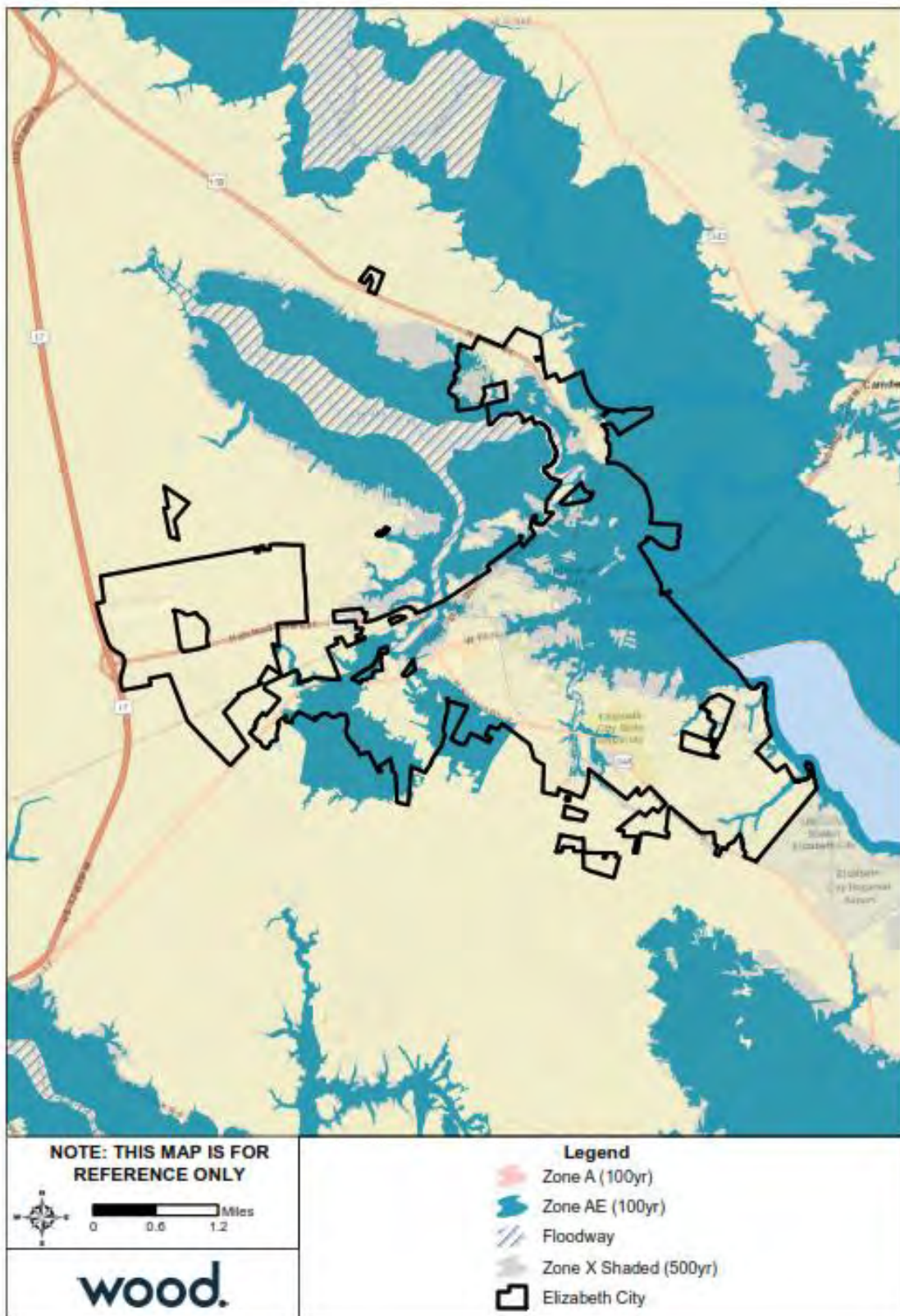
Source: NCEM Risk Management Tool

Figure E.4 – FEMA Flood Hazard Areas, Unincorporated Pasquotank County



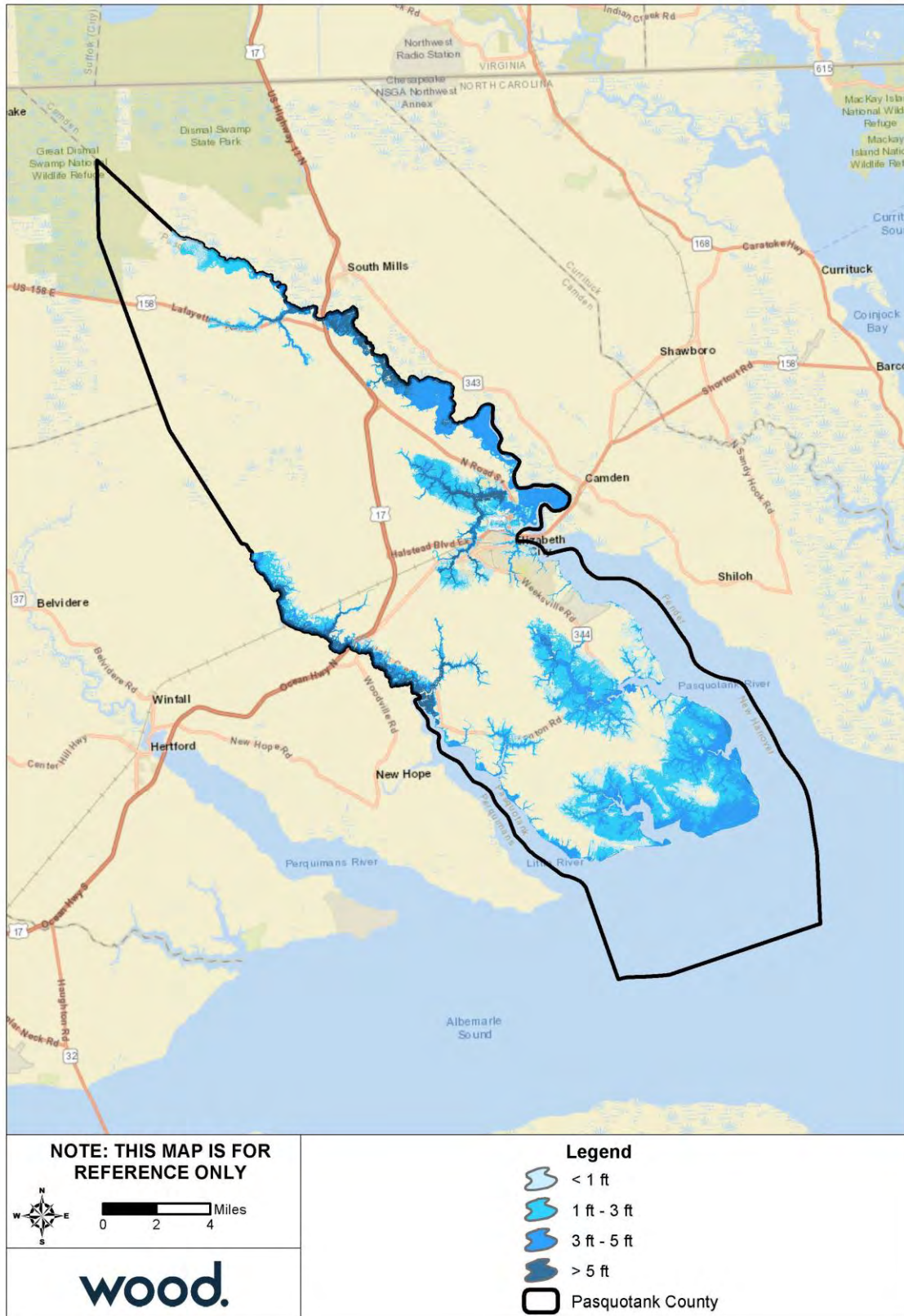
Source: FEMA Effective DFIRM

Figure E.5 – FEMA Flood Hazard Areas, City of Elizabeth City



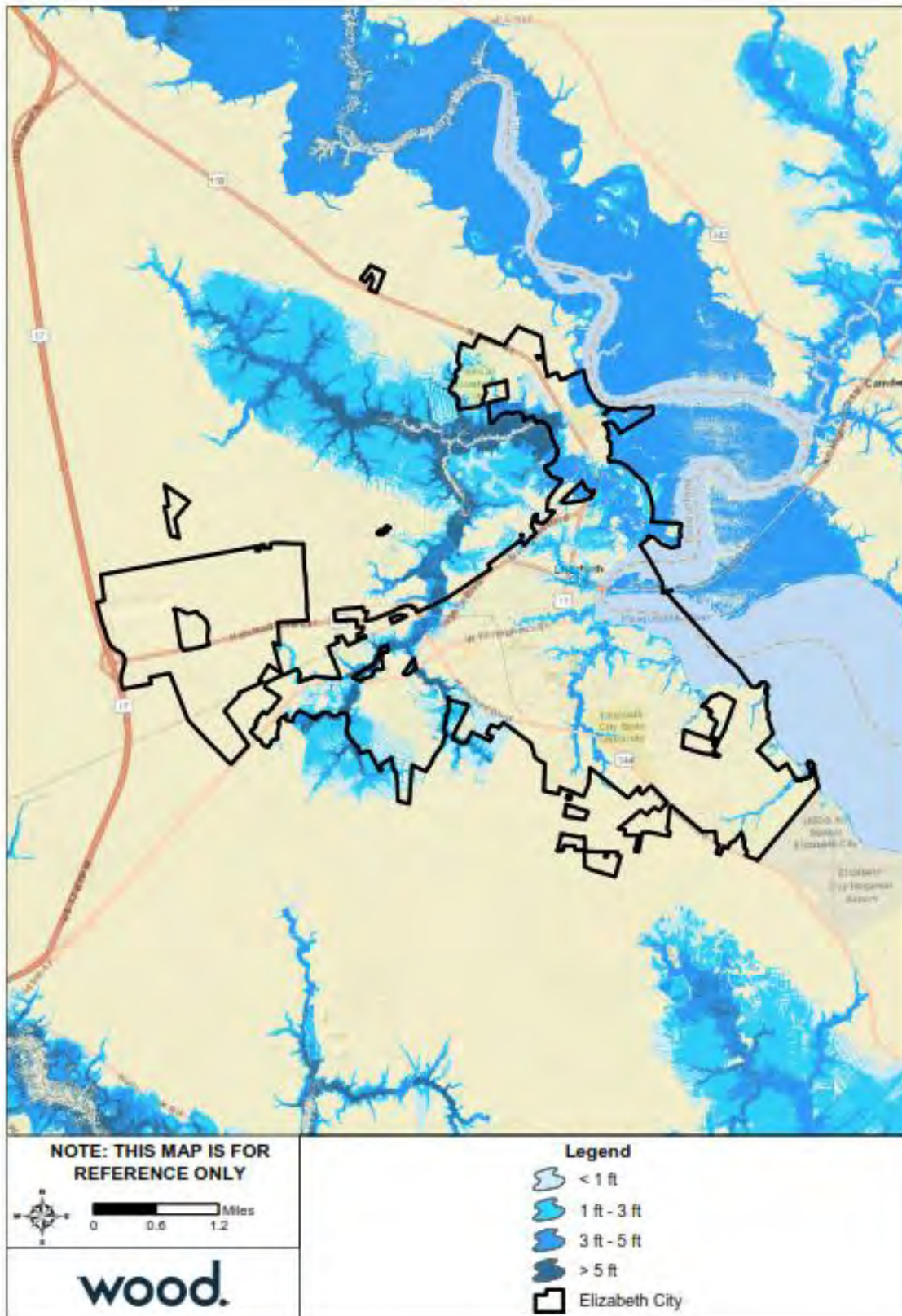
Source: FEMA Effective DFIRM

Figure E.6 – Flood Depth, 1%-Annual-Chance Floodplain, Unincorporated Pasquotank County



Source: FEMA Effective DFIRM

Figure E.7 – Flood Depth, 1%-Annual-Chance Floodplain, City of Elizabeth City



Source: FEMA Effective DFIRM

E.2.2 Wildfire

Table E.11 summarizes the acreage in Pasquotank County that falls within the Wildland Urban Interface (WUI), categorized by housing density. Areas in the WUI are those where development may intermix with flammable vegetation. Over 65 percent of Pasquotank County is not included in the WUI.

Table E.11 – Wildland Urban Interface Acreage, Pasquotank County

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	121,134.52	65.4%
	LT 1hs/40ac	15,565.45	8.4%
	1hs/40ac to 1hs/20ac	11,384.64	6.1%
	1hs/20ac to 1hs/10ac	11,528.16	6.2%
	1hs/10ac to 1hs/5ac	10,440.21	5.6%
	1hs/5ac to 1hs/2ac	7,907.41	4.3%
	1hs/2ac to 3hs/1ac	6,919.95	3.7%
	GT 3hs/1ac	309.15	0.2%
	Total	185,189.50	

Source: Southern Wildfire Risk Assessment

Figure E.8 depicts the WUI for Pasquotank County and all participating jurisdictions. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure E.9 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure E.10 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Potential fire intensity is moderate to low in Pasquotank County, without any significant clusters of heightened risk. Much of the county is not burnable or has a very low burn probability. WUI is spread throughout much of the county but rarely overlaps with any significant burn probability or high potential fire intensity. Therefore, a in Pasquotank County might not pose as high a risk to human settlement and the built environment.

Table E.12 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Pasquotank County and participating jurisdictions. Table E.13 provides counts and estimated damages for High Potential Loss Properties in these areas.

Table E.12 – Critical Facilities Exposed to Wildfire by Jurisdiction, Pasquotank County

Sector	Number of Buildings at Risk	Estimated Damages
Pasquotank County Unincorporated Area		
Banking and Finance	2	\$1,665,318
Commercial Facilities	209	\$121,682,281
Critical Manufacturing	126	\$54,209,694
Defense Industrial Base	1	\$92,649
Emergency Services	4	\$1,577,740
Food and Agriculture	248	\$11,453,811
Government Facilities	20	\$11,188,922
Healthcare and Public Health	4	\$3,887,819

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Sector	Number of Buildings at Risk	Estimated Damages
Transportation Systems	42	\$33,760,411
Water	17	\$4,508,497
All Categories	673	\$244,027,142
City of Elizabeth City		
Banking and Finance	3	\$1,623,108
Commercial Facilities	174	\$131,670,590
Communications	1	\$1,386,783
Critical Manufacturing	64	\$32,124,516
Energy	1	\$374,353
Food and Agriculture	14	\$662,016
Government Facilities	50	\$91,385,080
Healthcare and Public Health	28	\$30,696,293
Transportation Systems	23	\$11,944,137
Water	4	\$365,865
All Categories	362	\$302,232,741

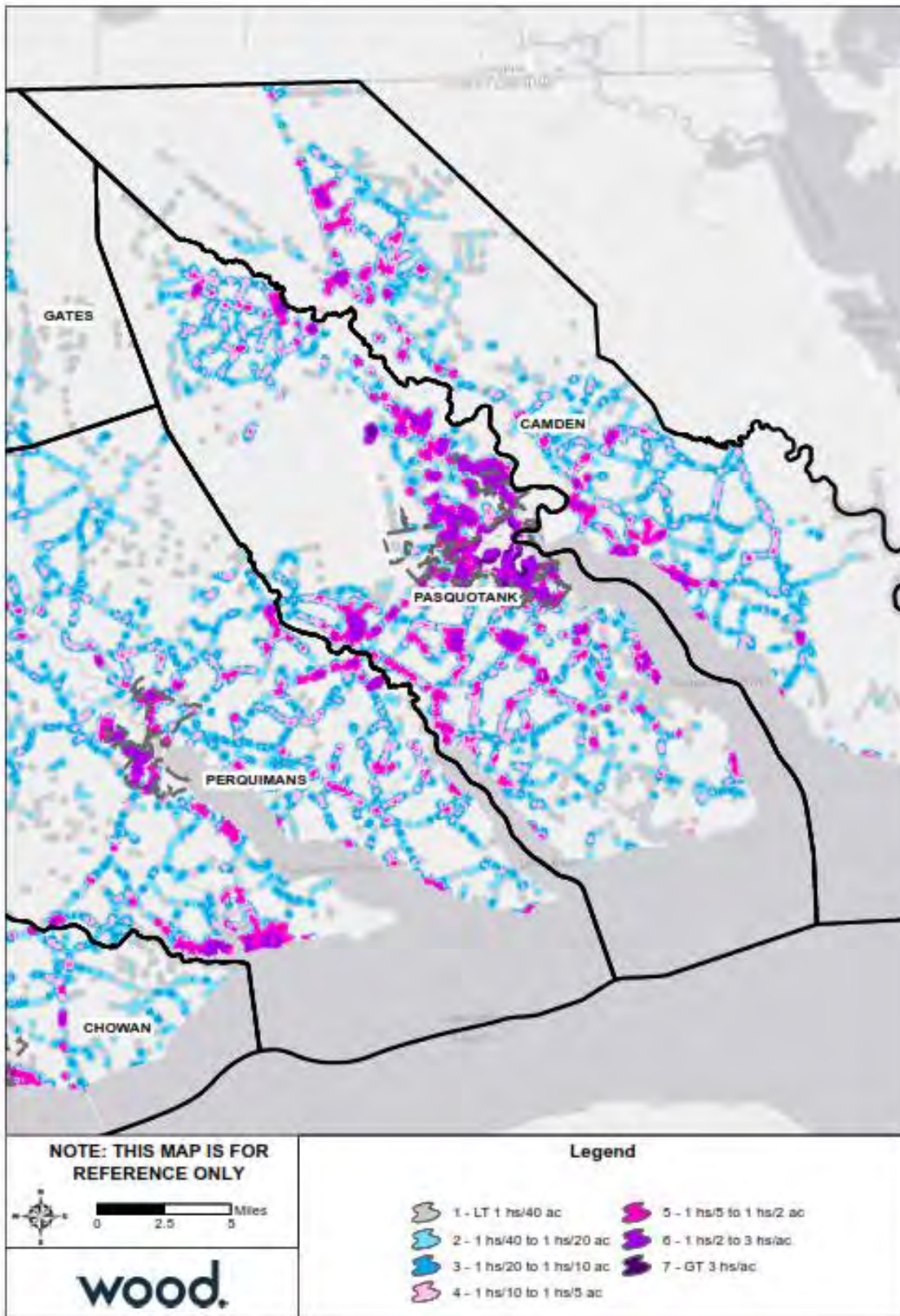
Source: NCEM Risk Management Tool

Table E.13 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Pasquotank County

Sector	Number of Buildings at Risk	Estimated Damages
Pasquotank County Unincorporated Area		
Commercial	4	\$6,175,038
Government	4	\$7,296,381
Religious	1	\$4,070,297
All Categories	9	\$17,541,716
City of Elizabeth City		
Commercial	18	\$50,115,207
Government	10	\$66,328,135
Industrial	1	\$9,556,164
Religious	5	\$7,631,850
Residential	2	\$11,767,820
All Categories	36	\$145,399,176

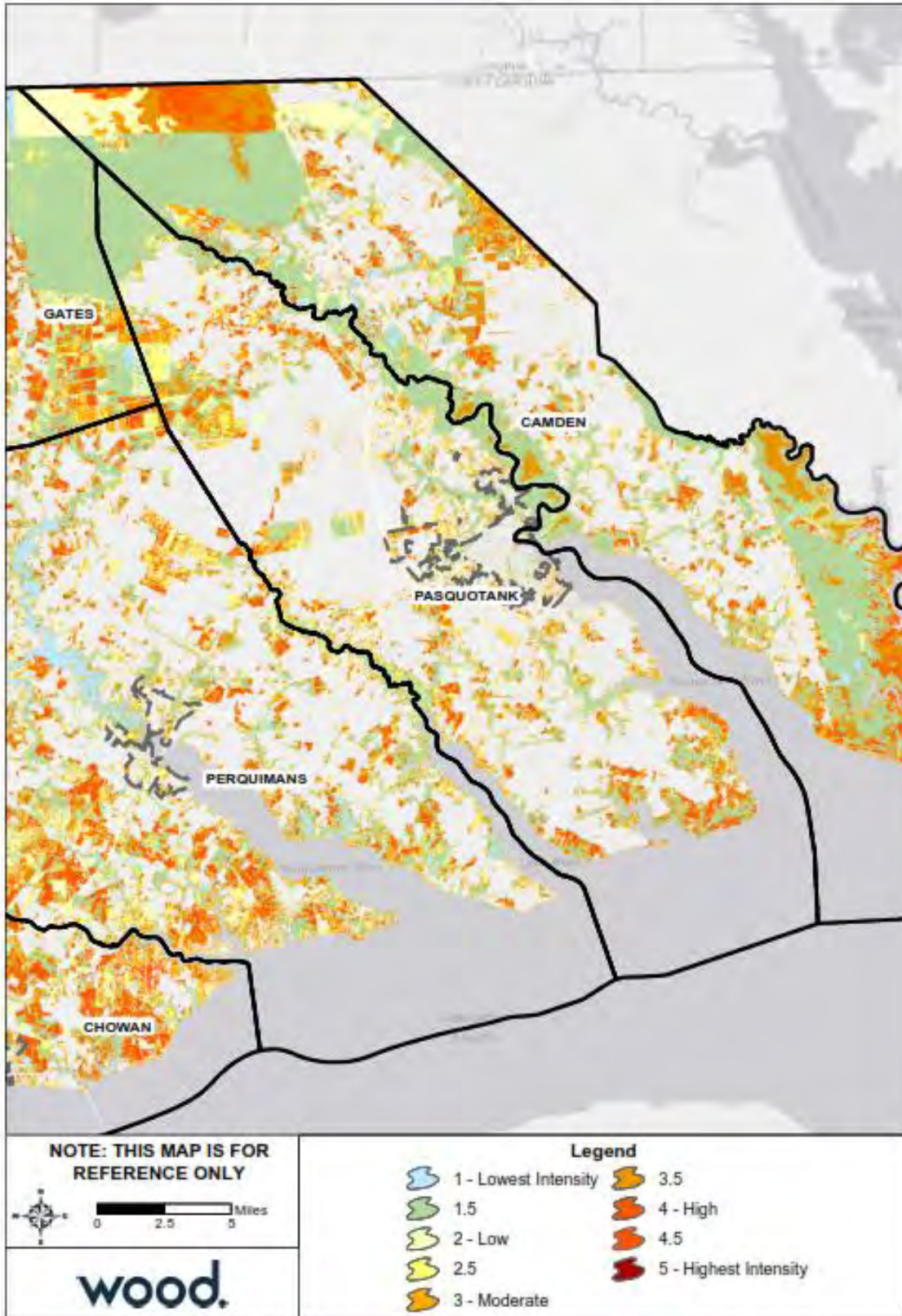
Source: NCEM Risk Management Tool

Figure E.8 – Wildland Urban Interface, Pasquotank County



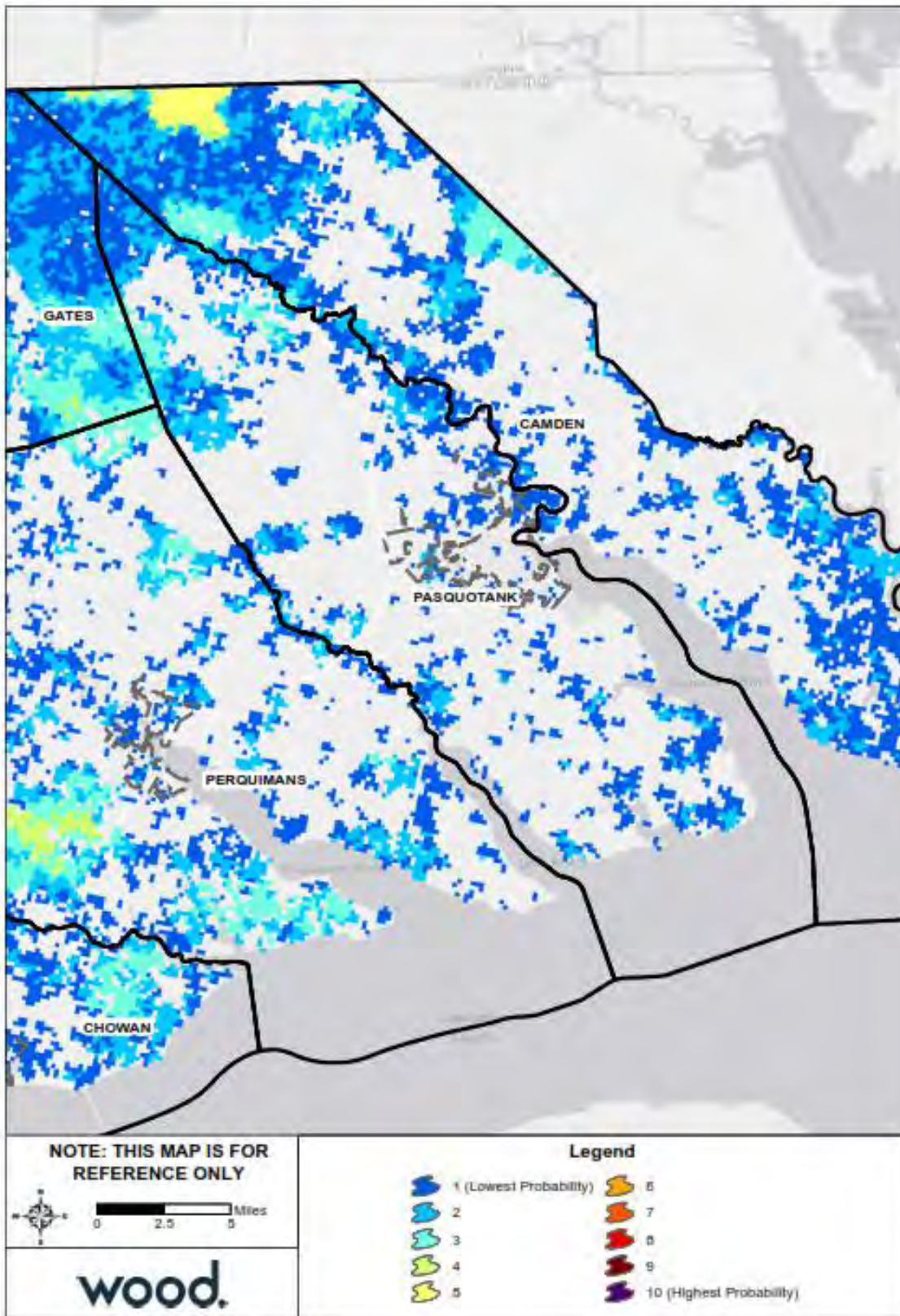
Source: Southern Wildfire Risk Assessment

Figure E.9 – Fire Intensity Scale, Pasquotank County



Source: Southern Wildfire Risk Assessment

Figure E.10 – Burn Probability, Pasquotank County



Source: Southern Wildfire Risk Assessment

E.3 CAPABILITY ASSESSMENT

E.3.1 Overall Capability

Details on the tools and resources in place and available to Pasquotank County were provided by the County’s HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Pasquotank County has an overall capability rating of High. Pasquotank County provides many resources for its incorporated jurisdictions and many of the mitigation projects in this plan are regional in nature, with the County serving as the project lead; therefore, the County’s capability is also an indicator for its incorporated areas. The County’s Self-Assessment of key capability areas is summarized in Table E.14 below.

