



# Northeastern NC Regional Hazard Mitigation Plan



Photo: C. Leinbach



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# 1 Introduction

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Section 1 provides a general introduction to hazard mitigation and an introduction to the Northeastern NC 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 Northeastern 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 coordinate activities 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.

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

## SECTION 1: INTRODUCTION

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

This plan has been prepared in coordination with FEMA Region IV and NCEM and in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford 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. Additionally, this plan will be monitored and updated on a routine basis in compliance with the above legislation and with the National Flood Insurance Act of 1968, as amended by 42 U.S.C. 4001 et seq, and North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act, as amended by Senate Bill 300: An Act to Amend the Laws Regarding Emergency Management as Recommended by the Legislative Disaster Response and Recovery Commission (2001).

This plan will be adopted by each participating jurisdiction in accordance with standard local procedures under the authority and police powers granted to counties as defined by the State of North Carolina (N.C.G.S., Chapter 153A) and the authority granted to cities and towns as defined by the State of North Carolina (N.C.G.S., Chapter 160A). Copies of adoption resolutions are provided in Section 9 Plan Adoption.

### 1.3 SCOPE

This document comprises a Regional Hazard Mitigation Plan for the Northeastern NC Region. The planning areas includes all incorporated municipalities and unincorporated areas listed in Table 1.1.

**Table 1.1 – Participating Jurisdictions in the Northeastern NC Regional Hazard Mitigation Plan**

<b>Bertie County</b>	
Askewville	Aulander
Colerain	Kelford
Lewiston-Woodville	Powellsville
Roxobel	Windsor
<b>Hyde County*</b>	
<b>Martin County</b>	
Bear Grass	Everetts
Hamilton	Hassell
Jamesville	Oak City
Parmele	Robersonville
Williamston	
<b>Tyrrell County</b>	
Columbia	
<b>Washington County</b>	
Creswell	Plymouth
Roper	

\* There are no incorporated jurisdictions in Hyde County

## SECTION 1: INTRODUCTION

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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 Northeastern NC Region followed the planning process prescribed by FEMA, and this plan was developed under the guidance of a HMPC, comprised of representatives of County 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, and examined each participating jurisdiction’s capabilities in place to mitigate them. The hazards profiled in this plan include:

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

### 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 Northeastern NC 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 Northeastern NC Regional Hazard Mitigation Plan. It consists of the following sub-sections:

- ▶ 2.1 Purpose and Vision
- ▶ 2.2 History of Hazard Mitigation Planning
- ▶ 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 Northeastern NC 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 Northeastern NC Region 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 statement and 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

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The vision of the Northeastern NC Regional Hazard Mitigation Plan is to establish sound public policy to protect life, property, and the quality of the natural environment; and to reduce risk and prevent loss from future hazard events.

### 2.2 HISTORY OF HAZARD MITIGATION PLANNING

This plan is an update to the 2017 Northeastern NC Regional Hazard Mitigation Plan, which included participation from Bertie, Hyde, Martin, Tyrell, and Washington Counties and was approved by FEMA on July 7, 2017. Hyde County was also previously included in the Pamlico Sound Regional Hazard Mitigation Plan, which was approved by FEMA on June 2, 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 2017 Northeastern NC Regional plan and provides the final decision made by the HMPC as to which hazards should be included in the updated 2020 Northeastern NC 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 Northeastern NC 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 CRS and FMA programs. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA’s HMGP; PDM; CRS; FMA; 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
<b>Phase I – Planning Process</b>	
§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
<b>Phase II – Risk Assessment</b>	
§201.6(c)(2)(i)	Step 4. Assess the Hazard
§201.6(c)(2)(ii) & (iii)	Step 5. Assess the Problem
<b>Phase III – Mitigation Strategy</b>	
§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
<b>Phase IV – Plan Maintenance</b>	
§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

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

## SECTION 2: PLANNING PROCESS

### 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 2017 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 Northeastern NC 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, risk and vulnerability assessment, and capability assessment. The Hazard Identification and Risk Assessment can be found in Section 4 and 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	Local comprehensive plans from around the region were referenced in the Planning Area Profile in Section 3. Other local comprehensive plans were incorporated into Mitigation Action Plans where applicable in Section 7 and referenced in the Capability Assessment in Section 5.
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.
Bertie, Hyde, Martin, Tyrrell, and Washington Flood Insurance Studies (FIS)	The Flood Insurance Studies were referenced during preparation of the flood hazard profile in Section 4.

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Resource Referenced	Use in this Plan
Northeastern NC Regional Hazard Mitigation Plan, 2016	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.
North Carolina State Hazard Mitigation Plan	The State plan was references in compiling the Hazard Identification and Risk Assessment in Section 4.

### 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 and HCP 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 Strategy.