Table E.14 – Capability Self-Assessment, Pasquotank County

Capability Area	Rating
Plans, Ordinances, Codes and Programs	High
Administrative and Technical Capability	High
Fiscal Capability	High
Education and Outreach Capability	High
Mitigation Capability	High
Political Capability	High
Overall Capability	High

E.3.2 Floodplain Management

The following tables reflect NFIP entry dates as well as policy and claims data for Pasquotank County and Elizabeth City, categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

Table E.15 – NFIP Program Entry Dates

Community	Regular Entry Date
Pasquotank County (Unincorporated Area)	December 4, 1985
City of Elizabeth City	April 3, 1978

Source: FEMA Community Information System

Table E.16 – NFIP Policy and Claims Data by Structure Type

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Pasquotank County Unincorporated Area					
Single Family	1,081	\$562,663	\$269,896,600	148	\$1,309,626.09
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	1	\$1,511	\$257,100	0	\$0.00
Non Residential	26	\$39,452	\$7,539,100	3	\$64,328.52
Total	1,108	\$603,626	\$277,692,800	151	\$1,373,954.61
City of Elizabeth City					
Single Family	1,021	\$556,213	\$197,991,100	156	\$2,308,364.80
2-4 Family	58	\$22,101	\$5,856,200	3	\$13,788.32
All Other Residential	74	\$45,490	\$15,229,200	3	\$204,509.74
Non Residential	153	\$258,524	\$58,019,900	50	\$2,255,424.60
Total	1,306	\$882,328	\$277,096,400	212	\$4,782,087.46

Source: FEMA Community Information System, accessed November 2019

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Table E.17 – NFIP Policy and Claims Data by Flood Zone

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Pasquotank County Unincorporated Area					
A01-30 & AE Zones	682	\$406,107	\$145,554,600	124	\$1,157,575.69
A Zones	3	\$3,640	\$494,200	6	\$64,143.46
B, C & X Zone					
Standard	12	\$20,558	\$3,866,200	4	\$16,575.29
Preferred	409	\$172,121	\$127,708,000	12	\$125,984.65
Total	1,106	\$602,426	\$277,623,000	146	\$1,364,279.09
City of Elizabeth City					
A01-30 & AE Zones	834	\$639,956	\$153,271,100	181	\$4,482,362.21
A Zones	0	\$0	\$0	8	\$96,328.94
B, C & X Zone					
Standard	48	\$52,456	\$11,230,600	5	\$42,530.82
Preferred	421	\$188,116	\$112,490,000	11	\$95,831.20
Total	1,303	\$880,528	\$276,991,700	211	\$4,778,599.01

Source: FEMA Community Information System, accessed November 2019

Table E.18 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Pasquotank County Unincorporated Area					
A01-30 & AE Zones	146	\$133,718	\$27,420,800	80	\$764,898.56
A Zones	1	\$1,305	\$234,200	4	\$26,404.65
B, C & X Zone					
Standard	4	\$4,913	\$1,125,100	2	\$13,332.31
Preferred	95	\$36,411	\$27,405,000	6	\$78,491.71
Total	246	\$176,347	\$56,185,100	92	\$883,127.23
City of Elizabeth City					
A01-30 & AE Zones	341	\$326,245	\$54,539,400	138	\$3,722,692.52
A Zones	0	\$0	\$0	3	\$32,652.12
V01-30 & VE Zones	0	\$0	\$0	5	\$55,976.91
B, C & X Zone					
Standard	29	\$23,572	\$4,331,600	5	\$42,530.82
Preferred	244	\$97,640	\$58,629,000	7	\$42,939.47
Total	614	\$447,457	\$117,500,000	158	\$3,896,791.84

Source: FEMA Community Information System, accessed November 2019

Table E.19 – NFIP Policy and Claims Data Post-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Pasquotank County Unincorporated Area					
A01-30 & AE Zones	536	\$272,389	\$118,133,800	44	\$392,677.13
A Zones	2	\$2,335	\$260,000	2	\$37,738.81
B, C & X Zone					
Standard	8	\$15,645	\$2,741,100	2	\$3,242.98
Preferred	314	\$135,710	\$100,303,000	6	\$47,492.94
Total	860	\$426,079	\$221,437,900	54	\$481,151.86

Albemarle Region

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Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
City of Elizabeth City					
A01-30 & AE Zones	493	\$313,711	\$98,731,700	43	\$759,669.69
A Zones	0	\$0	\$0	5	\$63,676.82
V01-30 & VE Zones	0	\$0	\$0	1	\$5,568.93
B, C & X Zone	196	\$119,360	\$60,760,000	4	\$52,891.73
Standard	19	\$28,884	\$6,899,000	0	\$0.00
Preferred	177	\$90,476	\$53,861,000	4	\$52,891.73
Total	689	\$433,071	\$159,491,700	53	\$881,807.17

Source: FEMA Community Information System, accessed November 2019

E.4 MITIGATION STRATEGY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PAS1	Engage in comprehensive pre- and post-storm planning efforts utilizing the most accurate and thorough data available. These efforts will involve the review and incorporation of all existing policy and regulatory tools currently in place in an effort to identify cost effective and environmentally sound mitigation projects for implementation.	Pasquotank County, Elizabeth City	All Hazards	1	1.3	P	<ul style="list-style-type: none"> County Planning Office City Planning Division County Board of Commissioners/City Council 	Staff Time	General Fund	Ongoing – As necessary	In Progress – Carry Forward	This effort will be undertaken as events occur within the County.
PAS2	Maintain “Storm Ready Community” Status	Pasquotank County, Elizabeth City	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	2	2.1	ES	County Emergency Management	\$10,000	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Pasquotank County continues to maintain the County’s Storm Ready Status and will continue to do so through implementation of this plan.
PAS3	Join the Community Rating System (CRS).	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2	P	<ul style="list-style-type: none"> County Board of Commissioners City Council County/City Staff 	\$15,000	General Fund	2 to 3 years	Not Started – Carry Forward	The County, as well as Elizabeth City, will consider joining the Community Rating System (CRS) through implementation of this plan.
PAS4	Develop and maintain comprehensive water management policies for Pasquotank County/Elizabeth City considering the connections between land use, urban growth, and surface water, and groundwater issues.	Pasquotank County, Elizabeth City	Drought	1	1.1	NRP	<ul style="list-style-type: none"> County Planning Office County Emergency Management County Board of Commissioners/City Council NCDCM – Coastal Area Management Act 	Staff Time	General Fund, Grant Funds	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to carry out these efforts through implementation of this plan.
PAS5	Continue to utilize annual, as well as post-disaster, Federal (FEMA) and State mitigation funds to both acquire and elevate structures impact by excessive flooding. The following provides a summary of mitigation target areas established following Hurricane Matthew in 2016: <ul style="list-style-type: none"> Mitigation Focus Areas: <ul style="list-style-type: none"> Oxford Heights Subdivision US 158 (near Blindman Road) One Non-residential structure (Chamber of Commerce building at 502 Ehringhaus Street) Elizabeth Street – Four Non-residential structures Laura Lee Street Shepard Street 	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.1	PP	<ul style="list-style-type: none"> County Public Works County Board of Commissioners City Administration 	To Be Determined	General Fund, NCDENR, NCDPS	Ongoing – As opportunities arise	New	This strategy addresses projects identified through the Hurricane Matthew Resilient Redevelopment Plan. These projects will be carried out through implementation of this plan.
PAS6	Encourage new or renovated critical facilities to apply structural hazard mitigation and sustainability concepts when building or remodeling their facilities, to include back-up power sources.	Pasquotank County, Elizabeth City	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	1	1.2	P	County Emergency Management	To Be Determined	General Fund, Grants	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to promote the integration of these concepts into the design consideration of new or renovated critical facilities.

ANNEX E: PASQUOTANK COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PAS7	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses, contractors, realtors, developers, and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both persons and property.	Pasquotank County, Elizabeth City	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management City Administration 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County undertakes these efforts, but will aim to improve upon its outreach and education efforts through implementation of this plan.
PAS8	Encourage the use of weather radios/severe weather warning apps – especially in schools, rest homes, convalescent homes, retirement centers and other locations where people congregate – to inform them of approaching severe weather.	Pasquotank County, Elizabeth City	Flood, Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Dam & Levee Failure, Severe Winter Storm, Tornado	2	2.1	PIO	County Emergency Management	Staff Time, American Red Cross	General Fund, Grant Funds through American Red Cross	Ongoing – next 5 years	In Progress – Carry Forward	This program is already in place and is considered important enough to carry forward into the implementation of this plan.
PAS9	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Pasquotank County, Elizabeth City	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management City Administration 	\$25,000	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County's Emergency Alert System is in place; however, the effectiveness of the system is reviewed annually, as well as following natural hazard events.
PAS10	Review the Pasquotank-Camden-Elizabeth City Multi- Hazard Emergency Operations Plan annually and update the plan as necessary. Ensure all County and City departments continue to develop guidelines for response to emergencies and to maintain departmental operations. Work with County and City departments to ensure each department possesses a clear understanding of department responsibilities as outlined in the Pasquotank-Camden-Elizabeth City Multi-Hazard Emergency Operations Plan.	Pasquotank County, Elizabeth City	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> County Emergency Management County Board of Commissioners Elizabeth City 	Staff Time	General Fund, Staff Time, NCDPS	Other – Once Annually	In Progress – Carry Forward	Pasquotank County, in conjunction with Elizabeth City will reviews its Emergency Operations Plan annually, specifically the County addresses issues identified through past storm experiences.
PAS11	Continue efforts to develop continuity of operational plans (COOP) for county/city departments.	Pasquotank County, Elizabeth City	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> County Board of Commissioner/City Council County/City Planning Boards 	Staff Time	General Fund, NCDPS	Other – Once Annually	In Progress – Carry Forward	The Continuity of Operations Plan is reviewed annually in concert with the Emergency Operations Plan. This effort is based on the results of a staged table top exercise, and/or any events that have occurred over the past year.
PAS12	Encourage the installation of generator switches in new construction critical facilities. As projects go through Technical Review Committee, applicants can be encouraged to pre-wire facilities for a generator. New construction critical facilities that would benefit from pre-wiring include, but are not limited to, public schools, local government facilities, facilities that may be utilized as storm shelters, adult care facilities, etc.	Pasquotank County, Elizabeth City	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.1	ES	GIS Coordinator	To Be Determined	General Fund, NCDPS	Other – As funding is available and need determined	In Progress – Carry Forward	The County will continue to work on establishing backup power supplies at all critical facilities. This will be undertaken as funding becomes available.
PAS13	Incorporate shoreline vegetation protection buffers into the City of Elizabeth City's Unified Development Ordinance as a stipulation to development in and near areas of environmental concern.	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	NRP	<ul style="list-style-type: none"> City Planning Division City Council 	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	This regulation has not been established to date, but will be considered through implementation of this plan.
PAS14	The NC Forestry Service representatives will be invited to attend the County's monthly Public Safety Meeting in an effort to address risk associated with wildfire.	Pasquotank County, Elizabeth City	Wildfire	4	4.1	PP	<ul style="list-style-type: none"> County Planning Office NC Forestry Service 	Staff Time	General Fund, NC Forestry Service	1 year	Not Started – Carry Forward	This strategy has not yet been carried out but will be enacted through implementation of this plan.

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Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
PAS15	Information is distributed during public events and via social media. All structures rehabilitated greater than 50% damage, or reconstructed greater than 50% have to meet present wind load requirements in NC Building Code.	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PP	<ul style="list-style-type: none"> County Emergency Management City Administration 	\$2,500	General Fund, NCDPS	1 year	Not Started – Carry Forward	The County will identify opportunities to disseminate this information and carry that effort out through implementation of this plan.
PAS16	Reduce the vulnerability of infrastructure and the built environment by identifying infrastructure (i.e., pumping stations, roads) in the city/county that is repetitively damaged by flooding and consider ways to reduce those vulnerabilities.	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.1	P	<ul style="list-style-type: none"> County Public Works County Board of Commissioners City Administration 	To Be Determined	General Fund, NCDPS, NCDEQ	Ongoing, as needed	In Progress – Carry Forward	This strategy will be carried out by the County as opportunities arise.
PAS17	Actively work with Federal, State, local and private partners to identify mitigation measures and secure funding via grants to alleviate flooding. These efforts should focus on the following areas: <ul style="list-style-type: none"> Blindman Road (near US 158) Rehabilitation Center (901 Halstead Boulevard) Oxford Heights Subdivision (Providence Rd and Bonner Dr) Weeksville Road at Peartree Road Traci Drive Riverside at Flora Avenue (Elizabeth City) Timothy Drive Shillingtown Road Brays Estates Subdivision (Scott Road) Halls Creek Road Crossing over Halls Creek Elizabeth Street at N. Road Street 	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	SP	<ul style="list-style-type: none"> County Public Works County Board of Commissioners City Administration 	To Be Determined	General Fund, NCDENR, NCDPS	5 years	New	N/A
PAS18	Install a detailed river gauge on the Pasquotank River (at South Mills).	Pasquotank County, Elizabeth City	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	P	<ul style="list-style-type: none"> County Planning Office County Board of Commissioners 	To Be Determined	General Fund, NCDENR	2 to 3 years	New	N/A

Annex F Perquimans County

F.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Perquimans County, including information on population, asset exposure, housing, and economy.

Geography

Figure F.1 on the following page shows a base map of Perquimans County and participating jurisdictions.

Population and Demographics

Table F.1 provides population counts and growth estimates for Perquimans County and participating jurisdictions as compared to the Region overall. Table F.2 provides demographic information for the County.

Table F.1 – Population Counts, Perquimans County, 2000-2017

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Hertford	2,070	2,143	2,533	3.5%	18.2%	22.4%
Winfall	554	594	624	7.2%	5.1%	12.6%
Unincorporated Areas	11,368	13,453	13,506	18.3%	0.4%	18.8%
Perquimans County	13,992	16,190	16,663	15.7%	2.9%	19.1%

Source: US Census Bureau American Community Survey.

Table F.2 – Racial Demographics, Perquimans County, 2017

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Hertford	58.2%	38.8%	0.0%	0.9%	2.1%	8.2%
Winfall	52.7%	45.5%	0.0%	0.3%	1.4%	2.1%
Perquimans County	73.4%	24.2%	0.3%	0.8%	1.3%	2.5%

*Other races includes American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, etc.

**Persons of Hispanic or Latino Origin are classified regardless of race; therefore, this percentage is considered independent of the other race classifications listed.

Source: US Census Bureau American Community Survey.

Figure F.1 – Jurisdictional Locations, Perquimans County



Asset Inventory

The following tables summarize the asset inventory for Perquimans County unincorporated and incorporated areas in order to estimate the total physical exposure to hazards in this area. The locations of critical facilities are shown in Figure F.2 through Figure F.4. Critical facilities are a subset of identified assets from the Critical Infrastructure & Key Resources dataset. Note that the counts are by building; where a critical facility comprises a cluster of buildings, each building is counted and displayed.

Table F.3 – Critical Infrastructure & Key Resources by Type

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Healthcare	Government Facilities	Defense Industrial Base	National Monuments and Icons	Nuclear Reactors, Materials and Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Unincorporated Perquimans County	316	0	0	354	0	32	0	110	20	0	0	0	0	14	0	10	0	856
Town of Hertford	10	30	0	254	6	12	0	52	16	0	0	4	2	34	0	10	0	430
Town of Winfall	6	0	0	48	0	12	0	40	4	0	0	2	0	10	2	2	0	126
Perquimans County Total	322	0	0	402	0	44	0	150	24	0	0	2	0	24	2	12	0	982

Source: NCEM Risk Management Tool

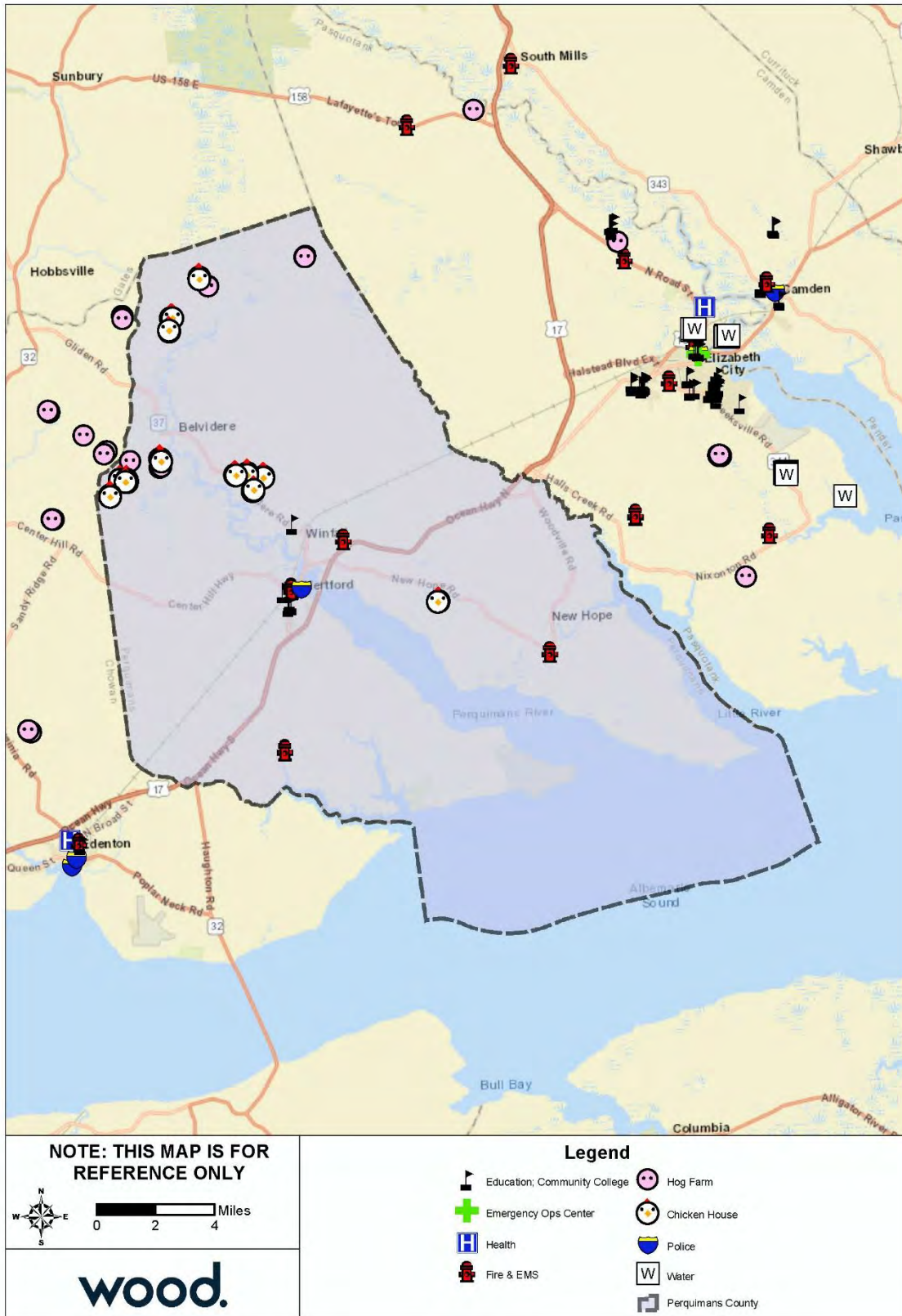
Table F.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Unincorporated Perquimans County	2	0	0	36	0	2	0	40
Town of Hertford	2	4	0	20	0	0	0	26
Town of Winfall	0	2	0	4	0	0	0	6
Perquimans County Total	4	6	0	60	0	2	0	72

Source: NCEM Risk Management Tool

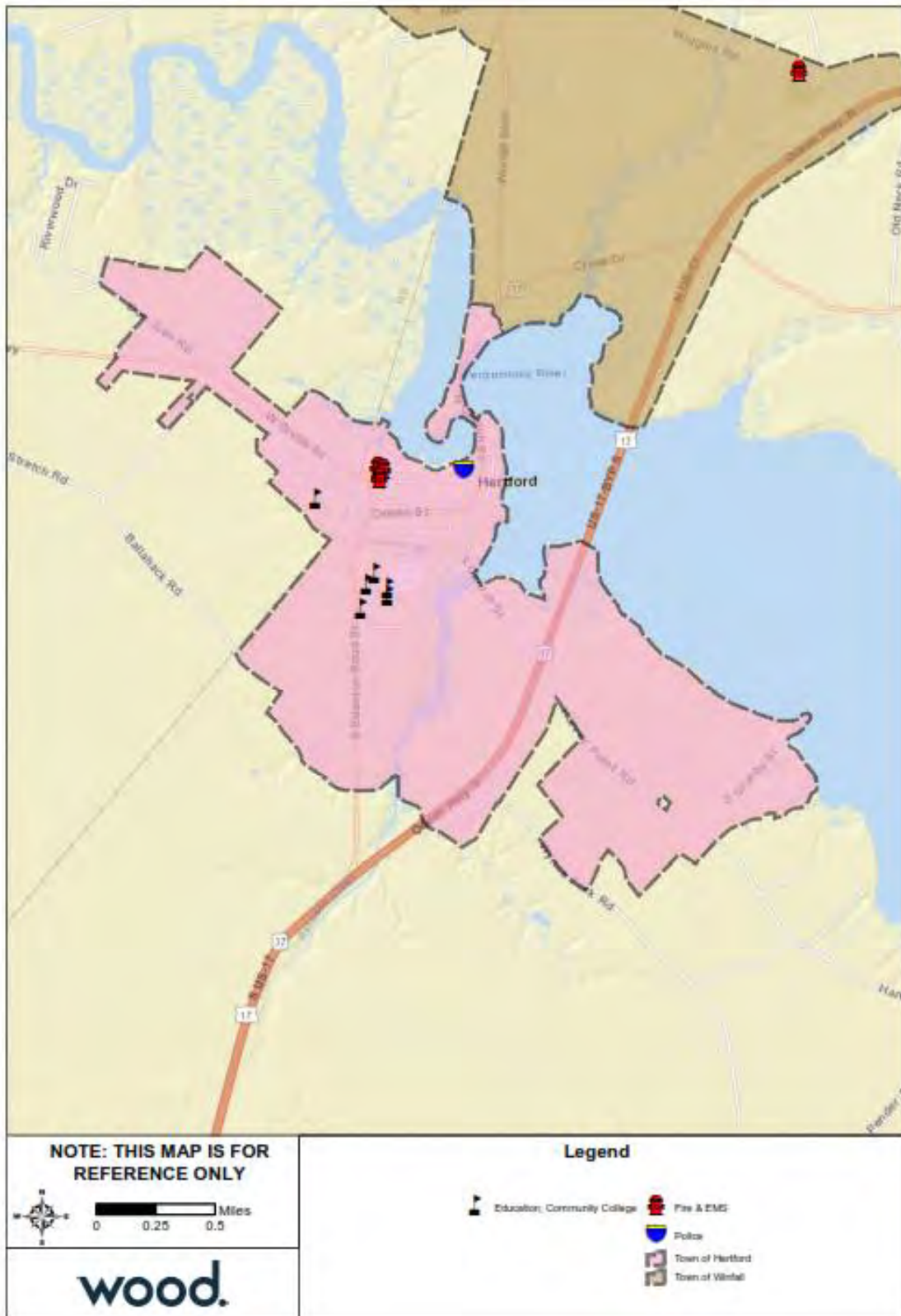
Note: A dash (-) indicates that no high potential loss facilities were reported in RMT.

Figure F.2 – Critical Facilities, Perquimans County



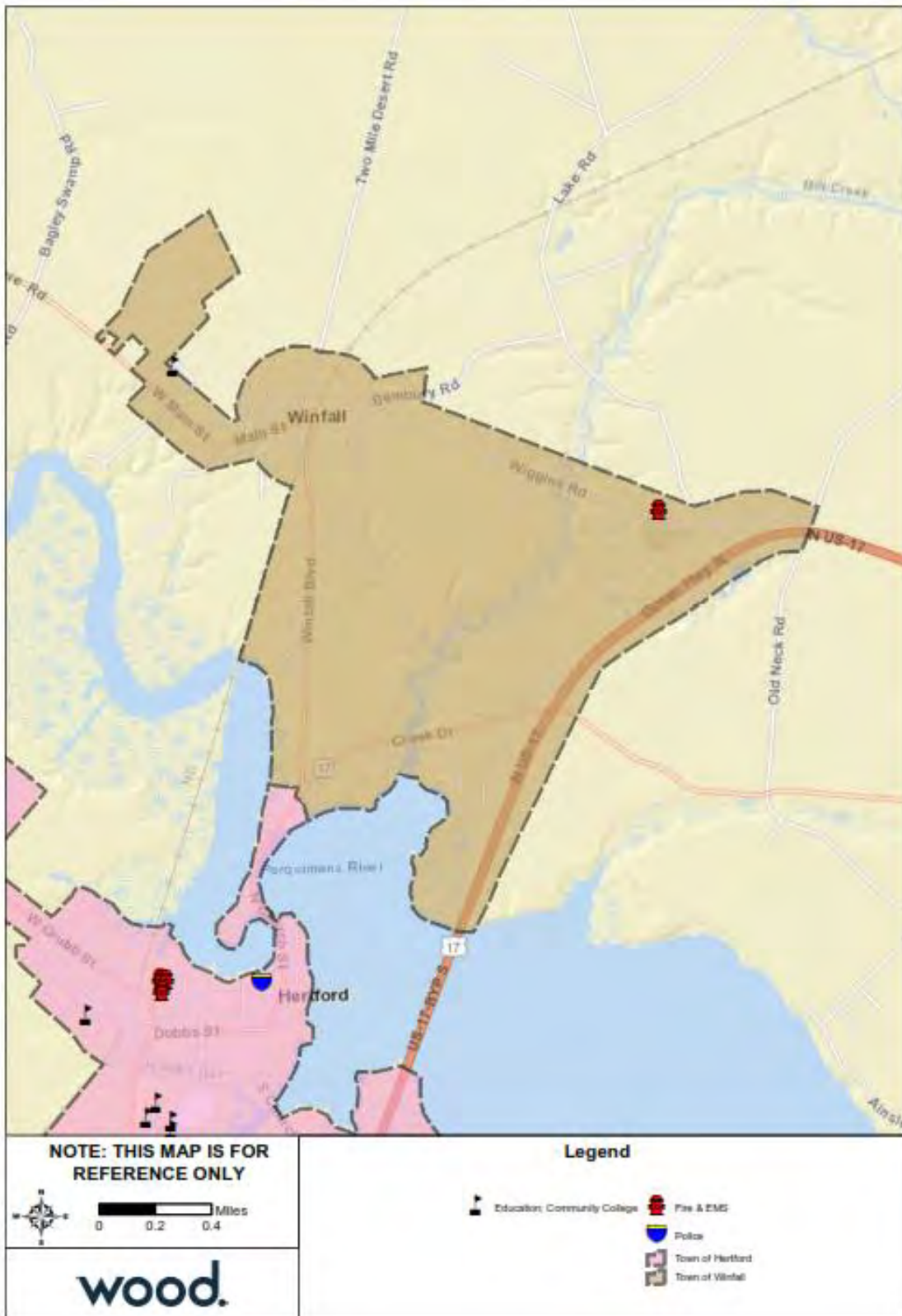
Source: NCEM IRISK Database, GIS Analysis

Figure F.3 – Critical Facilities, Town of Hertford



Source: NCEM IRISK Database, GIS Analysis

Figure F.4 – Critical Facilities, Town of Winfall



Source: NCEM IRISK Database, GIS Analysis

ANNEX F: PERQUIMANS COUNTY

Housing

The table below details key housing statistics for Perquimans County. As a percent of growth from 2010 housing, Perquimans County's housing stock has grown by 3.6%.

Table F.5 – Housing Statistics, Perquimans County, 2010-2017

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Hertford	1,104	1,270	15.0%	46.5%	18.3%
Winfall	373	334	-10.5%	62.7%	21.3%
Perquimans County	6,887	7,134	3.6%	72.8%	17.5%

Source: US Census Bureau American Community Survey.

Economy

The following tables present key economic statistics for Perquimans County.

Table F.6 – Economic Indicators, Perquimans County, 2017

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Hertford	53.3%	45.4%	7.4%	46.7%	14.1%
Winfall	58.6%	50.9%	5.7%	41.4%	10.0%
Perquimans County	51.5%	46.6%	4.2%	48.5%	8.4%

Source: US Census Bureau American Community Survey.

Table F.7 – Employment by Industry, Perquimans County, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Hertford	26.0%	24.5%	21.0%	16.4%	12.0%
Winfall	19.0%	30.6%	20.6%	21.0%	8.7%
Perquimans County	34.5%	19.6%	21.5%	13.9%	10.5%

Source: US Census Bureau American Community Survey.

F.2 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority by jurisdiction in Perquimans County than for the Albemarle Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have variations in risk that could be evaluated quantitatively on a jurisdictional level. The hazards included in this section are flood and wildfire.

F.2.1 Flood

Table F.8 details the acreage of Perquimans County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, approximately 20 percent of Perquimans County and both incorporated jurisdictions fall within the mapped 1%-annual-chance floodplain.

Table F.8 – Flood Zone Acreage by Jurisdiction, Perquimans County

Location	Flood Zone						Proportion in SFHA
	Zone A	Zone AE	Zone X Shaded (500-year)	Zone X Unshaded	Open Water	Total	
Perquimans							
Unincorporated County	4,743	39,419	2,079	143,584	19,237	209,062	21.1%
Hertford	25	368	42	1,405	0	1,840	21.4%
Winfall	0	298	32	1,135	0	1,465	20.3%

Source: FEMA Effective DFIRMs; GIS analysis

Figure F.5 through Figure F.7 reflect the effective mapped flood hazard zones for all jurisdictions with land in the Special Flood Hazard Area in Perquimans County, and Figure F.8 through Figure F.10 display the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

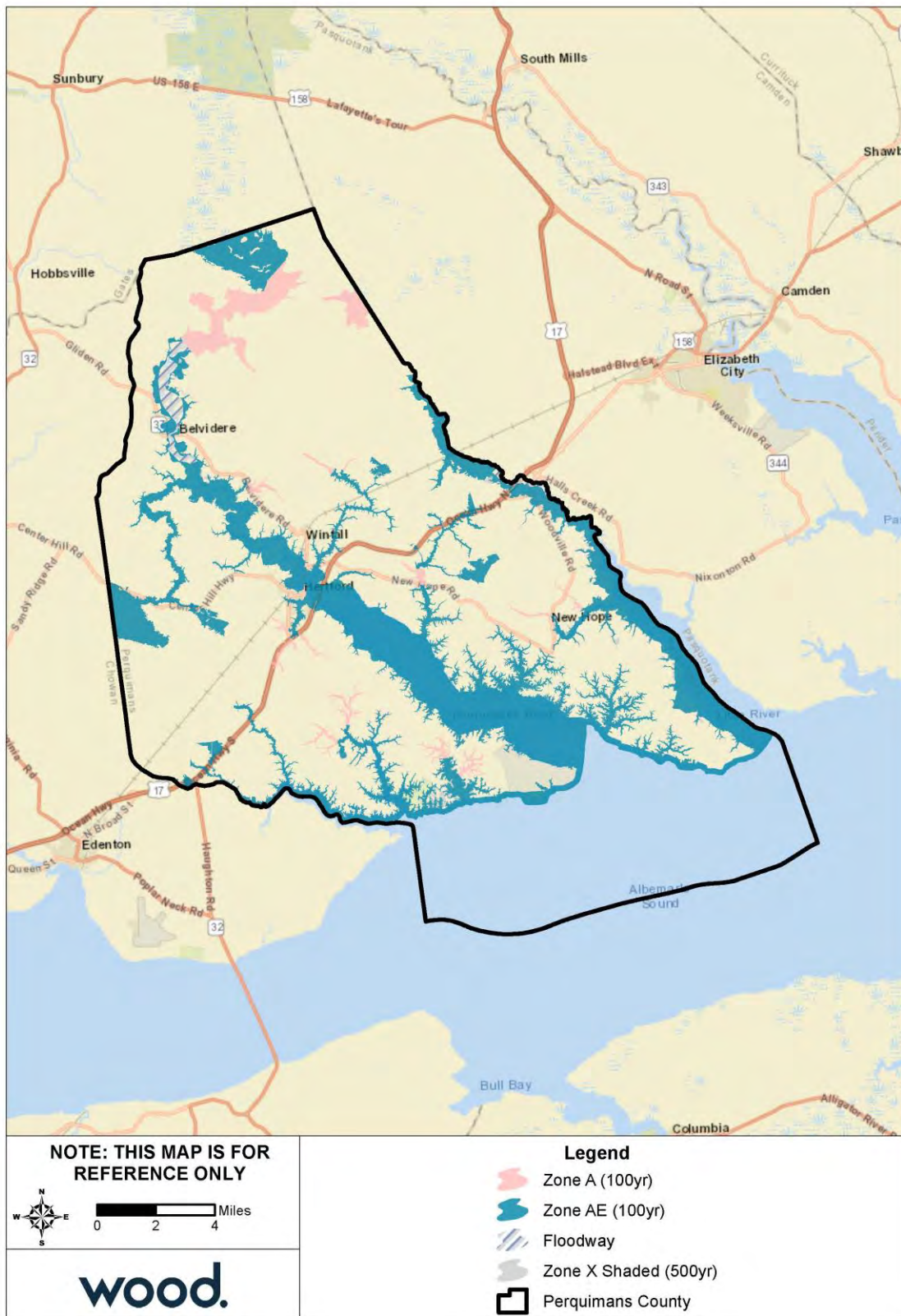
Table F.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Perquimans County and incorporated jurisdictions.

Table F.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction

Sector	Event	Number of Buildings at Risk	Estimated Damages
Perquimans County Unincorporated Areas			
Commercial Facilities	100 Year	4	\$20,236
Critical Manufacturing	100 Year	4	\$22,098
Food and Agriculture	100 Year	1	\$1,384
Healthcare and Public Health	100 Year	2	\$57,703
All Categories	100 Year	11	\$101,421
Town of Hertford			
Commercial Facilities	100 Year	1	\$5,544
Transportation Systems	100 Year	1	\$187
All Categories	100 Year	2	\$5,731
Town of Winfall			
Commercial Facilities	100 Year	2	\$26,529

Source: NCEM Risk Management Tool

Figure F.5 – FEMA Flood Hazard Areas, Unincorporated Perquimans County



Source: FEMA Effective DFIRM

Figure F.6 – FEMA Flood Hazard Areas, Town of Hertford



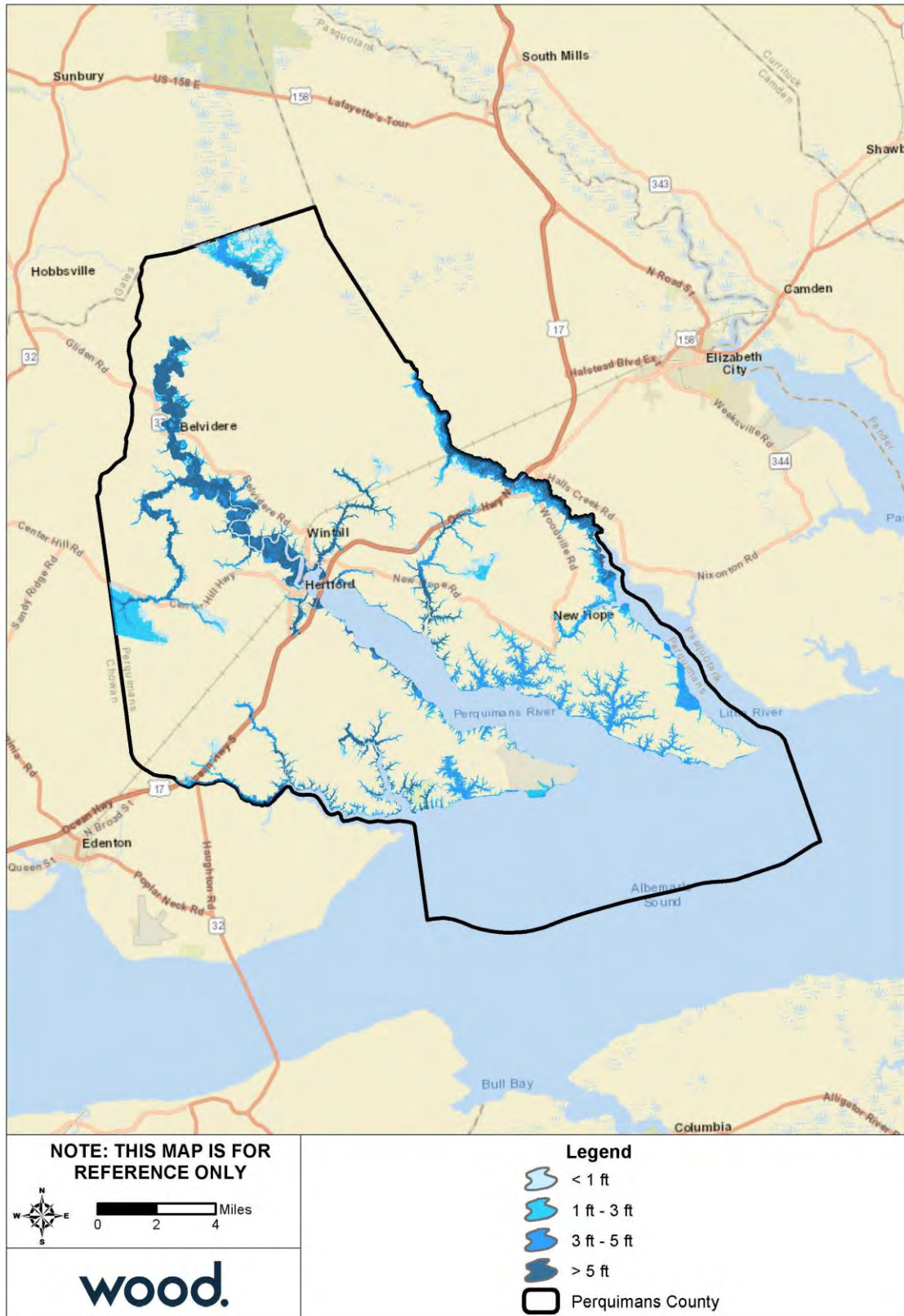
Source: FEMA Effective DFIRM

Figure F.7 – FEMA Flood Hazard Areas, Town of Winfall



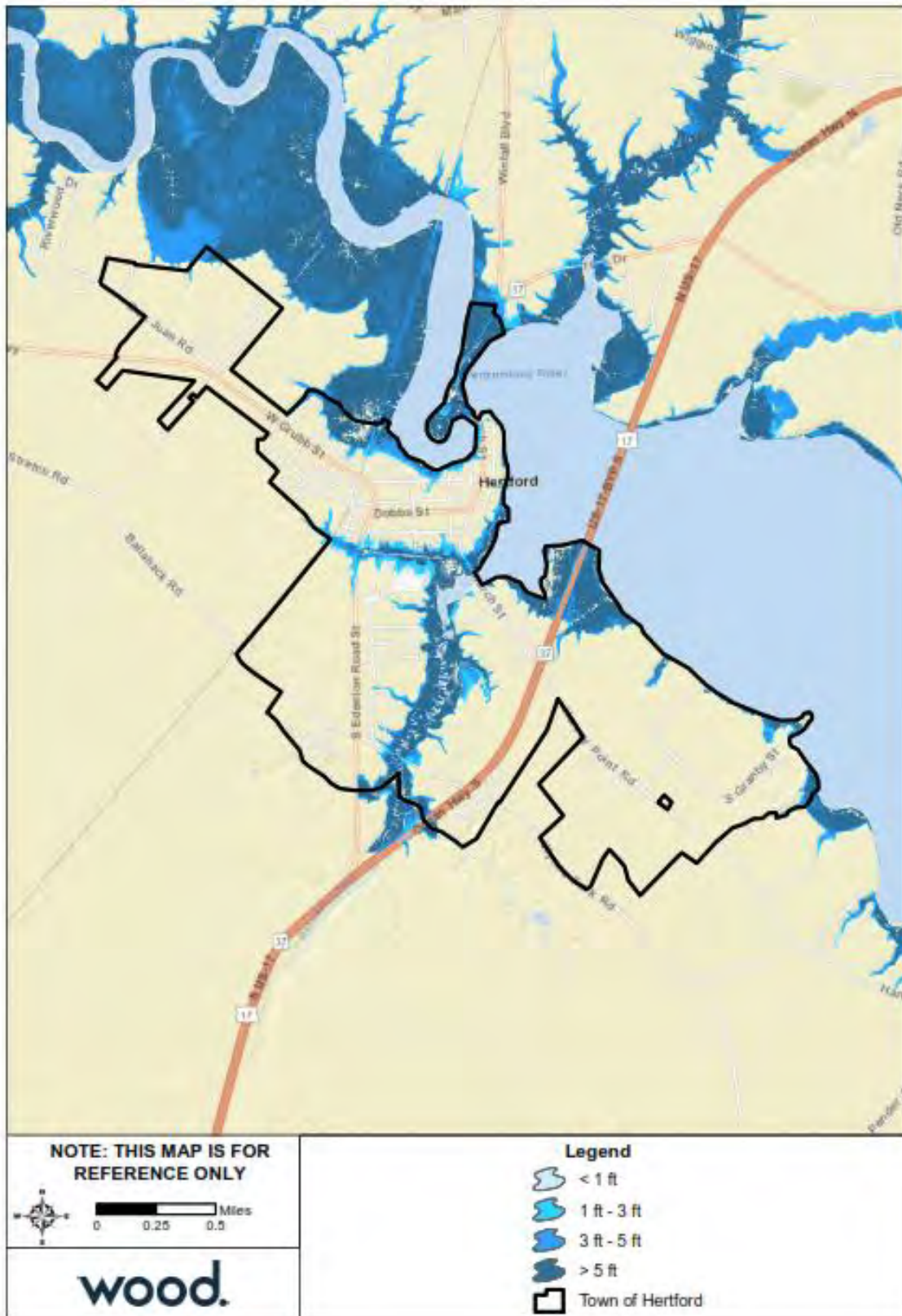
Source: FEMA Effective DFIRM

Figure F.8 – Flood Depth, 1%-Annual-Chance Floodplain, Unincorporated Perquimans County



Source: FEMA Effective DFIRM

Figure F.9 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Hertford



Source: FEMA Effective DFIRM

Figure F.10 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Winfall



Source: FEMA Effective DFIRM

F.2.2 Wildfire

Table F.10 summarizes the acreage in Perquimans County that falls within the Wildland Urban Interface (WUI), categorized by housing density. Areas in the WUI are those where development may intermix with flammable vegetation. Over 67 percent of Perquimans County is not included in the WUI.

Table F.10 – Wildland Urban Interface Acreage, Perquimans County

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	141281.34	67.1%
	LT 1hs/40ac	19795.87	9.4%
	1hs/40ac to 1hs/20ac	16066.05	7.6%
	1hs/20ac to 1hs/10ac	16898.04	8.0%
	1hs/10ac to 1hs/5ac	9385.12	4.5%
	1hs/5ac to 1hs/2ac	4979.66	2.4%
	1hs/2ac to 3hs/1ac	2085.04	1.0%
	GT 3hs/1ac	0.0	0.0%
	Total	210,491.1	

Source: Southern Wildfire Risk Assessment

Figure F.11 depicts the WUI for Perquimans County and all participating jurisdictions. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure F.12 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure F.13 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Most of Perquimans County is non-burnable. However, there are three areas in the county where high potential fire intensity and moderate burn probability overlap: in the northeastern corner at the County border, along the western central border with Chowan County, and in the southwestern corner along the Yeopim Creek and River. In the latter area, there is also overlap with the WUI, meaning wildfire risk may be greater here relative to the rest of the county.

Table F.11 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Perquimans County and participating jurisdictions. Table F.12 provides counts and estimated damages for High Potential Loss Properties in these areas.

Table F.11 – Critical Facilities Exposed to Wildfire by Jurisdiction, Perquimans County

Sector	Number of Buildings at Risk	Estimated Damages
Perquimans County Unincorporated Area		
Commercial Facilities	135	\$135,239,949
Critical Manufacturing	10	\$4,782,204
Emergency Services	2	\$4,447,246
Food and Agriculture	104	\$73,216,471
Government Facilities	35	\$32,135,243
Healthcare and Public Health	6	\$4,763,228
Transportation Systems	5	\$3,615,906
All Categories	297	\$258,200,247

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Sector	Number of Buildings at Risk	Estimated Damages
Town of Hertford		
Banking and Finance	6	\$5,348,553
Commercial Facilities	51	\$28,738,466
Critical Manufacturing	3	\$675,476
Food and Agriculture	1	\$1,522,527
Government Facilities	9	\$9,745,911
Healthcare and Public Health	3	\$3,736,008
Nuclear Reactors, Materials and Waste	1	\$5,743,536
Transportation Systems	4	\$1,522,715
All Categories	78	\$57,033,192
Town of Winfall		
Commercial Facilities	12	\$6,865,789
Critical Manufacturing	5	\$1,796,752
Emergency Services	1	\$462,235
Government Facilities	4	\$7,318,660
Healthcare and Public Health	2	\$2,128,012
Transportation Systems	3	\$4,452,792
All Categories	27	\$23,024,240

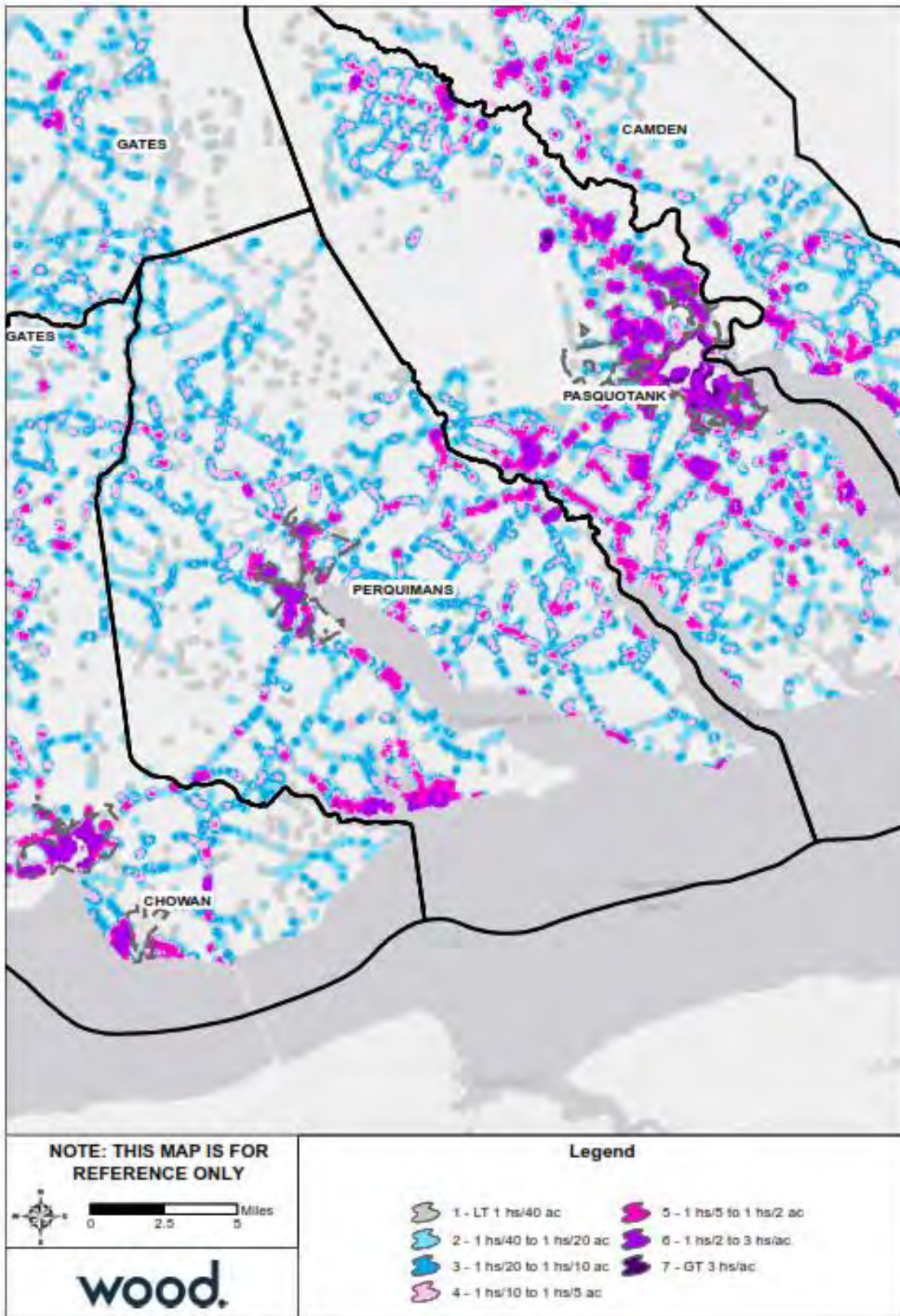
Source: NCEM Risk Management Tool

Table F.12 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Perquimans County

Sector	Number of Buildings at Risk	Estimated Damages
Perquimans County Unincorporated Area		
Government	12	\$18,820,867
Religious	1	\$3,317,576
Residential	1	\$1,182,400
All Categories	14	\$23,320,843
Town of Hertford		
Commercial	2	\$6,288,272
Government	4	\$13,812,722
All Categories	6	\$20,100,994
Town of Winfall		
Commercial	1	\$1,649,300
Government	1	\$6,809,100
All Categories	2	\$8,458,400

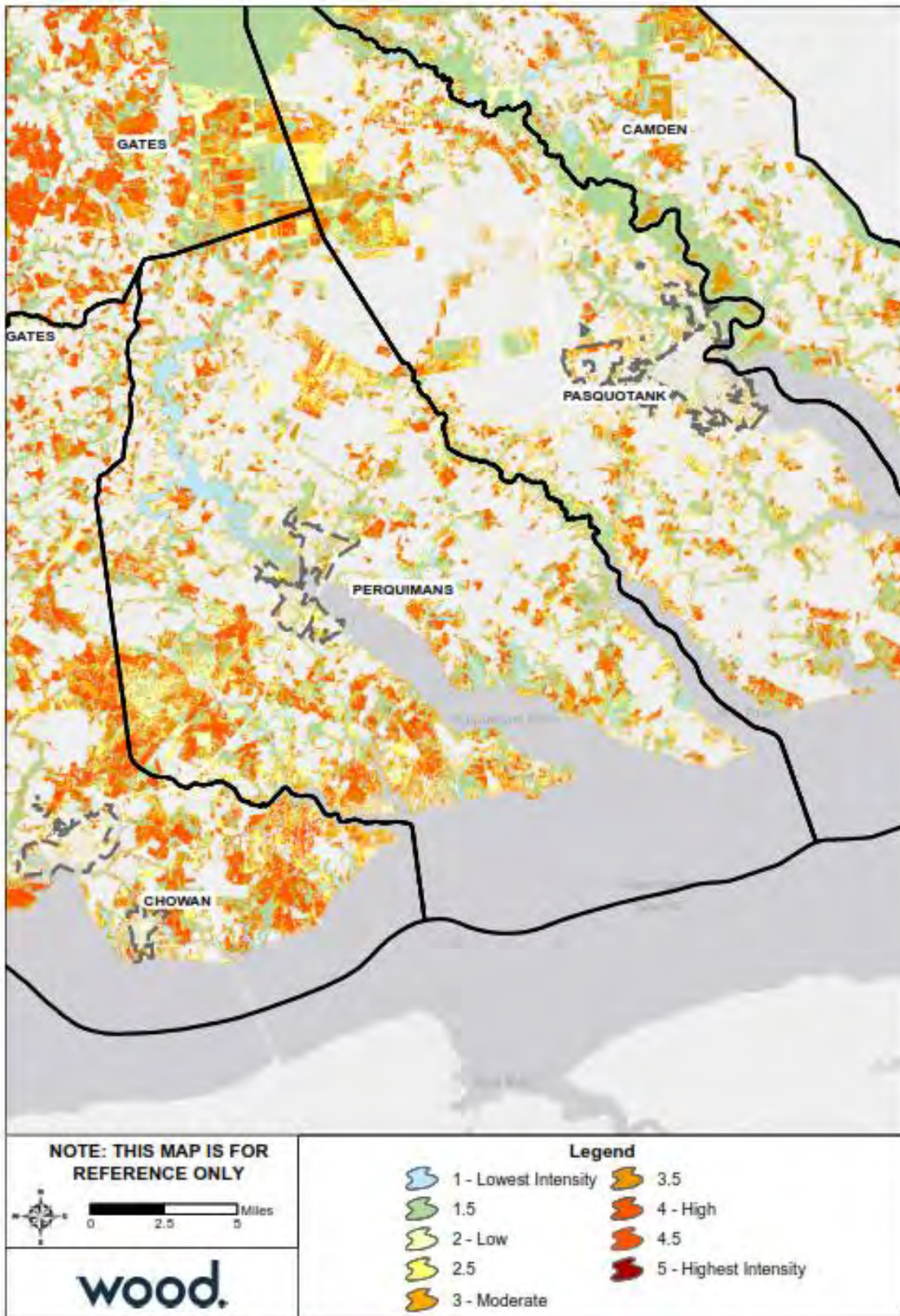
Source: NCEM Risk Management Tool

Figure F.11 – Wildland Urban Interface, Perquimans County



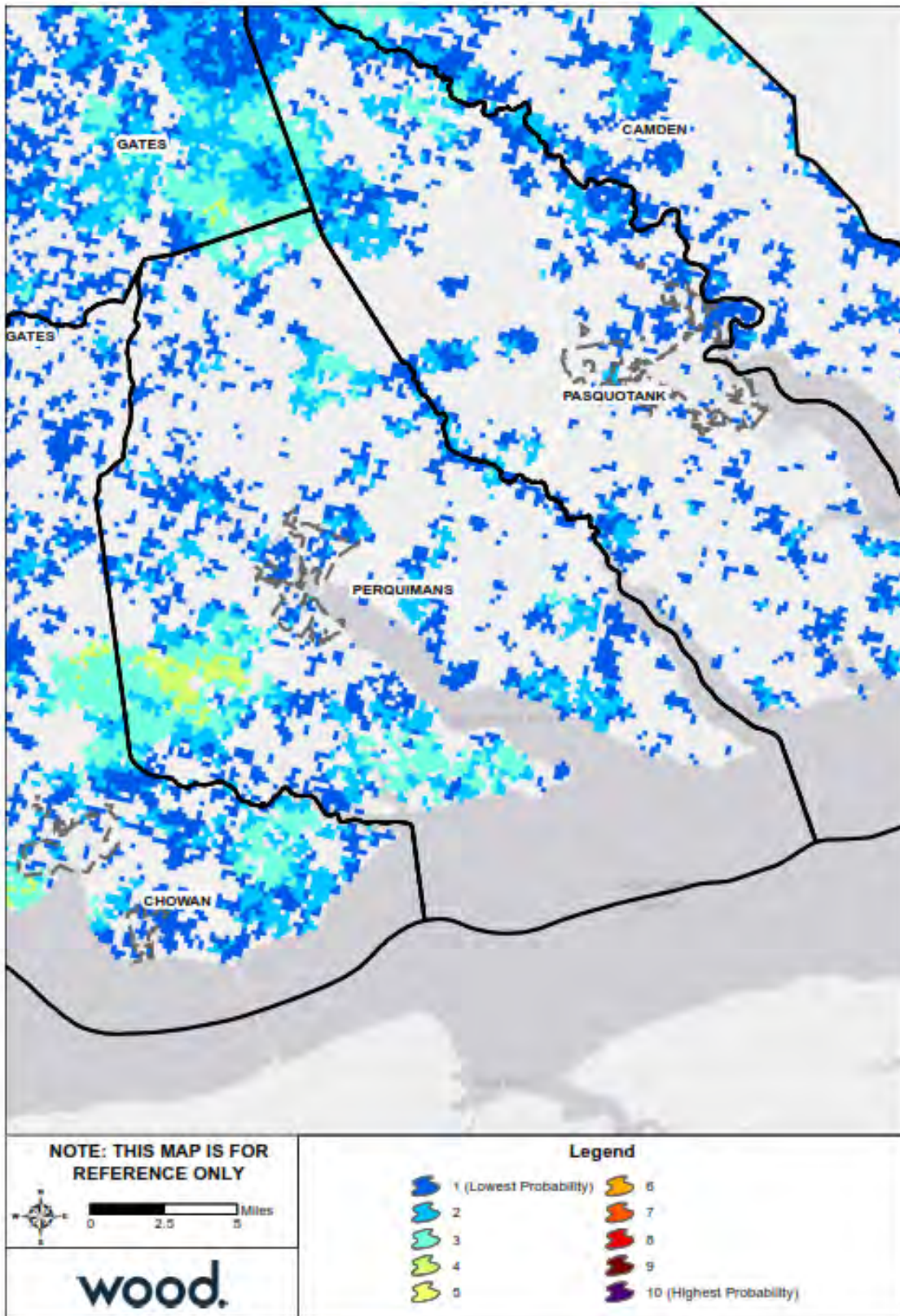
Source: Southern Wildfire Risk Assessment

Figure F.12 – Fire Intensity Scale, Perquimans County



Source: Southern Wildfire Risk Assessment

Figure F.13 – Burn Probability, Perquimans County



Source: Southern Wildfire Risk Assessment

F.3 CAPABILITY ASSESSMENT

F.3.1 Overall Capability

Details on the tools and resources in place and available to Perquimans County were provided by the County’s HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Perquimans County has an overall capability rating of High. Perquimans County provides many resources for its incorporated jurisdictions and many of the mitigation projects in this plan are regional in nature, with the County serving as the project lead; therefore, the County’s capability is also an indicator for its incorporated areas. The County’s Self-Assessment of key capability areas is summarized in Table F.13 below.

Table F.13 – Capability Self-Assessment, Perquimans County

Capability Area	Rating
Plans, Ordinances, Codes and Programs	High
Administrative and Technical Capability	High
Fiscal Capability	High
Education and Outreach Capability	High
Mitigation Capability	High
Political Capability	High
Overall Capability	High

F.3.2 Floodplain Management

The following tables reflect NFIP entry dates as well as policy and claims data for Perquimans County and incorporated jurisdictions, categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

Table F.14 – NFIP Program Entry Dates

Community	Regular Entry Date
Perquimans County (Unincorporated Area)	July 3, 1985
Town of Hertford	July 3, 1985
Town of Winfall	November 5, 1992

Source: FEMA Community Information System

Table F.15 – NFIP Policy and Claims Data by Structure Type

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Perquimans County Unincorporated Area					
Single Family	564	\$263,694	\$152,310,600	65	\$583,948.82
2-4 Family	1	\$276	\$76,700	0	\$0.00
All Other Residential	19	\$3,852	\$2,877,900	0	\$0.00
Non Residential	3	\$2,512	\$457,200	0	\$0.00
Total	587	\$270,334	\$155,722,400	65	\$583,948.82
Town of Hertford					
Single Family	36	\$17,388	\$9,648,600	15	\$289,720.58
2-4 Family	5	\$7,147	\$1,303,400	2	\$39,798.71
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	3	\$4,517	\$1,385,000	0	\$0.00
Total	44	\$29,052	\$12,337,000	17	\$329,519.29
Town of Winfall					

ANNEX F: PERQUIMANS COUNTY

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Single Family	12	\$6,594	\$2,985,000	2	\$57,407.64
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non Residential	2	\$3,713	\$593,000	0	\$0.00
Total	14	\$10,307	\$3,578,000	2	\$57,407.64

Source: FEMA Community Information System, accessed November 2019

Table F.16 – NFIP Policy and Claims Data by Flood Zone

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Perquimans County Unincorporated Area					
A01-30 & AE Zones	298	\$150,968	\$68,249,000	50	\$454,819.80
A Zones	1	\$574	\$250,000	0	\$0.00
AO Zones	4	\$2,387	\$790,700	1	\$9,585.68
B, C & X Zone					
Standard	11	\$8,747	\$2,912,900	6	\$64,388.88
Preferred	271	\$106,458	\$83,450,000	8	\$55,154.46
Total	585	\$269,134	\$155,652,600	65	\$583,948.82
Town of Hertford					
A01-30 & AE Zones	20	\$16,322	\$4,395,200	11	\$267,223.71
A Zones	0	\$0	\$0	1	\$17,358.58
B, C & X Zone					
Standard	3	\$1,048	\$711,800	1	\$1,249.12
Preferred	21	\$11,682	\$7,230,000	4	\$43,687.88
Total	44	\$29,052	\$12,337,000	17	\$329,519.29
Town of Winfall					
A01-30 & AE Zones	7	\$7,905	\$1,786,000	2	\$57,407.64
B, C & X Zone					
Preferred	7	\$2,402	\$1,792,000	0	\$0.00
Total	14	\$10,307	\$3,578,000	2	\$57,407.64

Source: FEMA Community Information System, accessed November 2019

Table F.17 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Perquimans County Unincorporated Area					
A01-30 & AE Zones	57	\$39,003	\$10,464,300	30	\$281,685.14
A Zones	1	\$574	\$250,000	0	\$0.00
AO Zones	3	\$2,061	\$631,700	1	\$9,585.68
B, C & X Zone					
Standard	4	\$2,521	\$1,300,000	0	\$0.00
Preferred	46	\$17,058	\$12,488,000	6	\$45,706.33
Total	111	\$61,217	\$25,134,000	37	\$336,977.15
Town of Hertford					
A01-30 & AE Zones	14	\$13,912	\$3,163,800	7	\$93,267.51
A Zones	0	\$0	\$0	1	\$17,358.58
B, C & X Zone					
Preferred	18	\$7,016	\$5,436,800	1	\$10,689.69

ANNEX F: PERQUIMANS COUNTY

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Standard	3	\$1,048	\$711,800	0	\$0.00
Preferred	15	\$5,968	\$4,725,000	1	\$10,689.69
Total	32	\$20,928	\$8,600,600	9	\$121,315.78
Town of Winfall					
A01-30 & AE Zones	4	\$4,553	\$741,000	2	\$57,407.64
B, C & X Zone	6	\$1,958	\$1,442,000	0	\$0.00
Standard	0	\$0	\$0	0	\$0.00
Preferred	6	\$1,958	\$1,442,000	0	\$0.00
Total	10	\$6,511	\$2,183,000	2	\$57,407.64

Source: FEMA Community Information System, accessed November 2019

Table F.18 – NFIP Policy and Claims Data Post-FIRM

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Perquimans County Unincorporated Area					
A01-30 & AE Zones	241	\$111,965	\$57,784,700	20	\$173,134.66
A Zones	0	\$0	\$0	0	\$0.00
AO Zones	1	\$326	\$159,000	0	\$0.00
B, C & X Zone	232	\$95,626	\$72,574,900	8	\$73,837.01
Standard	7	\$6,226	\$1,612,900	6	\$64,388.88
Preferred	225	\$89,400	\$70,962,000	2	\$9,448.13
Total	474	\$207,917	\$130,518,600	28	\$246,971.67
Town of Hertford					
A01-30 & AE Zones	6	\$2,410	\$1,231,400	4	\$173,956.20
B, C & X Zone	6	\$5,714	\$2,505,000	4	\$34,247.31
Standard	0	\$0	\$0	1	\$1,249.12
Preferred	6	\$5,714	\$2,505,000	3	\$32,998.19
Total	12	\$8,124	\$3,736,400	8	\$208,203.51
Town of Winfall					
A01-30 & AE Zones	3	\$3,352	\$1,045,000	0	\$0.00
B, C & X Zone	1	\$444	\$350,000	0	\$0.00
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$444	\$350,000	0	\$0.00
Total	4	\$3,796	\$1,395,000	0	\$0.00

Source: FEMA Community Information System, accessed November 2019

F.4 MITIGATION STRATEGY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
Perquimans County and Jurisdictions												
PER1	Create a preferred foliage and wind resistant tree list for the County. Distribute the list to property owners in an effort to reduce the risk of trees and plants from breaking in high wind events.	Perquimans County	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.2	P	<ul style="list-style-type: none"> County Public Works County Board of Commissioners 	\$10,000	General Fund	2 to 3 years	Not Started – Carry Forward	The County has not undertaken this strategy, but intends to do so in an effort to minimize tree damage.
PER2	Record all tax parcel information and floodplain locations in a GIS system including repetitive loss areas, areas of greatest risk, and vulnerable populations. Maintain and update GIS layers that identify critical facilities/infrastructure and other facilities to include childcare centers, mobile home parks/subdivisions, and senior care facilities.	Perquimans County, Hertford, Winfall	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.2	PIO	<ul style="list-style-type: none"> County GIS Municipal Planning 	Staff Time	General Fund NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County GIS Department will continue to maintain this data and incorporate new information as natural disasters occur.
PER3	Consider participating in the Community Rating System (CRS).	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	3.2	P	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	Staff Time	General Fund, NCDPS, NFIP	2 to 3 years	Not Started – Carry Forward	Perquimans County, as well as Hertford and Winfall will consider joining the CRS program through implementation of this plan.
PER4	Continue to acquire destroyed or substantially damaged properties and relocate households. Seek State and Federal funding (voluntary program).	Perquimans County, Hertford, Winfall	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.2	SP	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	To Be Determined	HMGP, FMA, CDBG, General Fund	Ongoing – next 5 years	In Progress – Carry Forward	Perquimans County will continue to carry out the mitigation buyout/elevation programs related to Hurricanes Matthew and Florence, as well as potential future disasters.
PER5	Maintain and annually update the county Emergency Operations Plan. This plan should contain detailed information on responsible parties and contact information. This information should be updated as positions and contact information change.	Perquimans County, Hertford, Winfall	All Hazards	3	3.2	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing - Annually	In Progress – Carry Forward	This effort is carried out annually by Perquimans County Emergency Services. The review and amendments are based on the results of the County’s annual tabletop exercise.
PER6	Work to improve/expand its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	2	2.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	\$20,000	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	The County will continue to work towards improving upon existing emergency notification system procedures.
PER7	Promote and encourage the training of Community Emergency Response Teams (CERT) throughout the county.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	2	2.2	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	\$10,000	General Fund, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County will continue efforts to expand upon its existing CERT program participation.
PER8	Work to develop continuity of operations plans (COOP) for county/town departments, assisted living facilities, long-term care facilities, day care centers, etc.	Perquimans County, Hertford, Winfall	All Hazards	4	4.2	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	The County will review and update the County’s Continuity of Operations Plan (COOP), following its annually scheduled tabletop exercise.

ANNEX F: PERQUIMANS COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
Perquimans County and Jurisdictions												
PER9	Minimize construction of additional impervious surfaces within floodplains in order to reduce stormwater runoff, including limiting construction of impervious surface parking lots in the areas near the rivers through amendments to the County Land Development Regulations.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	NRP	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	Staff Time	General Fund, NCDEQ	2 to 3 years	Not Started – Carry Forward	The County will consider amending existing zoning and subdivision regulations in an effort to promote development that better manages stormwater runoff.
PER10	Continue to monitor and maintain prewired generator switches in new construction critical facilities and existing shelters. As projects go through the County’s development review process, applicants can be encouraged to pre-wire facilities for a generator.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	2	2.1	ES	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	County Emergency Management maintains switches at all critical facilities, the County Building Inspections Department will require switches be installed during the construction of any new facility deemed critical or that will potentially be utilized as a shelter.
PER11	Sponsor a hazard mitigation symposium for county residents, including information on preparedness for all significant hazards. The symposium should address the options of elevation, relocation, and flood-proofing.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	2	2.2	PIO	<ul style="list-style-type: none"> County Emergency Management Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing - Annually	In Progress – Carry Forward	The County will host a symposium once annually prior to the start of hurricane season.
PER12	Continue to maintain a library of materials focused on educating property owners, contractors, realtors and developers about ways to mitigate the effects of high winds and flooding through the use of best management practices during the construction/ renovation of residential and non-residential structures. The County will also utilize print and social media for awareness and education. The County will also maintain staff educated in these issues to work with prospective builders.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	2	2.2	PIO	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	This activity is currently underway and will be maintained through the planning process.
PER13	Increase awareness regarding the impacts of natural disasters by educating and informing residents, businesses and visitors via public education, social media and print materials. These efforts should focus on ways to mitigate disaster impacts to both person and property.	Perquimans County, Hertford, Winfall	All Hazards	2	2.1	PIO	<ul style="list-style-type: none"> County Emergency Management County Planning & Zoning 	Staff Time	General Fund, NCDPS	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to carry out these efforts through continued outreach and public education efforts.
PER14	Develop and distribute information to the public regarding the requirements for anchoring LP gas tanks.	Perquimans County, Hertford, Winfall	All Hazards	2	2.2	PIO	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations 	\$1,000	General Fund, NCDPS	1 year	Not Started – Carry Forward	This effort is not currently underway; however, the County Building Inspections Department, will undertake this strategy through implementation of this plan.
PER15	Actively working with Federal, State, local and private partners to identify mitigation measures and secure funding via grants to alleviate flooding. These efforts should focus on the following areas: <ul style="list-style-type: none"> Property along the Perquimans River Bear Swamp Watershed Bagley Swamp Watershed Burnt Mill Watershed 	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County Planning & Zoning County Board of Commissioners 	To Be Determined	General Fund, NCDPS, HMGP, NCDENR	3 to 5 years	New	N/A

ANNEX F: PERQUIMANS COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
Perquimans County and Jurisdictions												
PER16	Establish active river gauges at various points along the Perquimans River.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	2	2.1	PIO	County Planning & Zoning	To Be Determined	General Fund, NCDPS	2 to 3 years	New	This strategy was defined within the Hurricane Matthew Resiliency Redevelopment Plan.
PER17	Establish a county-wide Mosquito Abatement Program.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	ES	County Public Works	To Be Determined	General Fund	2 to 3 years	New	This strategy was defined within the Hurricane Matthew Resiliency Redevelopment Plan.
PER18	Undertake a county-wide campaign to snag and clear all arterial creeks and canals of beaver dams and other problematic blockages.	Perquimans County	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	<ul style="list-style-type: none"> County Public Works County Board of Commissioners 	To Be Determined	General Fund, NCDPS, NCDEQ	2 to 3 years	New	This strategy was defined within the Hurricane Matthew Resiliency Redevelopment Plan.
PER19	Support planning for improvements to the Perquimans County regional transportation systems to provide for safe traffic flow and evacuation. These efforts should include the identification of location for the use of electrical highways signs intended to provide warning regarding inclement weather and/or hazardous road conditions.	Perquimans County, Hertford, Winfall	Hurricane & Tropical Storm, Severe Weather (Thunderstorm Wind, Lightning, & Hail), Severe Winter Storm, Tornado	1	1.1	P	<ul style="list-style-type: none"> County Planning & Zoning Municipal Administrations NCDOT 	Staff Time	General Fund, NCDOT	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work closely with NCDOT, as well as the Regional Transportation organization to carry out this strategy.
PER20	Update/maintain the County’s current Action Plan for Wildfire Response. These efforts will include a review of inter-agency and multijurisdictional efforts to identify, contain and extinguish wildfires. This effort will also involve an education effort focused on informing home and property owners about Wildland/Urban Interface fire safety.	Perquimans County, Hertford, Winfall	Wildfire	4	4.2	P	<ul style="list-style-type: none"> County Emergency Management County Manager Volunteer Fire Depts. US Forestry Service 	Staff Time	General Fund, US Forest Service	Ongoing – next 5 years	In Progress – Carry Forward	The County will continue to work with citizens in conjunction with the US Forestry Service to carry out this strategy.
Town of Hertford												
HRT1	Update the CAMA Land Use Plan in conjunction with the County’s Core Land Use Plan.	Town of Hertford	All Hazards	1	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
HRT2	Consider revising Hertford’s Zoning Ordinance and Subdivision Regulations to improve stormwater management practices in developments to better address Mitigation Goals and Objectives.	Town of Hertford	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
HRT3	Work in conjunction with NCDOT and other agencies to ensure that stormwater facilities are maintained to allow for reasonable flows.	Town of Hertford	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
Town of Winfall												
WIN1	Review the Town’s Land Use Plan, Land Development Regulations, and Water and Sewer Ordinances and ensure that hazard mitigation objectives are addressed.	Town of Winfall	All Hazards	1	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.
WIN2	Minimize construction of impervious surfaces adjacent to floodplains or near storm water drainage routes that empty into the river.	Town of Winfall	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	1	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will consider updating the Local land Use Plan through implementation of the mitigation Plan.

ANNEX F: PERQUIMANS COUNTY

Action #	Description	Applicable Jurisdictions	Hazards Addressed	Goal	Objective	Category	Lead/Participating Agencies (Lead Agency is in bold)	Estimated Cost	Potential Funding Sources	Implementation Schedule	2019 Status	Status Comments/Explanation
Perquimans County and Jurisdictions												
WIN3	Continue to encourage efforts toward county-wide water systems with Perquimans County.	Town of Winfall	Drought	1	1.3	P	Town Manager	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	The Town will continue to work with the County to ensure the availability of water system resources.
WIN4	Continue to evaluate those businesses with potential hazardous liquids for adequate protection of the public.	Town of Winfall	All Hazards	4	4.2	ES	Town Council	Staff Time	General Fund	Ongoing – next 5 years	In Progress – Carry Forward	This effort is also addressed through the County’s standing Local Emergency Planning Committee (LEPC).

Appendix A Plan Review Tool

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LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Albemarle Region (Camden County, Chowan County, Gates County, Hertford County, Pasquotank County, Perquimans County, and incorporated jurisdictions)	Title of Plan: Albemarle Regional Hazard Mitigation Plan	Date of Plan: January 2020
Local Point of Contact: David Stroud	Address: 4021 Stirrup Creek Drive, Suite 100 Durham, NC 27703	E-Mail: David.stroud@woodplc.com
Title: Emergency & Hazard Mitigation Lead		
Agency: Wood Environment & Infrastructure Solutions, Inc.		
Phone Number: 919-856-6485		

State Reviewer: Carl Baker	Title: Hazard Mitigation Planner	Date: March 26, 2020
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FEMA Reviewer:	Title:	
Date Received in FEMA Region <i>(insert #)</i>		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

**SECTION 1:
REGULATION CHECKLIST**

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been ‘Met’ or ‘Not Met.’ The ‘Required Revisions’ summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is ‘Not Met.’ Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST	Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)			
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 2 (p. 5-31); Appendix B		
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 2 (p. 8-14); Appendix B (p.B.31- B.32) Appendix B, page B.31		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 2 (p. 13-14); Appendix B (p.B.13- B.30) Appendix B page, B.13-B.30		
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 2 (p. 8-9) Table 2.3		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 8 (p. 280) Section 8.3		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 8 (p. 276-280) Section 8.2		

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT A: REQUIRED REVISIONS				
A1 NCEM 1 st review: Not all meeting attendees on rosters in Appendix B are listed in Table 2.4. The Local Mitigation Plan Review Guide, page 15, states: “The plan must identify who represented each jurisdiction. The Plan must provide, at a minimum, the jurisdiction represented and the person’s position or title and agency within the jurisdiction.”				
A2 NCEM 1 st review: No revisions identified.				
A3 NCEM 1 st review: No revisions identified.				
A4 NCEM 1 st review: No revisions identified.				
A5 NCEM 1 st review: No revisions identified.				
A6 NCEM 1 st review: No revisions identified.				
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT				
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 4.5 (p. 99-237; Hazard Description, Location, Extent, Hazard Summary by Jurisdiction), Annexes			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 4.5 (p. 99-237; Past Occurrences, Probability of Future Occurrence, Hazard Summary by Jurisdiction),			
B3. Is there a description of each identified hazard’s impact on the community as well as an overall summary of the community’s vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 4.5 (p. 99-237; Vulnerability Assessment, Hazard Summary by Jurisdiction), Annexes			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 4.5.6 (p.167)			
ELEMENT B: REQUIRED REVISIONS				
B1 NCEM 1 st review: Extent heading is missing from the flooding hazard.				
B2 NCEM 1 st review: Limited data on erosion and high temperatures.				
B3 NCEM 1 st review: No revisions required.				
B4 NCEM 1 st review: No revisions required.				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 5 (p. 238-252)			

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 5 (p. 243-245)			
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 6 (p.253-254)			
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 6 (p. 255-256), Section 7 (p. 257-275), Appendix C			
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 6 (p. 255-256), Section 7 (p. 257-275)			
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 8 (p.276-280)			
ELEMENT C: REQUIRED REVISIONS				
C1 NCEM 1 st review: No revisions identified.				
C2 NCEM 1 st review: Table 5.1 does not list Harrellsville in the NFIP, yet table 5.2 notes that the town joined NFIP in 2009. Only 8 of 17 have a floodplain management plan, and 13 of 17 have a floodplain manager.				
C3 NCEM 1 st review: No revisions identified				
C4 NCEM 1 st review: Only one county broke out the towns by name in the mitigation action table. Hertford only lists one all hazard action. From page 257: “This section provides the mitigation action plan for each participating jurisdiction, grouped by county. To improve regional coordination and increase capability to implement projects, many actions are multijurisdictional but will be led by the respective county.” Add town names to tables to demonstrate each jurisdiction in the plan is participating in the efforts. Add “all hazard” actions from Perquimans County to Hertford and Winfall to satisfy the minimum number of actions.				
C5 NCEM 1 st review: No revisions identified.				
C6 NCEM 1 st review: No revisions identified.				
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 3 (p. 32-79), Section 4 (p. 80-237; Asset Inventory, Vulnerability Assessment), Annexes			
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 2 (p. 6, 15-31), Section 5 (p.238-252)			
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 6 (p. 253-256), Section 7 (p. 257-275)			

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
<u>ELEMENT D: REQUIRED REVISIONS</u>				
D1 NCEM 1 st review: Population changes are addressed in Section 3. Future land use is located in Annex A-F.				
D2 NCEM 1 st review: No revisions identified.				
D3 NCEM 1 st review: No revisions identified.				
ELEMENT E. PLAN ADOPTION				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Plan will be adopted pending APA letter from FEMA; Adoption resolutions will be added to Section 9			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Plan will be adopted pending APA letter from FEMA; Adoption resolutions will be added to Section 9			
<u>ELEMENT E: REQUIRED REVISIONS</u>				
NCEM 1 st Review: No action at this time.				
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)				
F1.				
F2.				
<u>ELEMENT F: REQUIRED REVISIONS</u>				
Complete agency and title on page one.				
Correct page numbers in bookmarks to annexes.				
Section 4.5, table numbers are out of sequence, some numbers are repeated.				

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

**SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)**

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were ‘Met’ or ‘Not Met,’ and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1	Camden County	County										
2	Chowan County	County										
3	Edenton	Town										
4	Gates County	County										
5	Gatesville	Town										
6	Hertford County	County										
7	Ahoskie	Town										
8	Como	Town										
9	Harrellsville	Town										

MULTI-JURISDICTION SUMMARY SHEET

#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
10	Murfreesboro	Town										
11	Winton	Town										
12	Cofield	Town										
13	Pasquotank County	County										
14	Elizabeth City	City										
15	Perquimans County	Count										
16	Hertford	Town										
17	Winfall	Town										

Appendix B Planning Process Documentation

PLANNING STEP 1: ORGANIZE TO PREPARE THE PLAN

Table B.1 – HMPC Meeting Topics, Dates, and Locations

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
HMPC Mtg. #1 – Project Kickoff	<ol style="list-style-type: none"> 1) Introduction to DMA, CRS, and FMA requirements and the planning process 2) Review of HMPC responsibilities and the project schedule. 	February 26, 2019	Town of Edenton Council Chambers 504 S Broad Street, Edenton
HMPC Mtg. #2	<ol style="list-style-type: none"> 1) Review and update plan goals 2) Brainstorm a vision statement 3) Report on status of actions from the 2015 plan 4) Complete the capability assessment 	March 28, 2019	Pasquotank County Public Safety Building, Community Room, 200 E. Colonial Ave, Elizabeth City, NC
HMPC Mtg. #3	<ol style="list-style-type: none"> 1) Review draft Hazard Identification & Risk Assessment (HIRA) 2) Review draft goals and objectives 3) Draft Mitigation Strategies 	June 21, 2019	Perquimans County Library 514 S Church Street Hertford
HMPC Mtg. #4	<ol style="list-style-type: none"> 1) Review the Draft Hazard Mitigation Plan 2) Solicit comments and feedback 	December 3, 2019	Emergency Services Building Meeting Room, 159 Creek Drive, Hertford, NC

Note: All HMPC Meetings were open to the public.

Meeting agendas, minutes, and sign in sheets are provided on the following pages. Presentations referenced in the minutes can be provided upon request.

HMPC Meeting Agendas, Minutes, and Sign-in Sheets

HMPC Meeting 1: February 26, 2019

Agenda

Albemarle Regional Hazard Mitigation Plan
Hazard Mitigation Planning Committee Meeting
February 26, 2019, 10:00 AM
Town of Edenton Council Chambers

- Introductions
- Project Overview
 - Participants
 - What is Hazard Mitigation?
 - Requirement for Update
 - Trends in Disasters
 - Disaster Mitigation Act of 2000
 - Federal and State Requirements
 - Planning Requirements
 - Planning Process Review
 - Scope of Work
 - Risk Management Tool (RMT)
- Project Schedule
- Plan Website
- Next Steps
 - Complete Plan Survey
 - Share Link to Plan Website on Local Community Websites
 - Prepare to Discuss Goals and Strategies at Next Meeting
- Questions

Albemarle Regional Hazard Mitigation Plan
Hazard Mitigation Planning Committee Meeting
Tuesday, February 26, 2019-10:00 AM
Meeting Minutes

Landin Holland called the meeting to order at 10:00 am in the Town of Edenton Town Council Chambers.

Present

Refer to the attached sign in sheet.

Introduction

Mr. Holland introduced himself and provided an explanation of the overall project, as well as the project team that will be working through the Planning Process.

Presentation

Mr. Holland provided a presentation that detailed project partners, project schedule, and plan content. The presentation has been attached as a component of these minutes. An overview of the project schedule was discussed, including a potential timeframe for the second meeting.

Questions

Mr. Holland advised everyone that there needed to be a primary and secondary staff member for non-Community Rating System (CRS) communities. Mr. Holland went on to say that local units of government that are participants in the CRS program must identify the primary and secondary staff members, as well as two citizen stakeholders. The defined stakeholders should not be elected officials.

Adjourn

There being no further business to conduct, Mr. Holland adjourned the meeting at 11:00 AM.

Albemarle Regional Hazard Mitigation Plan
 Hazard Mitigation Planning Committee Kick-Off Meeting
 Tuesday, February 26, 2019, 10:00 AM

21.	Anne Marie Knight	Town of Edenton
22.	Fred Yates	Town of Winfall
23.	Elizabeth Bryant	Town of Edenton
24.	Dina H. White	Town of Harrellsville
25.	Shelley Cox	Pasq. County Planning
26.	Logan P. Nash	Emergency Mng.
27.	Kerry McDuffie	Town of Ahoskie
28.	Lois Brickhouse	Town of Ahoskie
29.	Kellen Long	City of Elizabeth City
30.	CHRIS SMITH	Hertford County - EM
31.	ELL MONTGOMERY	GATES County EM
32.	Billy Wain	GATES County / Snowsboro
33.	Penny Turner Hall	Town of Cotfield
34.	CARL PIERCE	Town of Winton
35.	Rhonda Money	Perquimans County
36.	Priscilla Stewart	Chatham County
37.	IRVIN STEPHENS JR.	Town of Como
38.	Caroleen Dawson	Town of Murfreesboro
39.	HAL THOMAS	Town of Murfreesboro
40.	CHRIS CREW	NCEM
41.		

HMPC Meeting 2: March 28, 2019

Agenda

Albemarle Regional Hazard Mitigation Plan
Hazard Mitigation Planning Committee Meeting
March 28, 2019, 2:00 PM

Pasquotank County Public Safety Building Community Room

- Participants/Attendance
- Community Rating System
 - What is CRS?
 - CRS in the Albemarle Region
 - CRS Goals
- Mitigation Goals
 - Existing Goals from 2015 Plan
 - Recommended Revisions
 - Recommended Goals
- Update Mitigation Strategies
 - Existing Mitigation Strategies
 - Mitigation Action Reporting Form
- Community Capability Assessment
- Project Schedule
- Housekeeping
- Next Steps
 - Complete strategy exercise by April 28, 2019
 - Review and return capability assessment by April 28, 2019
- Questions

**Albemarle Regional Hazard Mitigation
Hazard Mitigation Planning Committee Meeting**

**Thursday, March 28, 2019-2:00 PM
Meeting Minutes**

Landin Holland called the meeting to order at 2:00 PM at the Pasquotank County Public Safety Building located in Elizabeth City, NC.

Present

Refer to the attached sign in sheet.

Introduction

Mr. Holland introduced himself and provided an overview of the topics to be covered at the second meeting.

Presentation

Mr. Holland provided a presentation that focused on the community's participation in the planning process. This presentation has been attached as a component of these minutes. In particular, Mr. Holland discussed the need for participating counties and municipalities to review and provide a status for each of the existing mitigation strategies. Mr. Holland informed the group that they would be receiving the existing mitigation strategies and "Mitigation Action Reporting Sheets" to fill out the week of April 1st. In addition to the strategies, the HMPC was informed that they would also be receiving summary sheets related to each participating jurisdiction's capability to carry out mitigation strategies.

Mr. Holland requested that this information be returned to Cindy Anderson with Holland Consulting Planners within thirty days.

Questions

Mr. Holland was asked if participating municipalities needed to meet with all jurisdictions, principally the County, to discuss the relevancy and progress made regarding existing strategies. Mr. Holland stated that this approach is feasible; however, this was not necessary and that other regions were relying on the County to complete the review for strategies impacting "all jurisdictions."

Adjourn

There being no further business to conduct, Mr. Holland adjourned the meeting at 3:10 PM.

APPENDIX B: PLANNING PROCESS DOCUMENTATION

Albemarle Regional Hazard Mitigation Plan
 Hazard Mitigation Planning Public Meeting #12
 Thursday, March 28, 2019, 6:00 PM

	Name	Organization (resident)	Phone	E-Mail
1.	Billy Wynn	Gates County / Town of Gates	252-287-7516	townofgatescounty.nc.gov
2.	CHRIS SMITH	Municipal Affairs / Hertford County EM	252-642-7000	Chris.Smith@hertfordcounty.nc.gov
3.	Rhonda Money	Pergolians County	252-486-2027	rhonda.money@pergoliancounty.nc.gov
4.	Dina White	Town of Hargettsville	252-356-4499	hargettsville@centurylink.net
5.	IRVIN STEPHENS, SR.	Town of CAMO	252-396-3322	swk1088@yahoo.com
6.	Mellen Long	City of Elizabeth City	252-340-9328	blong@cityofec.com
7.	Matthew Schelly	City of Elizabeth City	252-357-6672	mschelly@cityofec.com
8.	Elizabeth Bryant	Town of Eden	252-482-2155	elizabeth.bryant@eden-nc.gov
9.	Christy Saunders	Pasquotank-Camden EM	252-335-4444	saundersc@co.pasquotank.nc.us
10.	LOGAN NASH	PASQUOTANK-CAMDEN EM	252-335-4444	nashl@co.pasquotank.nc.us
11.	Pam Hurdle	Town of Hertford	252-426-1969	manager@townofhertford.com
12.	Jacazza Jones	NC EM Mitigation	919-825-2592	jacazza.jones@nodps.gov
13.	Fred Yates	Town of Winfall	252-333-9393	Fred@intelliport.com
14.	Ken Rominger	Town of Winfall	252-333-0253	Krominger58@gmail.com
15.	Quentin Jackson	Town of Hertford	(919) 820-6496	quentin@townofhertfordnc.com
16.	Mate Brickhouse	Town of Alsea	(252) 332-5146	MateBrickhouse@alseekc.gov
17.	Carl Pierce	Town of Winton	252-287-7110	townshop@hotmail.com
18.				
19.				
20.				

HMPC Meeting 3: June 21, 2019

Agenda

Albemarle Regional Hazard Mitigation Plan
Hazard Mitigation Planning Committee Meeting
June 21, 2019, 10:00 AM
Perquimans County Library

- Participants/Attendance
- Project Update
 - Schedule
 - Participation
 - Repetitive Loss Data
- Mitigation Goals
 - Review of Goals and Objectives
 - Overview of Draft Mitigation Strategies
- Presentation of Hazard Identification and Risk Assessment (HIRA)
 - Hazard identification
 - Asset Inventory
 - Hazard Profile
- Housekeeping
- Public Comment
- Questions

**Albemarle Regional Hazard Mitigation Plan
Hazard Mitigation Planning Committee Meeting
Friday, June 21, 2019-10:00 AM
Meeting Minutes**

Landin Holland called the meeting to order at 10:00 am in the Perquimans County Library.

Present

Refer to the attached sign in sheet.

Introduction

Mr. Holland introduced himself and provided an update regarding the project status, and attendance at the previous meetings.

Presentation

Mr. Holland provided a presentation that detailed project elements. This discussion provided a review of the Plan's existing as well as updated strategies. Mr. Holland requested that each jurisdiction review draft strategies to be forwarded via email. All comments should be received by 7/26/2019. Mr. Holland went on to provide an explanation of the Hazard Identification Risk Analysis developed through the North Carolina Department of Public Safety's Risk Management Tool (RMT). Communities were asked to review this information in an effort to ensure accuracy regarding each community's potential vulnerability.

Questions

Mr. Holland was asked to ensure that each municipal jurisdiction was adequately represented regarding the data developed and represented within the HIRA analysis. Mr. Holland assured that the project team would follow up on this request.

Adjourn

There being no further business to conduct, Mr. Holland adjourned the meeting at 11:05 AM.

Albemarle Regional Hazard Mitigation Plan
 Hazard Mitigation Planning Committee Meeting
 Friday, June 21, 2019, 10:00 AM

42.	Phil Bishop Asheville		
43.	Fred Yates Winstail		
44.	Ken Rominger Winstail		
45.	Dina H. White	Town of Harelsville	
46.	Patricia Munkle	Town of Hertford	
47.	Patrick Dillboy	Winton / Hertford County	
48.	CHRIS CAW	NCEM Risk Mgmt	
49.	Heleen Long	City of Elizabeth City	
50.	EDUARDO MORAONE	FEMA (FIRM)	
51.	Jacazza Jones	NCEM/HM	
52.	Rhonda Money	Perquimans County	
53.	Cordell Palmer	Chowan EM	
54.	Notable Fleunthwaite	Dare County	
55.	Deventin Jackson	Town of Hertford	
56.			
57.			
58.			
59.			
60.			
61.			
62.			

HMPC Meeting 4: December 3, 2019

**Albemarle Regional Hazard Mitigation Plan
Hazard Mitigation Planning Committee Meeting
Tuesday, December 3, 2019-3:00 PM
Meeting Minutes**

Landin Holland called the meeting to order at 3:00 pm in the Perquimans Emergency Services Building Meeting Room.

Present

Refer to the attached sign in sheet.

Introduction

Mr. Holland introduced himself and provided an update regarding the overall project, including that the overall draft plan has been completed and is available for review on the project website.

Presentation

Mr. Holland provided an overview of the project status and explained the overall structure of the plan, including a review of each plan section. Mr. Holland went on to provide an explanation of the remaining steps of the planning process and what will be required of each community to ensure adoption and certification of the document moving forward through the adoption phase of the project. Mr. Holland requested that communities provide any necessary modifications to the draft plan no later than December 20, 2019, so that edits may be incorporated into the plan prior to submittal to the North Carolina Department of Public Safety.

Questions

No questions were posed following Mr. Holland's presentation.

Adjourn

There being no further business to conduct, Mr. Holland adjourned the meeting at 3:50 PM.

APPENDIX B: PLANNING PROCESS DOCUMENTATION

Albemarle Regional Hazard Mitigation Plan
 Hazard Mitigation Planning Committee Meeting
 Wednesday, December 4, 2019, 3:00 PM

	Name	Organization	Phone	E-Mail
1.	Rhonda Money	Perquimans County Planning Office	(252) 426-2027	rhonda.money@perquimanscounty.nc.gov
2.	Fred Yates	Town of Winton	252-333-9393	Fred@intellipart.net
3.	Dina Harrell	Town of Harrellsville	252-356-4499	harrellville@centurylink.net
4.	Billy Winn	Community Town of Edenton	252-756	dwinn@gatescounty.nc.gov
5.	Chris Smith	Hertford Co / Curritow counties	252-642-7000	chris.smith@portfoctownline.gov
6.	Rogean Dash	PASA-CRMDEN Emergency	252-335-4444	nashl@coprasoutank.nc.us
7.	Jonathan Nixon	Perquimans County Services	252-331-9817	jonix@perquimanscounty.nc.gov
8.	Pamela Hurdle	Town of Hertford	252-426-1969	mhurdle@townofhertford.com
9.	Julie Soussbee	Perquimans County Emergency	252-426-5046	jsoussbe@perquimanscounty.nc.gov
10.	Mark B. B... (unclear)	Town of Ahoskie	252-332-5146	MarkB@ahoskieahoskie.nc.gov
11.	Kerry McPuffie	Town of Ahoskie	252-287-6733	Kerry.mcpuffie@ahoskie.nc.gov
12.	Kent Pierce	Chowan County	252-482-5618	Kent.pierce@chowan.nc.gov
13.	Anne Marie Knight	Town of Edenton	252-482-7352	Anne-Marie.Knight@edenton.nc.gov
14.	Kellen Long	City of Elizabeth City	252-340-2578	klong@cityofec.com
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PLANNING STEP 2: INVOLVE THE PUBLIC

Table B.2 – Public Meeting Topics, Dates, Locations

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
Public Meeting #1	<ol style="list-style-type: none"> 1) Introduction to DMA, CRS, and FMA requirements and the planning process 2) Review of HMPC responsibilities and the project schedule. 	March 28, 2019	Pasquotank County Public Safety Building, Community Room, 200 E. Colonial Ave, Elizabeth City, NC
Public Meeting #2	<ol style="list-style-type: none"> 1) Review “Draft” Hazard Mitigation Plan 2) Solicit comments and feedback 	December 3, 2019	Emergency Services Building Meeting Room, 159 Creek Drive, Hertford, NC

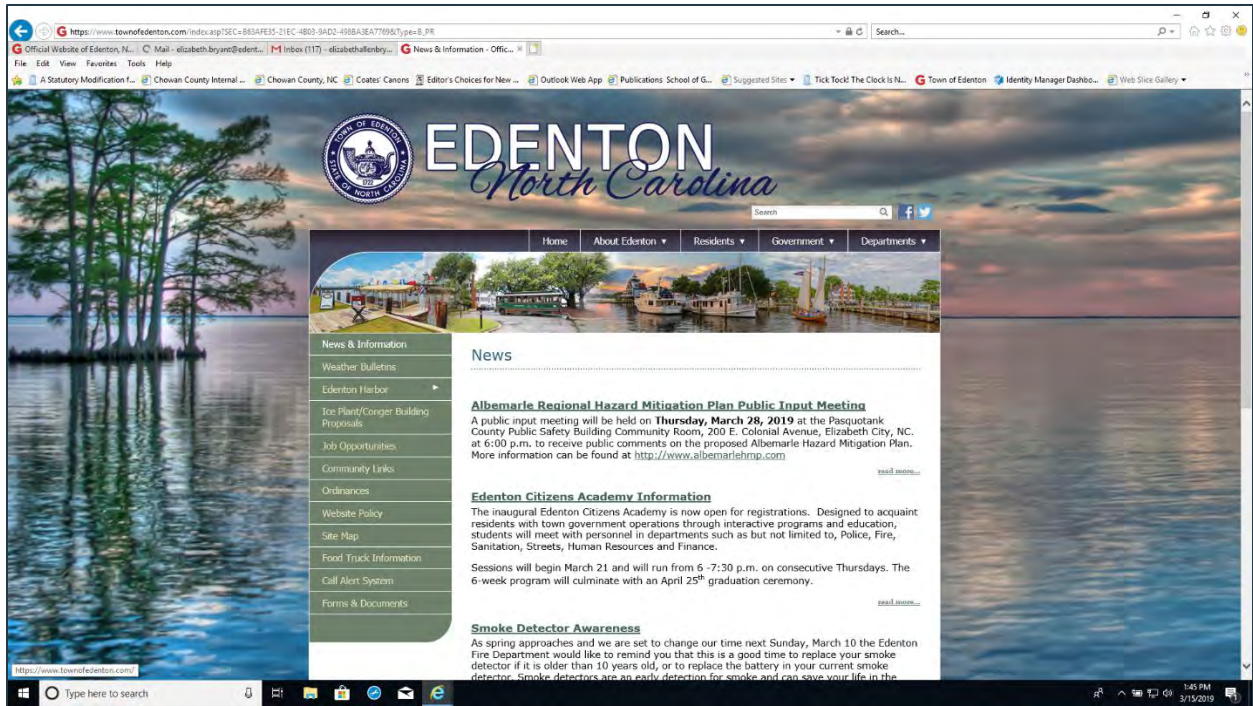
APPENDIX B: PLANNING PROCESS DOCUMENTATION

Public Meeting Agendas, Minutes, Sign-in Sheets, and Announcements

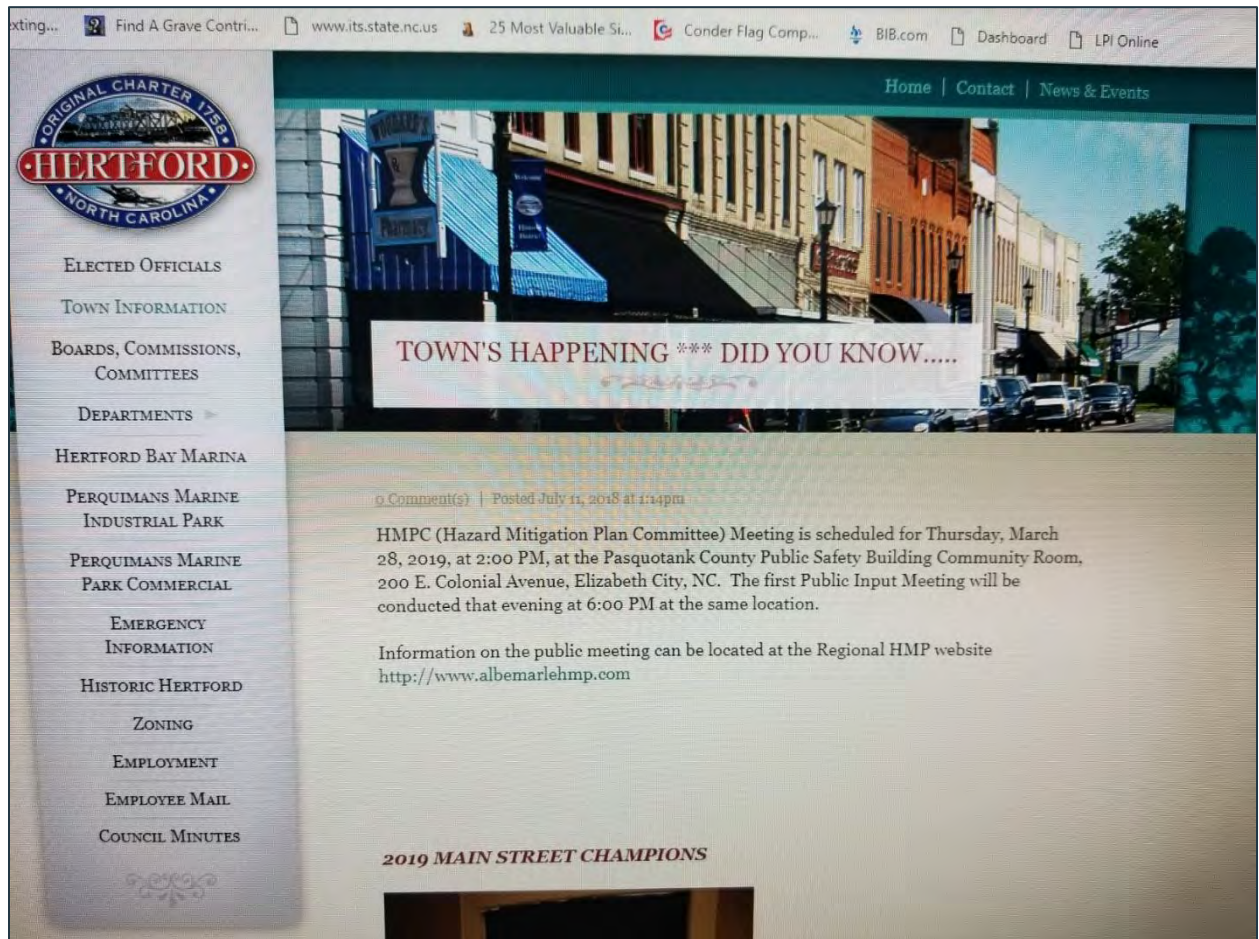
Public Meeting 1: March 28, 2019

	Name	Organization (resident)	Phone	E-Mail
1.	Michael Bapp			michaelrapp@cox.net
2.				
3.				
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APPENDIX B: PLANNING PROCESS DOCUMENTATION




APPENDIX B: PLANNING PROCESS DOCUMENTATION



WELCOME TO THE TOWN OF MURFREESBORO


****ANNOUNCEMENTS****




MURFREESBORO
UNDER BANKS, NC

The first Public Input Meeting for the Albemarle Regional HMPC will be held at 6:00 PM on Thursday, March 28, 2019, at the Pasquotank County Public Safety Building Community Room, 200 E. Colonial Avenue, Elizabeth City, NC.

HMP website (<http://www.albemarlehmp.com>).



Check out Murfreesboro on Facebook!



Visit the official web site for PAWS of Hertford County! Adopt a dog or cat today!

**** If in need to contact Murfreesboro Public Works after hours you can call 252-398-4151****

Welcome to the historic town of Murfreesboro, North Carolina, incorporated in 1787, and home

Emergency Management

EMERGENCY MANAGEMENT HOME

ABOUT EMERGENCY MANAGEMENT

GALLERY

NEWS

ROAD CLOSURES

EVACUATION

SHELTER INFORMATION

FLOODING

HURRICANE INFORMATION


TORNADOES

SPECIAL NEEDS REGISTRY

BUSINESS PLANNING RESOURCES

HELPFUL LINKS

CONTACT US




Emergency Management

Elizabeth City - Pasquotank - Camden

Welcome to the Pasquotank-Camden-Elizabeth City Emergency Management website! This is a static site utilized to provide basic Emergency Management information. *For current information please follow us on Facebook!*


Contact our office at 252-335-4444 with any questions or concerns!

Important Notice!



Albemarle Regional Hazard Mitigation Planning Committee is hosting a Public Input Meeting scheduled for *Thursday, March 28, 2019 at 6:00 PM*, at the Pasquotank County Public Safety Building Community Room, 200 E. Colonial Avenue, Elizabeth City, NC, 27909

For more information, Visit <http://www.albemarlehmp.com>



Am I at risk for flooding?

APPENDIX B: PLANNING PROCESS DOCUMENTATION

Pasquotank/Camden/Elizabeth City Emergency Mgmt
@CamPasqEM

Hazard Mitigation Public Input Meeting
Albemarle Regional Hazard Mitigation Planning Committee is hosting a Public Input Meeting scheduled for Thursday, March 28, 2019 at 6:00 PM, at the Pasquotank County Public Safety Building Community Room, 200 E. Colonial Avenue, Elizabeth City, NC, 27909 For more

97 People Reached | 9 Engagements

200 E Colonial Ave (0.42 mi)
Elizabeth City, North Carolina 27909
(252) 335-4444

Latest Events

- Mon Mar 19 @ 7:00PM - Commissioners Work Session
- Thu Mar 21 @ 5:30PM - Social Services Board Meeting
- Mon Apr 01 @ 7:00PM - Commissioners Regular Meeting
- Tue Apr 09 @ 7:00PM - Planning Board Meeting
- Thu Apr 11 @ 8:00AM - Soil & Water Conservation Meeting
- Mon Apr 15 @ 7:00PM - Commissioners Work Session
- Thu Apr 18 @ 5:30PM - Social Services Board Meeting
- Mon May 06 @ 7:00PM - Commissioners Regular Meeting
- Tue May 14 @ 7:00PM - Planning Board Meeting
- Thu May 16 @ 5:30PM - Social Services Board Meeting

Announcements

Red Cross Blood Drive - March 21, 2019
The American Red Cross will be hosting a Blood Drive on March 21, 2019 from 2:00 p.m. to 6:00 p.m. at the Pasquotank County Recreation Center located at 310 Granby Street, Hartford, NC 27944. For more information, go to [Red Cross Blood Drive - March 21, 2019](#)

Public Input Meeting of the Albemarle Regional Hazard Mitigation Plan - March 28, 2019
The Public Input Meeting of the Albemarle Regional Hazard Mitigation Plan will be conducted at Pasquotank County Public Safety Building Community Room, 200 E. Colonial Avenue, Elizabeth City, NC, on March 28, 2019 at 6:00 PM. For more information regarding this Public Input Meeting, please go to <http://www.albemarlehcp.com>

AWARE Rabies Clinic - April 6, 2019
The Animal Welfare of the Albemarle Region Everyday (AWARE) will be holding a Rabies Clinic on April 6, 2019 from 1:00 - 3:00 p.m. at the Missing Mill Park in Hartford, NC 27944. The cost is \$8.00 (cash only). For more information, go to [AWARE Rabies Clinic - April 6, 2019](#)

Notice of Rights Under Hawkins v. Cohen
All Department of Social Services agencies are to post a Notice of Rights Under Hawkins v. Cohen on their websites. To view the notice, go to:
[Notice of Rights Under Hawkins v. Cohen](#)
[Notice of Rights Under Hawkins v. Cohen \(Spanish\)](#)

Convenience Site Summer Hours 2019
Effective March 10, 2019, the Convenience Site hours will change. For more information, go to [Convenience Site Summer Hours 2019](#)

AWARE: Spayed-Neutered Flyer - Extended through March
If you are covered by Medicaid or SNAP (Food Stamps) and need to have your cats spayed or neutered, THIS SALE IS FOR YOU! This has been extended through March 31, 2019. For more information, go to [AWARE - Spayed or Neutered Flyer - Extended Through March](#)

APPENDIX B: PLANNING PROCESS DOCUMENTATION

Public Meeting 2: December 3, 2019

Albemarle Regional Hazard Mitigation Plan Hazard Mitigation Planning Public Meeting #2 Tuesday, December 3, 2019, 5:30 PM				
	Name	Organization (resident)	Phone	E-Mail
1.	James Burch	PA Schools	252-426-5741	jamesburch@pschools.org
2.	Jonathan Nixon	Piedmonts County Emergency Serv	252-426-5646	jnixon@perc.piedmontscountync.gov
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

APPENDIX B: PLANNING PROCESS DOCUMENTATION

The screenshot shows the Town of Ahoskie website. At the top, there are navigation links for Business Directory, Public Records Request, Utility Bill Payment Center, Municipal Codes & Meeting Minutes, and Surplus Equipment Property Auctions. The main header features the town's logo and the slogan "The Only One". Below the header is a search bar and a menu with categories like Town Government, Town Services, Budget, Grants, Forms, and Fees, and Maps & GIS. The main content area displays a news article titled "Albemarle Regional Hazard Mitigation Public Input Meeting" dated November 15, 2019. The article text states: "The fourth meeting of the Albemarle Regional Hazard Mitigation Planning Committee (HMPC) has been scheduled for Tuesday, December 3, 2019, at 3:00 PM, at the Emergency Services Building Meeting Room, 159 Creek Drive, Hertford, NC 27944. The second Public Input Meeting will be conducted that evening at 5:30 PM at the same location. For more information, please follow this link to the Regional HMP website."

The screenshot shows the Emergency Management website for Elizabeth City - Pasquotank - Camden. On the left is a navigation menu with items like Emergency Management, EMERGENCY MANAGEMENT HOME, ABOUT EMERGENCY MANAGEMENT, GALLERY, NEWS, EMERGENCY ALERTS, REQUEST FOR PROPOSALS, ROAD CLOSURES, EVACUATION, KNOW YOUR ZONE, SHELTER INFORMATION, FLOODING & HURRICANES, TORNADOES, SPECIAL NEEDS REGISTRY, BUSINESS PLANNING RESOURCES, HELPFUL LINKS, and CONTACT US. The main content area has a header with a circular logo and the text "Emergency Management Elizabeth City - Pasquotank - Camden". Below this is a welcome message: "Welcome to the Pasquotank-Camden-Elizabeth City Emergency Management website! This is a static site utilized to provide basic Emergency Management information. For current information please follow us on Facebook!". A paragraph of text repeats the meeting information from the screenshot above. Below the text is a weather forecast for Elizabeth City, showing a clear day with a high of 52°F and a low of 46°F. To the right of the weather is a table of daily forecasts:

Thu	Fri	Sat	Sun	Mon	Tue	Wed
54°F 46°F	54°F 43°F	50°F 50°F	54°F 45°F	50°F 41°F	57°F 37°F	55°F 32°F

At the bottom, there are two logos: "DO YOU KNOW YOUR ZONE? NORTH CAROLINA COASTAL EVACUATION ZONES" with the URL KNOWYOURZONE.NC.GOV, and "CODE RED" with the text "Sign-up for emergency notifications."

Public Survey

The Albemarle Region distributed a public survey, shown below, that requested public input into the Hazard Mitigation Plan planning process and the identification of mitigation activities that could lessen the risk and impact of future flood hazard events. The survey was announced at the first public meeting, provided via a link on participating jurisdictions web and social media accounts, and made available online on the plan website.

Albemarle Regional Hazard Mitigation Plan Public Survey

Online version can be found at: <https://www.surveymonkey.com/r/AlbemarleHMP>

Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans Counties, along with their local jurisdictions, are updating the Albemarle Regional Hazard Mitigation Plan to assess and minimize risk to natural hazards. Your participation in this process is important to us. Your input will help us to better understand the vulnerabilities within the region and decide on how to best mitigate or reduce the impacts of these hazards. **Please help us by completing this survey by Friday, May 10th and returning it to:**

Abby Moore, Wood
 4021 Stirrup Creek Drive, Suite 100, Durham, NC 27703
 Or by email to: abigail.moore@woodplc.com

This survey can also be completed online at: <https://www.surveymonkey.com/r/AlbemarleHMP>

If you have any questions about this survey or want to learn about more ways to participate in the Albemarle Regional Hazard Mitigation Plan update, please contact one of the planning consultants for the project: Landin Holland with Holland Consulting Planners at holland@hccplanning.com, or Abby Moore with Wood at abigail.moore@woodplc.com. You can also visit the project website at www.AlbemarleHMP.com.

BACKGROUND INFORMATION

1. Where do you live?

<input type="checkbox"/> Camden County <input type="checkbox"/> Chowan County <input type="checkbox"/> Gates County <input type="checkbox"/> Hertford County	<input type="checkbox"/> Pasquotank County <input type="checkbox"/> Perquimans County <input type="checkbox"/> Other: _____
---	---
2. Do you rent or own your home?
 - Rent
 - Own
3. How prepared do you feel for a hazard event?
 - Not at all prepared Somewhat prepared Very prepared
4. Do you know where evacuation centers or storm shelters are?
 - Yes
 - No
5. Are you able to evacuate or take shelter if necessary?
 - Yes
 - No
6. Do you know where/how to get more information on hazard risk and preparedness?
 - Yes
 - No

1

HAZARD INFORMATION

7. The hazards addressed in the Hazard Mitigation Plan are listed below. Please indicate the level of significance that you perceive for each hazard. Please rate these hazards 1 through 3 as follows: 1=low, 2=moderate, 3=high.

- | | |
|--|---|
| <input type="checkbox"/> Dam/Levee Failure | <input type="checkbox"/> Hurricane |
| <input type="checkbox"/> Drought | <input type="checkbox"/> Severe Weather (Thunderstorm/Lightning/Hail) |
| <input type="checkbox"/> Earthquake | <input type="checkbox"/> Severe Winter Storm |
| <input type="checkbox"/> Erosion | <input type="checkbox"/> Tornado |
| <input type="checkbox"/> Extreme Heat | <input type="checkbox"/> Wildfire |
| <input type="checkbox"/> Flood | <input type="checkbox"/> Other _____ |

8. Describe specific hazard issues/problem areas that you would like the planning committee to consider.

9. Describe any actions you have taken to mitigate hazard risk for your family, home, or neighborhood.

10. Which categories of mitigation actions do you feel would be most effective?

- Preventive activities (e.g. planning and zoning, building codes)
- Property protection (e.g. retrofitting, insurance, flood prone property buyout)
- Natural resource protection (e.g. wetlands protection, erosion control, forest health protection)
- Emergency services (e.g. hazard threat recognition, hazard warning systems, critical facilities protection)
- Structural projects (e.g. storm drain improvements, hazardous tree removal,
- Public information (e.g. outreach projects, environmental education, public education)

11. What is the best way for you to receive information about how to make your family, home, or neighborhood more resilient to hazards? Please check all that apply.

- | | |
|---|--|
| <input type="checkbox"/> Television News/Advertisements | <input type="checkbox"/> County/Local website |
| <input type="checkbox"/> Radio News/Advertisements | <input type="checkbox"/> County/Local social media |
| <input type="checkbox"/> Public Forums/Workshops | <input type="checkbox"/> Email |
| <input type="checkbox"/> Public Library | <input type="checkbox"/> Text messages |
| <input type="checkbox"/> Print Media – newspaper, phone book, informational brochures | <input type="checkbox"/> Other _____ |

Thank you for your input!

Please provide your name and email below if you would like to be informed of future meetings related to the planning process.

Name: _____ Email: _____

APPENDIX B: PLANNING PROCESS DOCUMENTATION

The County received 17 responses to the survey. The following bullet points summarize significant findings from the survey. Key questions and responses are detailed in Figure B.1 through Figure B.11.

- ▶ 10 responses were from Pasquotank County, 3 were from Hertford County, 3 were from Perquimans County, and 1 was from Camden County.
- ▶ All respondents expressed some level of preparedness for hazard events; 64.7% feel somewhat prepared and 35.3% feel very prepared.
- ▶ Nearly 24% of respondents do not know where evacuation centers or storm shelters are located; however, over 94% of respondents say they are able to evacuate or take shelter if necessary, which indicates that most people manage evacuating or taking shelter through their own resources. It is possible that these results skew toward those with more awareness of hazard risk and resources to respond.
- ▶ 17.7% of respondents do not know where to get more information on hazard risk and preparedness.
- ▶ Hurricane was rated the most significant hazard, followed by flood, severe weather, and tornado. Earthquake was rated the least significant hazard, followed by earthquake.
- ▶ Many respondents reported having taken steps to mitigate risk at home; these efforts primarily include preparedness measures; therefore, it may be beneficial to promote prevention and property protection activities via public outreach.
- ▶ Respondents favored preventive activities and structural projects for mitigation.

Figure B.1 – Survey Response, County of Residence

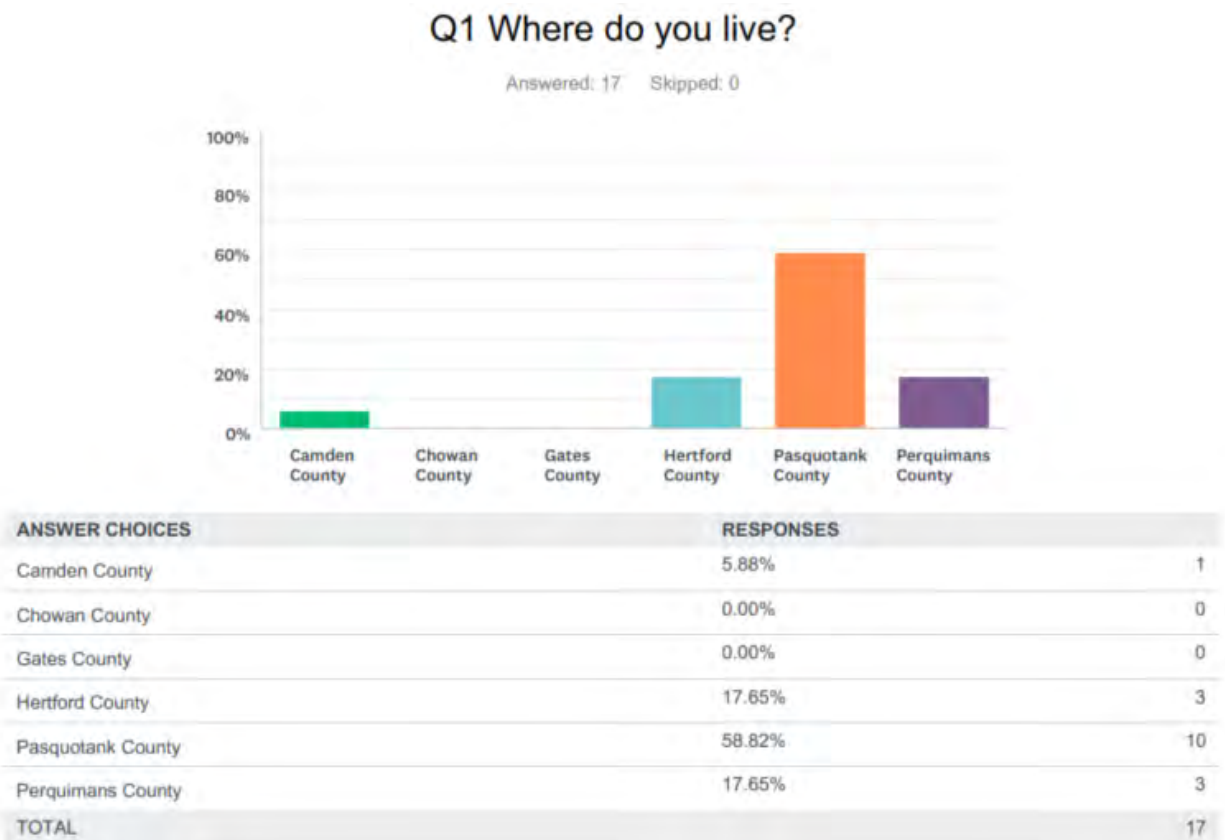
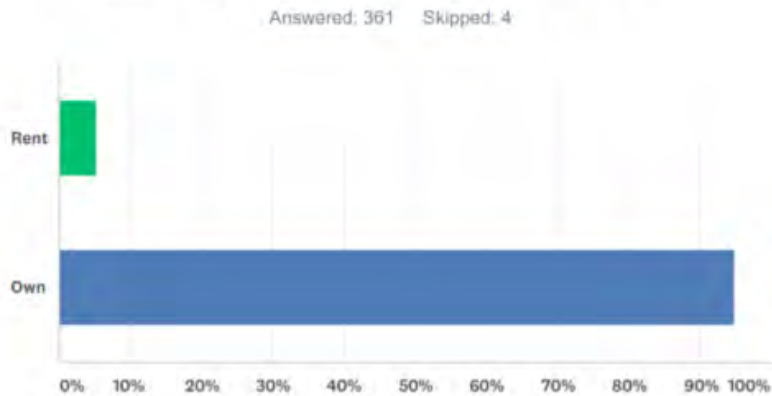


Figure B.2 – Survey Response, Home Tenure
 Q2 Do you rent or own your home?



ANSWER CHOICES	RESPONSES	
Rent	5.26%	19
Own	94.74%	342
TOTAL		361

Figure B.3 – Survey Response, Preparedness

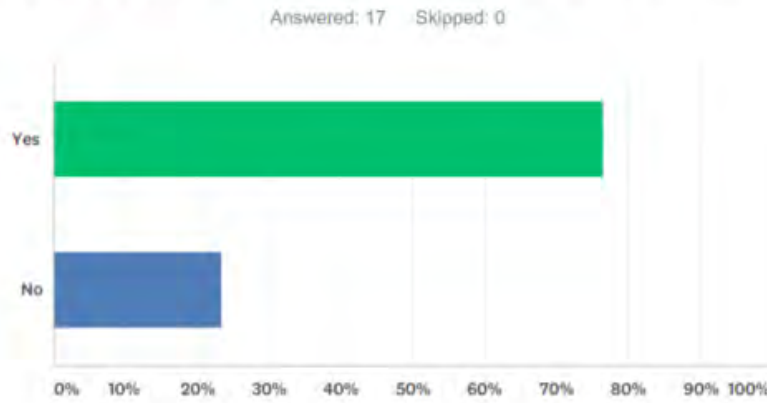
Q3 How prepared do you feel for a hazard event?



ANSWER CHOICES	RESPONSES	
Not at all prepared	0.00%	0
Somewhat prepared	64.71%	11
Very prepared	35.29%	6
TOTAL		17

Figure B.4 – Survey Response, Evacuation Center/Shelter Awareness

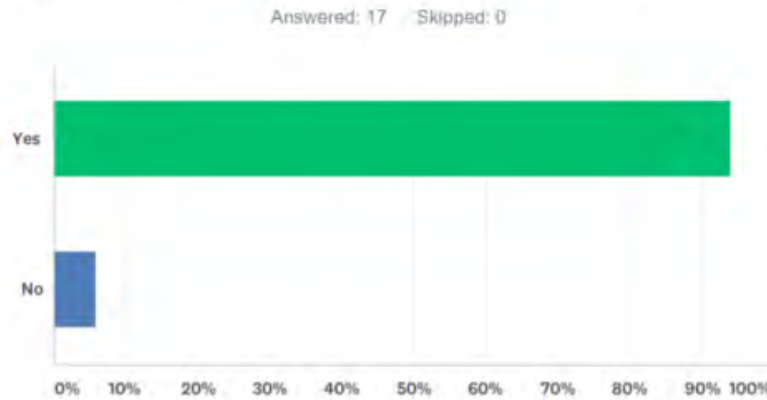
Q4 Do you know where evacuation centers or storm shelters are?



ANSWER CHOICES	RESPONSES	
Yes	76.47%	13
No	23.53%	4
TOTAL		17

Figure B.5 – Survey Response, Ability to Evacuate/Take Shelter

Q5 Are you able to evacuate or take shelter if necessary?

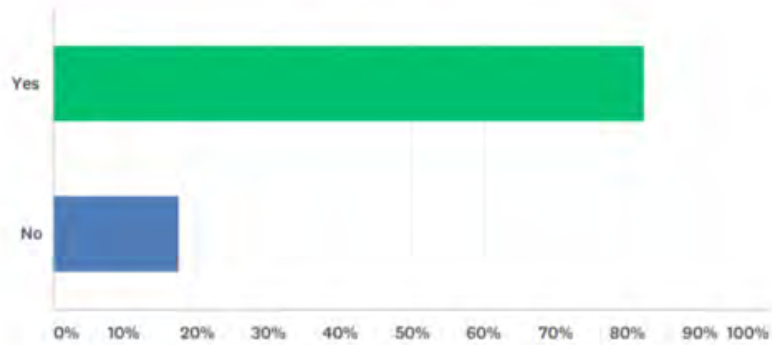


ANSWER CHOICES	RESPONSES	
Yes	94.12%	16
No	5.88%	1
TOTAL		17

Figure B.6 – Survey Response, Knowledge of Where to Find Hazard Information

Q6 Do you know where/how to get more information on hazard risk and preparedness?

Answered: 17 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	82.35%	14
No	17.65%	3
TOTAL		17

Figure B.7 – Survey Response, Hazard Significance Ratings

Q7 The hazards addressed in the Hazard Mitigation Plan are listed below. Please indicate the level of significance that you perceive for each hazard. Please rate these hazards 1 through 3 as follows: 1=low, 2=moderate, 3=high.

Answered: 9 Skipped: 8

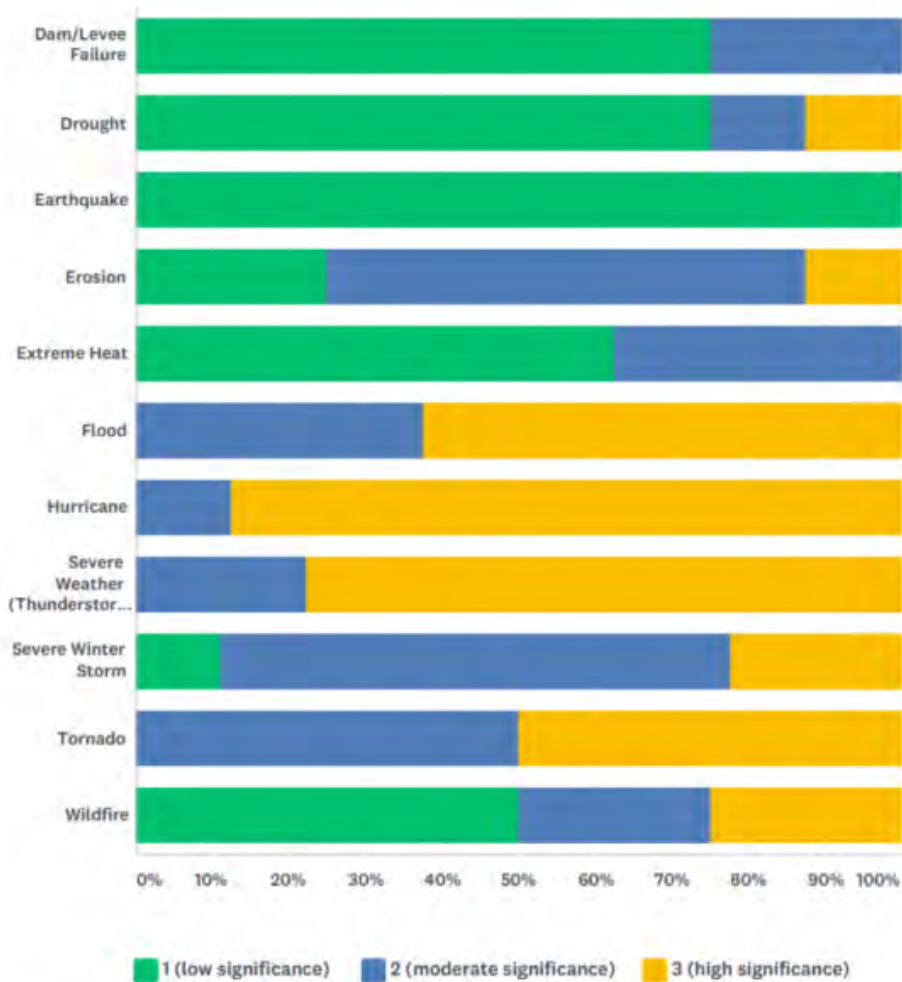


Figure B.8 – Survey Response, Key Hazard Issues/Concerns

Q8 Describe specific hazard issues/problem areas that you would like the planning committee to consider.

- ▶ Flooding and hurricane preparation
- ▶ Cleaning out the little river so it can flow. This river floods constantly
- ▶ Fixing flood prone areas such as Symons Creek on Nixonton Road and Meadstown Road by improving drainage and building a bridge over Meadstown Rd so the creek when it floods can drain more effectively
- ▶ Hurricane hazards

Figure B.9 – Survey Response, Personal Actions Taken for Mitigation

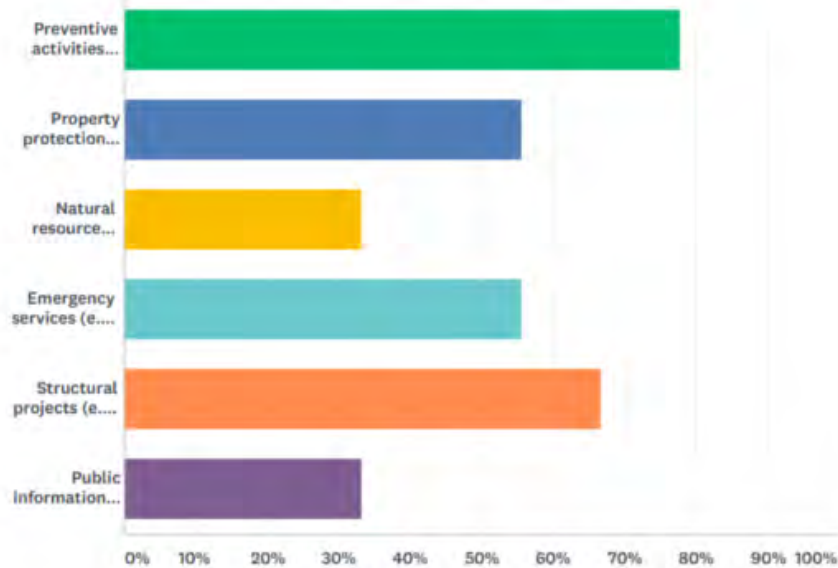
Q9 Describe any actions you have taken to mitigate hazard risk for your family, home, or neighborhood.

- ▶ Emergency kits and evacuation plans
- ▶ Defendable space for wildland. Generator for storms
- ▶ Evacuation preparations
- ▶ Disaster preparedness plan; ditch kept clear for proper drainage; backup generator
- ▶ Backup generation and food and water supplies

Figure B.10 – Survey Response, Preferred Mitigation Categories

Q10 Which categories of mitigation actions do you feel would be most effective?

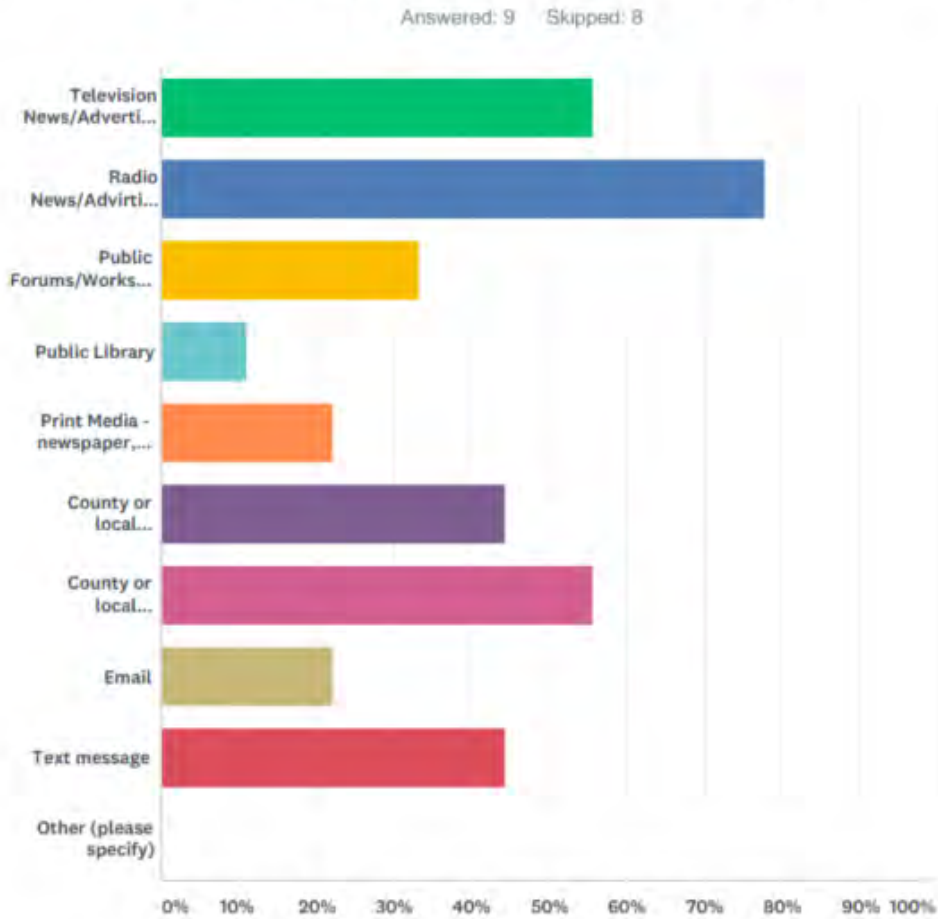
Answered: 9 Skipped: 8



ANSWER CHOICES	RESPONSES	
Preventive activities (e.g. planning and zoning, building codes)	77.78%	7
Property protection (e.g. retrofitting, insurance, flood prone property buyout)	55.56%	5
Natural resource protection (e.g. wetlands protection, erosion control, forest health protection)	33.33%	3
Emergency services (e.g. hazard threat recognition, hazard warning systems, critical facilities protection)	55.56%	5
Structural projects (e.g. storm drain improvements, hazardous tree removal,	66.67%	6
Public information (e.g. outreach projects, environmental education, public education)	33.33%	3
Total Respondents: 9		

Figure B.11 – Survey Response, Preferred Public Outreach Methods

Q11 What is the best way for you to receive information about hazard events? Please check all that apply.



PLANNING STEP 3: COORDINATE

This planning step credits the incorporation of other plans and other agencies' efforts into the development of the Hazard Mitigation Plan. Other agencies and organizations must be contacted to determine if they have studies, plans and information pertinent to the Hazard Mitigation Plan, to determine if their programs or initiatives may affect the community's program, and to see if they could support the community's efforts. To incorporate stakeholder input into the plan, a variety of stakeholders were identified by the HMPC and sent an email inviting them to attend a public meeting, review the draft plan, and provide feedback and comments. The coordination letter sent via email is provided below. A list of stakeholders detailing their involvement is provided in Table B.3.

Stakeholders were also involved through specific requests for data to support the development of the plan.

From: Cindy M. Anderson <canderson@hcpplanning.com>
Sent: Friday, November 22, 2019 4:55 PM
To: director@albemarleareauw.org; president@cph4h.org; lmason@eicinc.org; lee@coastallandtrust.org; jferrell@camden.k12.nc.us; rjackson@ecps.k12.nc.us; williamsb@gatescountyschools.net; wwright@hertford.k12.nc.us; rjamesdavis@ecpps.k12.nc.us; jamesbunch@pgschoools.org; hintonj@chowan.edu; rrfreeman@mail.escu.edu; robert_wynegar02@albemarle.edu; Mary.Newns@currituckcountync.gov; ronnie.storey@nhcnh.net; nicksp@halifaxnc.com; mitch.cooper@bertie.nc.gov; public@cityofchesapeake.net; eesutton@vbgov.com; rstephens@suffolkva.us; roy.mcclure@fema.dhs.gov; Edwardine.Marrone@fema.dhs.gov; ktodd@ISO.com; jbratcher@iso.com; sharper@iso.com; ewstrom@usgs.gov; Dan.Brubaker@ncdps.gov; jcrew@ncem.org; john.holley@ncdenr.gov; linda.culpepper@ncdenr.gov; tim.baumgartner@ncdenr.gov; Hannah.thompson@ncagr.gov; murfreesborochamber@gmail.com; jhouston602@gmail.com; win.dale@edenton.nc; hstaples@elizabethcitychamber.org


Cc: Moore, Abigail; Stroud, David A
Subject: Albemarle Regional Hazard Mitigation Plan

Good morning,

The Counties of Camden, Chowan, Gates, Hertford, Pasquotank, and Perquimans are in the process of developing an update to the 2015 Albemarle Regional Hazard Mitigation Plan. To assist with this process, the Counties and the Hazard Mitigation Planning Committee are seeking your input and expertise to support our planning effort.

We invite you to attend a public information meeting on the draft plan on **Tuesday, December 3, 2019, at 5:30 PM**, at the **Emergency Services Building Meeting Room, 159 Creek Drive, Hertford, NC 27944**. Additionally, soon after the public meeting we will be releasing the full draft of the plan for review. The draft will be posted on the plan website at <http://www.albemarlehmp.com/draftDocuments.html>. The website already contains information on the risk assessment findings and the planning process, which we encourage you to review. We appreciate any input you may have! Please email any comments or feedback on the draft plan to Abigail Moore at abigail.moore@woodplc.com.

Thank you for your assistance in this important effort to make our communities safer and more resilient to hazards!



Cindy M. Anderson
Office Manager
3329 Wrightsville Ave, Ste F
Wilmington, NC 28403
Phone: 910/392-0060
Email: canderson@hcpplanning.com

APPENDIX B: PLANNING PROCESS DOCUMENTATION

Table B.3 – Stakeholder List

First Name	Last Name	Organization
<i>Non-Profit Organizations</i>		
Bill	Blake	Albemarle Area United Way, Executive Director
Ron	Cummings	Chowan/Perquimans Habitat for Humanity, President
Dr. Landon	Mason	Economic Improvement Council, Executive Director
Lee	Leidy	NC Coastal Land Trust, Northeast Region Director
<i>Educational Institutions</i>		
Dr. Joe	Ferrell	Camden County Schools, Superintendent
Dr. Rob	Jackson	Edenton-Chowan Schools, Superintendent
Dr. Phillip Barry	Williams	Gates County Schools, Superintendent
Dr. William	Wright	Hertford County Public Schools, Superintendent
Rhonda	James-Davis	Elizabeth City-Pasquotank Public Schools, Interim Superintendent
James	Bunch	Perquimas County Schools, Interim Superintendent
John	Hinton	Chowan University, Vice President
Rickey	Freeman	Elizabeth City State University Emergency Management Professional
Dr. Robert	Wynegar	College of the Albemarle, President
<i>Surrounding Municipalities</i>		
Mary Beth	Newns	Currituck County, Emergency Management Director
Ronnie	Storey, Jr.	Northampton Emergency Management Coordinator
Phil	Ricks	Halifax County Emergency Services Director
Mitch	Cooper	Bertie County Emergency Services Director
Sharon	Chamberlain	Chesapeake, VA Emergency Management, Senior Planner
Erin	Sutton	Virginia Beach, VA Deputy Emergency Service Coordinator
Richard	Stephens	Suffolk County, VA Deputy Emergency Management Coordinator
<i>Federal Government</i>		
Roy	McClure	FEMA NFIP/CRS Specialist
Edwardine	Marrone	FEMA Mitigation Planning Specialist
Mandy	Todd	ISO/CRS Specialist
Mike	Bratcher	ISO/CRS Specialist
Sherry	Harper	ISO/CRS Technical Coordinator
Eric	Strom	USGS - Raleigh Field Office
Commander Randy	Meador	US Coast Guard Base Elizabeth City
<i>State Government</i>		
Dan	Brubaker	State NFIP Coordinator
Chris	Crew	State Hazard Mitigation Officer
John	Holley	NC DENR - Land Quality Section Regional Office
Linda	Culpepper	DEQ Division of Water Resources, Director
Tim	Baumgartner	DEQ Division of Mitigation Services, Director
Hannah	Thompson-Welch	NC Forest Service, Wildfire Mitigation Specialist
<i>Business Community</i>		
Daryl	Williams	Murfreesboro Chamber of Commerce, Executive Director
Johnny	Houston	Elizabeth City Regional Airport, Chairman
Win	Dale	Edenton Chowan Chamber of Commerce, Executive Director
Holly	Staples	Elizabeth City Chamber of Commerce

Appendix C Mitigation Alternatives

44 CFR Subsection D §201.6(c)(3)(ii): [The mitigation strategy section shall include] a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

As part of the process of developing the mitigation action plans found in Section 7, the HMPC reviewed and considered a comprehensive range of mitigation options before selecting the actions identified for implementation. This section summarizes the full range of mitigation measures evaluated and considered by the HMPC, including a review of the categories of mitigation measures outlined in the 2017 CRS Coordinator's Manual, a discussion of current local implementation and CRS credits earned for those measures, and a list of the specific mitigation projects considered and recommended for implementation.

Mitigation alternatives identified for implementation by the HMPC were evaluated and prioritized using the criteria discussed in Section 6 of this plan.

C.1 CATEGORIES OF MITIGATION MEASURES CONSIDERED

Once it was determined which flood hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of mitigation categories which are utilized as part of the CRS planning process.

- ▶ Prevention
- ▶ Property Protection
- ▶ Natural Resource Protection
- ▶ Structural Projects
- ▶ Emergency Services
- ▶ Public Information and Outreach

C.2 ALTERNATIVE MITIGATION MEASURES PER CATEGORY

Note: the CRS Credit Sections are based on the 2017 CRS Coordinator's Manual.

C.2.1 Preventative and Regulatory Measures

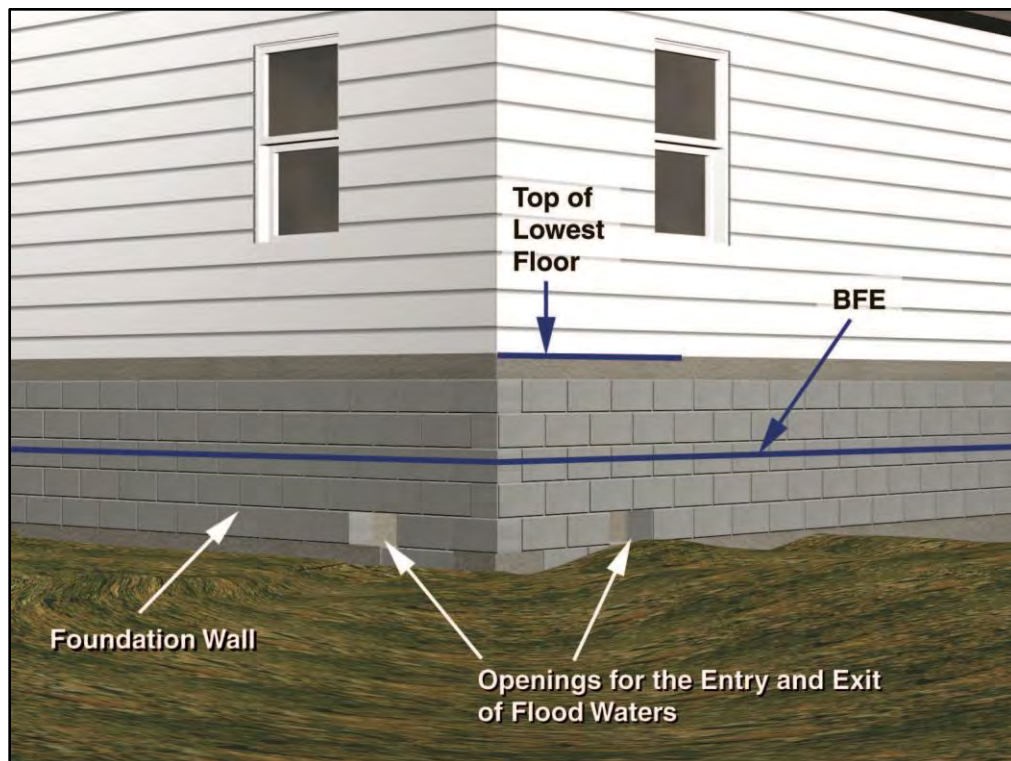
Preventative measures are designed to keep a problem - such as flooding - from occurring or from getting worse. The objective of preventative measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning and code enforcement offices usually administer preventative measures. Some examples of types of preventative measures include:

- ▶ Building codes
- ▶ Zoning ordinance
- ▶ Comprehensive or land use plan
- ▶ Open space preservation
- ▶ Floodplain regulations
- ▶ Subdivision regulations
- ▶ Stormwater management regulations

Building Codes

Building codes provide one of the best methods for addressing natural hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). This is shown in Figure B.1.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step.



Source: FEMA Publication: *Above the Flood: Elevating Your Floodprone House, 2000*

Figure B.1 – Building Codes and Flood Elevations

ASCE 24 is a referenced standard in the International Building Code. Any building or structure that falls within the scope of the IBC that is proposed in a flood hazard area is to be designed in accordance with ASCE 24. Freeboard is required as a function of the nature of occupancy and the flood zone. Dwellings and most other buildings have 1-foot of freeboard; certain essential facilities have 2-3 feet; only agricultural facilities, temporary facilities and minor storage facilities are allowed to have their lowest floors at the BFE.

Comprehensive or Land Use Plan

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, particularly floodplains and wetlands. They do this by designating land uses that are compatible with the natural conditions of land that is prone to flooding, such as open

Albemarle Region

Regional Hazard Mitigation Plan
2020

space or recreation. Communities in the Albemarle Region prepare land use plans in compliance with North Carolina Coastal Area Management Act (CAMA) requirements.

Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or reserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes.

Zoning Ordinance

Zoning enables a community to designate what uses are acceptable on a given parcel. Zoning can ensure compatibility of land use with the land's level of suitability for development. Planning and zoning activities can also provide benefits by allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach. Zoning regulations describe what type of land use and specific activities are permitted in each district, and how to regulate how buildings, signs, parking, and other construction may be placed on a lot. Zoning regulations also provide procedures for rezoning and other planning applications. The zoning map and zoning regulations provide properties with certain rights to development.

Floodplain Regulations

A Flood Damage Prevention Ordinance sets development standards for Special Flood Hazard Areas (SFHAs). Communities participating in the National Flood Insurance Program (NFIP) are required to adopt a flood damage prevention ordinance that meets at least the minimum standards of the NFIP; however, a community can incorporate higher standards for increased protection. For example, communities can adopt higher regulatory freeboard requirements, cumulative substantial damage definitions, fill restrictions, and other standards.

Another important consideration in floodplain regulations is the protection of natural and beneficial functions and the preservation of natural barriers such as vegetation. Vegetation along a stream bank is extremely beneficial for the health of the stream. Trees and other plants have an extensive root system that strengthen stream banks and help prevent erosion. Vegetation that has sprouted up near streams should remain undisturbed unless removing it will significantly reduce a threat of flooding or further destruction of the stream channel.

Stormwater Management Regulations

Stormwater runoff is increased when natural ground cover is replaced by urban development. Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality. There are three ways to prevent flooding problems caused by stormwater runoff:

- 1) Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties;

APPENDIX C: MITIGATION ALTERNATIVES

- 2) Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions; and
- 3) Set construction standards so buildings are protected from shallow water.

Reducing Future Flood Losses

Zoning and comprehensive planning can work together to reduce future flood losses by directing development away from hazard prone areas. Creating or maintaining open space is the primary way to reduce future flood losses.

Planning for open space must also be supplemented with development regulations to ensure that stormwater runoff is managed and that development is protected from flooding. Enforcement of the flood damage prevention ordinance and the flood protection elevation requirement provides an extra level of protection for buildings constructed in the planning area.

Stormwater management and the requirement that post-development runoff cannot exceed pre-development conditions is one way to prevent future flood losses. Retention and detention requirements also help to reduce future flood losses.

CRS Credit

The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's Building Code Effectiveness Grading Schedule (BCEGS) classification and points are awarded for adopting the International Code series. In North Carolina, communities are limited by the State Building Code Council which has not implemented the most current version of the International Building Code.

CRS credits are available for regulations that encourage developers to preserve floodplains or other hazardous areas away from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Communities in the Albemarle Region could receive credit for Activity 430 – Higher Regulatory Standards and for Activity 420 – Open Space Preservation for preserving parcels within the SFHA as open space. Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. The credits in the 2017 manual have doubled for OSP (Open Space Preservation). The participating communities could also receive credit for Activity 450 – Stormwater Management for enforcing regulations for stormwater management and soil and erosion control. Prevention mitigation options considered by the HMPC are elaborated below.

Table C.1 – Prevention Mitigation Options and Recommended Projects

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Prevention Measures Considered by HMPC and Not Recommended			
-	Zoning and Subdivision Ordinances should require storm shelters in all mobile home areas and subdivisions.	The County does not intend to pursue this strategy at this time.	n/a
-	Amend Zoning Ordinances to require lightning detection devices be installed in public outdoor gathering areas such as school stadiums and ball parks.	This strategy is not being pursued by the County at this time.	n/a
-	Require all new structures to include drainage ditches and/or culverts installed around perimeter of property to prevent flooding and flood damage to structures.	Not currently being pursued, the Town relies on local and state stormwater regulations for this purpose.	n/a

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Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Prevention Measures and Funding Recommended for Implementation			
CHO/EDN4	Compile a map reflecting the “true” extent of past flooding events. This effort should document the flooding associated with each respective flooding event, and document flooding that coincides with defined NFIP Flood Hazard Areas. Additionally, impacted critical facilities, businesses, homes, and infrastructure should be catalogued.	Camden County maintains all GIS data through its tax department. These efforts will continue through this plan update.	General Fund NCDPS
CAM13	Minimize economic and property losses due to flooding through continued compliance with NFIP and participation in the Community Rating System (CRS).	The County, through implementation of this plan, will continue to carry out the requirements of the NFIP Community Rating System.	General Fund, NCDPS
GAT1	Establish a county-wide program focused on clearing and snagging watercourses and arterial ditches to open waterways by clearing debris throughout the county to minimize localized flooding.	Gates County carries this effort out annually and will continue to do so through implementation of this plan.	GF, NCDEQ, NCDPS

C.2.2 Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building;
- Modify the building (retrofit) so it can withstand the impacts of the hazard; and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

Keeping the Hazard Away

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reaching a house.

Flooding

There are five common methods to keep a flood from reaching and damaging a building:

- Erect a barrier between the building and the source of the flooding.
- Move the building out of the flood-prone area.
- Elevate the building above the flood level.
- Demolish the building.
- Replace the building with a new one that is elevated above the flood level.

The latter three approaches are the most effective types to consider for the planning area.

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Barriers

A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier. Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained.



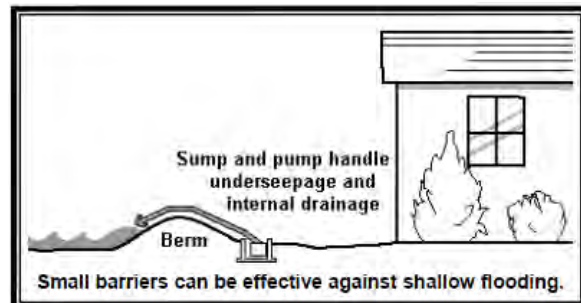
Relocation

Moving a building out of a flood prone area to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.



Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents. Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means



of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures, or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move – such as larger, slab foundation or masonry structures – and for dilapidated structures that are not cost-beneficial to protect.



Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one

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on the site that meets or exceeds all flood protection codes. FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot program, and not a regularly funded option. Certain rules must be followed to qualify for federal funds for pilot reconstruction.

Retrofitting

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

▶ **Dry Floodproofing**

Dry floodproofing means making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

▶ **Wet Floodproofing**

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, so long as the policy is in force, without requiring human intervention for the measure to work.

▶ **Private Property**

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area. Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.

▶ **Public Property**

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

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Local Implementation/CRS Credit

The CRS provides the most credit points for acquisition and relocation under Activity 520, because this measure permanently removes insurable buildings from the floodplain. Communities in the Albemarle Region could receive credit for Activity 520 – Acquisition and Relocation, for acquiring and relocating buildings from the SFHA. The HMPC recommended that communities pursue the purchase of repetitive loss buildings and other buildings which are subject to flood damage in order to return this land to open space.

The CRS also credits barriers and elevating existing buildings under Activity 530. The credit for Activity 530 is based on the combination of flood protection techniques used and the level of flood protection provided. Points are calculated for each protected building. Bonus points are provided for the protection of repetitive loss buildings and critical facilities. Communities could receive credit for Activity 360 – Flood Protection Assistance by providing advice and assistance to homeowners who may want to flood proof their home or business. Advice is provided both on property protection techniques and on financial assistance programs to help fund mitigation.

Flood insurance information for each community is provided in Section 5 and in greater detail in Annex B. There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that, among other topics, explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage. Communities in the Albemarle Region could receive credit for Activity 330 – Outreach Projects. Various property protection mitigation options considered by the HMPC are detailed below.

Table C.2 – Property Protection Mitigation Options and Recommended Projects

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Prevention Measures Considered by HMPC and Not Recommended			
-	Encourage the installation of lightning detection devices be installed in public outdoor gathering areas such as school stadiums and ball parks.	The County/City is no longer pursuing this strategy.	n/a
Prevention Measures and Funding Recommended for Implementation			
HER4	Retrofit all County and Municipal facilities for lightning protection.	The County will work with electric service providers to establish funding and a solution for addressing this strategy.	GF, Grant Funds, Utility Providers
PAS14	The NC Forestry Service representatives will be invited to attend the County’s monthly Public Safety Meeting in an effort to address risk associated with wildfire.	This strategy has not yet been carried out but will be enacted through implementation of this plan.	General Fund, NC Forestry Service
CAM2	Minimize economic and property losses due to flooding through continued compliance in the National Flood Insurance Program (NFIS).	Camden County continues to be an active participant of the NFIP program and will continue to do so through the planning period.	General Fund

C.2.3 Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and stormwater in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. This section covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Six areas were reviewed:

- Wetland protection
- Erosion and sedimentation control
- Stream/River restoration
- Best management practices
- Dumping regulations
- Farmland protection

Wetland Protection

Wetlands are often found in floodplains and topographically depressed areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.



Erosion and Sedimentation Control

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil. Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

Stream/River Restoration

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There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

Communities are required by state and federal regulations to monitor storm water drainage outfalls and control storm water runoff.

Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many cities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

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Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how re-grading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Farmland Protection

Farmland protection is an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land.

Local Implementation/CRS Credit

There is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations. Communities in the Albemarle Region could receive credit for Activity 420 – Open Space Preservation for preserving a portion of the SFHA as open space.

Additionally, credit is available for Activity 540 – Drainage System Maintenance. Having a portion of the drainage system inspected regularly throughout the year and maintenance performed as needed would earn a community credit. Communities could also get credit under this activity for providing a listing of problem sites that are inspected more frequently, and for implementing an ongoing Capital Improvements Program.

Table C.3 – Natural Resource Protection Mitigation Options and Recommended Projects

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Natural Resource Protection Measures Considered by HMPC and Not Recommended			
-	Coordinate open space planning and preservation with all local certified CAMA land use plans	The County does not anticipate updating its CAMA land use plan during the planning period.	n/a
Natural Resource Protection Measures and Funding Recommended for Implementation			
CAM4	Develop and maintain comprehensive water management policies for the County considering the connections between land-use, urban growth, and surface water and ground water issues.	Camden County continues to monitor its water resources and will maintain a water shortage management plan to ensure the availability of resources during drought conditions.	General Fund, NCDEQ, NCDPS
CHO/EDN10	Advocate the use of existing State and Federal regulatory programs for protecting and preserving coastal	N/A	General Fund, NCDEQ

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Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
	wetland Areas of Environmental Concern.		
HER10	At the local government staff level, work with the North Carolina Dept. of Transportation (NCDOT) and the Regional Planning Organization to identify drainage problem areas; develop resolutions for drainage issues created by NCDOT facilities, including inspections of channels, retention basins; and, as needed, pursue debris removal.	The County will work with NCDOT, as well as all participating municipal jurisdictions to carry out this strategy.	GF

C.2.4 Emergency Services Measures

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. This section reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

Threat Recognition

The first step in responding to a flood is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

The National Weather Service (NWS) is the prime agency for detecting meteorological threats. Severe weather warnings are transmitted through NOAA's Weather Radio System. Local emergency managers can then provide more site-specific and timely recognition after the Weather Service issues a watch or a warning. A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On smaller rivers and streams, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Warning

The next step in emergency response following threat recognition is to notify the public and staff of other agencies and critical facilities. More people can implement protection measures if warnings are early and include specific detail.

The NWS issues notices to the public using two levels of notification:

- Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.
- Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

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- CodeRED countywide mass telephone emergency communication system
- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should include a public information component.

StormReady

The National Weather Service (NWS) established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather-related warnings for the public. To be officially StormReady, a community must:



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

Being designated a NWS StormReady community is a good measure of a community's emergency warning program for weather hazards.

Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness)
- Closing streets or bridges (police or public works)
- Shutting off power to threatened areas (utility company)
- Passing out sand and sandbags (public works)
- Holding children at school or releasing children from school (school superintendent)
- Opening evacuation shelters (the American Red Cross)
- Monitoring water levels (public works)
- Establishing security and other protection measures (police)

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

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Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

Evacuation and Shelter

There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., disabled persons, prisoners, hospital patients, schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

Local Implementation /CRS Credit

Flash flood warnings are issued by National Weather Service Offices, which have the local and county warning responsibility. Flood warnings are forecasts of coming floods, are distributed to the public by the NOAA Weather Radio, commercial radio and television, and through local emergency agencies. The warning message tells the expected degree of flooding, the affected river, when and where flooding will begin, and the expected maximum river level at specific forecast points during flood crest.

Communities in the Albemarle Region could receive credit for Activity 610 – Flood Warning Program for maintaining a program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain residents, and coordinates flood response activities. Community Rating System credits are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive credit for the telephone calling system and more credits for additional measures, like telephone trees. Being designated as a StormReady community also provides additional credits.

Table C.4 – Emergency Services Mitigation Options and Recommended Projects

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Emergency Services Measures Considered by HMPC and Not Recommended			
-	Increase driving safety during thunderstorms by installing visibility, reflector tape or paint along road edges and in the dividing line should be placed on all major roads throughout the county.	This strategy is a function of NCDOT on all major highways; it is not considered necessary on local access streets.	n/a
-	Encourage the practice of placing storm shelters in all mobile home areas and subdivisions.	The County/City is no longer pursuing this strategy.	n/a
Emergency Services Measures and Funding Recommended for Implementation			

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Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
PAS2	Maintain "Storm Ready Community" Status	Pasquotank County continues to maintain the County's Storm Ready Status and will continue to do so through implementation of this plan.	General Fund
PER5	Maintain and annually update the county Emergency Operations Plan. This plan should contain detailed information on responsible parties and contact information. This information should be updated as positions and contact information change.	This effort is carried out annually by Perquimans County Emergency Services. The review and amendments are based on the results of the County's annual tabletop exercise.	General Fund, NCDPS
WIN4	Continue to evaluate those businesses with potential hazardous liquids for adequate protection of the public.	This effort is also addressed through the County's standing Local Emergency Planning Committee (LEPC).	General Fund
CAM5	Encourage critical facilities to apply structural hazard mitigation and sustainability concepts when building or remodeling their facilities; to include back-up power sources.	The County will continue to promote the integration of these concepts into the design consideration of new or renovated critical facilities.	General Fund, NCDPS
CHO/EDN16	Maintain, and where necessary, establish backup generators at all identified critical facilities. Additionally, County Emergency Management will evaluate the equipment on a regular basis to assure it continues to meet operational demands at county facilities.	The County will continue to identify need regarding the installation of backup generators and where necessary work with NCDPS to implement this strategy.	General Fund, NCDPS
GAT2	Support the expansion of US Highway 13/158 to facilitate greater evacuation capacity.	The County continues to support this strategy and will do so until the project is funded and constructed through efforts associated with the County Transportation Improvement Plan.	GF, NCDOT

C.2.5 Structural Projects

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings.
- Many projects can be built without disrupting citizens' homes and businesses.
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures also have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

- Advantages
 - They may provide the greatest amount of protection for land area used
 - Because of land limitations, they may be the only practical solution in some circumstances

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- They can incorporate other benefits into structural project design, such as water supply and recreational uses
- Regional detention may be more cost-efficient and effective than requiring numerous small detention basins
- Disadvantages
 - They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat
 - They require regular maintenance
 - They are built to a certain flood protection level that can be exceeded by larger floods
 - They can create a false sense of security
 - They promote more intensive land use and development in the floodplain

Levees and Floodwalls

Probably the best-known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).



Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Diversions

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Local Implementation /CRS Credit

Structural flood control projects that provide at least 100-year flood protection and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS so as not to duplicate the larger premium reduction provided by removing properties from the mapped floodplain. Other flood control projects can be accepted by offering a 25-year flood protection.

Table C.5 – Structural Projects Mitigation Options and Recommended Projects

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Structural Project Measures Considered by HMPC and Not Recommended			
-	List areas in need of repair, replacement and improvement.	Strategy determined to be ambiguous and lacking in substance.	n/a
-	Research possible seawall options to prevent tidal flooding.	The County is not pursuing this strategy at this time.	n/a
-	Hertford County will continue to support the NC Office of Dam Safety's efforts to monitor and inspect all dams throughout the state. The county will rely on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Although the County supports this effort, it is a function of the Office of Dam Safety.	n/a
Structural Project Measures and Funding Recommended for Implementation			
CHO/EDN3	Repair and upgrade all facilities and equipment associated with both Bennett and Dillard Millpond.	The County has not initiated these efforts but will do so through implementation of this plan.	General Fund, NCDPS, NCDEQ
PER4	Continue to acquire destroyed or substantially damaged properties and relocate households. Seek State and Federal funding (voluntary program).	Perquimans County will continue to carry out the mitigation buyout/elevation programs related to Hurricanes Matthew and Florence, as well as potential future disasters.	HMGP, FMA, CDBG, General Fund
CAM19	Continue to utilize annual, as well as post-disaster Federal (FEMA) and State mitigation funds, to acquire and elevate structures impact by excessive flooding.	The County continues to utilize mitigation funding to address the impacts of recent natural hazard events including both Hurricanes Matthew and Florence.	NCDPS, FEMA

C.2.6 Public Information

Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Awareness of the hazard is not enough; people need to be told what they can do about the hazard. Thus, projects should include information on safety, health and property protection measures. Research has shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

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Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for floods or a website about floods for children.

Technical Assistance

Hazard Information

Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Communities can easily provide map information from FEMA's FIRMs and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never flood.

Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track. Building or public works department staffs can provide the following types of assistance:

- Visit properties and offer protection suggestions
- Recommend or identify qualified or licensed contractors
- Inspect homes for anchoring of roofing and the home to the foundation
- Explain when building permits are needed for home improvements.

Public Information Program

A Program for Public Information (PPI) is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A PPI consists of the following parts, which are incorporated into this plan:

- The local flood hazard
- The property protection measures appropriate for the flood hazard
- Flood safety measures appropriate for the local situation
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies

APPENDIX C: MITIGATION ALTERNATIVES

- Goals for the community's public information program
- The outreach projects that will be done each year to reach the goals
- The process that will be followed to monitor and evaluate the projects

Local Implementation /CRS Credit

Communities in the Albemarle Region could receive credit under Activity 330 – Outreach Projects as well as Activity 350 – Flood Protection Information. Credit is available for targeted and general outreach projects. Credit is also provided for making publications relating to floodplain management available in the reference section of the local library.

Table C.6 – Public Information and Outreach Mitigation Options and Recommended Projects

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
Public Information and Outreach Measures Considered by HMPC and Not Recommended			
-	Research and interview with property owners	Strategy determined to be ambiguous and lacking in substance.	n/a
Public Information and Outreach Measures and Funding Recommended for Implementation			
GAT3	Expand efforts to provide public awareness of local hazard mitigation planning and emergency response procedures through the use of social media, local news outlets, and public meetings.	The County currently undertakes these efforts and will continue to expand upon these efforts through implementation of this plan.	GF, NCDPS
GAT12	Work to improve its emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	N/A	General Fund, NCDPS
HER13	Mail once annually a notice to all property owners whose land is located within a special flood hazard area. This notice should clearly state that the recipients' property is susceptible to flooding. The County will also maintain a flood map information service, whereby County residents can call or come by to receive information regarding their property in relation to the defined floodplain.	The County will initiate these annual mailings through implementation of this plan.	GF

Appendix D References

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