#### Planning Step 8: Draft an Action Plan

A complete first draft of the plan was prepared based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7. This draft was shared for HMPC, stakeholder, and public review and comment via the plan website. 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

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 mitigation actions. Section 8 Plan Maintenance provides an overview of the strategy for plan implementation and maintenance and outlines

## SECTION 2: PLANNING PROCESS

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the method and schedule for monitoring, updating, and evaluating the plan. The Section also discusses incorporating the plan into existing planning mechanisms and how to continue public involvement.

### 2.4 HAZARD MITIGATION PLANNING COMMITTEE

As with the previous plan, this Hazard Mitigation Plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC). The Committee's representatives included representatives of County 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 Northeastern NC 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 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. The Towns of Aulander, Everetts, and Hassell were represented by their respective County leads due to limited local administrative capability. These jurisdictions still had representatives on the HMPC who received emails and updates about the planning

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process even if they were unable to attend meetings in person. Additionally, draft documents were distributed via the plan website so that the HMPC members could easily access and review them and provide comments.

**Table 2.4 – HMPC Members**

Jurisdiction	Agency/Department	Representative	Position or Title
<b>CRS Steering Committee</b>			
Hyde County	Hyde County Administration	Kris Noble	County Manager
Hyde County	Hyde County Bldg Inspections	Jane Hodges	Permit Technician
Hyde County	Hyde County Emergency Services	Justin Gibbs	Director
Hyde County	Spencer True Value Furniture	Jo Anne Spencer	Citizen/Stakeholder
Hyde County	SQ Volunteer Fire Dept.	Jeffrey Stotesberry	Fire Chief
Washington County	Planning and Safety	Ann Keyes	Director
Washington County	County Manager's Office	Curtis Potter	County Manager/County Attorney
Washington County	N/A	David Clifton	Citizen/Stakeholder
Washington County	N/A	Katie Walker	Citizen/Stakeholder
Creswell	Town of Creswell	Penny Chapman	Town Clerk
Creswell	N/A	Ryan Swain	Citizen/Stakeholder
Creswell	N/A	Brenda Logan	Citizen/Stakeholder
Creswell	N/A	Syble Spruill	Citizen/Stakeholder
Plymouth	Public Works	Mike Wright	Asst. Town Manager/Public Works Director
Plymouth	N/A	Joyce Koss	Citizen/Stakeholder
Plymouth	N/A	Joanne Floyd	Citizen/Stakeholder
Plymouth	N/A	Vanessa P. Palin	Citizen/Stakeholder
Roper	Town of Roper	Jessica Clifton	Assistant Clerk
Roper	N/A	Raemona Jackson	Citizen/Stakeholder
Roper	N/A	Denise Blount	Citizen/Stakeholder
Roper	N/A	Charles Sharpe	Citizen/Stakeholder
<b>HMPC Working Group</b>			
Bertie County	Bertie Co Emergency Svcs	Mitch Cooper	Emergency Services Director
Bertie County	Bertie Co Administration	Sarah Tinkham	Clerk to the Board
Askewville	Town of Askewville	Gloria Bryant	Mayor
Askewville	Town of Askewville	Carla Pesce	Commissioner
Aulander	Public Works	Steven A. Draper	Director
Aulander	Town of Aulander	Renee' Buck	Town Clerk/Finance Officer
Colerain	Town of Colerain	John Adams	Public Works
Colerain	Town of Colerain	Bob Kaylor	Council Member
Kelford	Town of Kelford	Bailey Parker	Mayor
Kelford	Town of Kelford	Wade Tim Emory	Commissioner
Lewiston-Woodville	Town of Lewiston-Woodville	Diane Harrington	Town Clerk
Powellsville	Town of Powellsville	James Peele	Mayor
Powellsville	Town of Powellsville	Carlyle Hoggard	Commissioner
Roxobel	Town of Roxobel	Gary Johnson	Mayor
Roxobel	Town of Roxobel	Robert Phelps	Commissioner
Windsor	Town of Windsor Public Works	Matt Wilson	Public Works Director
Windsor	Town of Windsor Administration	Allen Castelloe	Town Administrator

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Jurisdiction	Agency/Department	Representative	Position or Title
Martin County	Martin County Emergency Management	Jody Griffin	EM Director
Martin County	Martin County Emergency Management	Michael Bryant	EM Specialist/Fire Marshal
Martin County	Martin County Administration	David Bone	County Manager
Bear Grass	Town of Bear Grass	Charlotte B. Griffin	Mayor
Bear Grass	Town of Bear Grass	Calvin Owens	Commissioner/Clerk to the Board
Everetts	Town of Everetts	Ray Deans	Mayor
Hamilton	Town of Hamilton	William Freeman	Maintenance Supervisor/Commissioner
Hamilton	Town of Hamilton	Mamie Staton	Commissioner
Hamilton	Town of Hamilton	Annie B. Jones	Clerk/Finance Officer
Hassell	Town of Hassell	Michelle Davis	Mayor
Jamesville	Town of Jamesville	Kimberly Cockrell	Town Clerk/Finance Officer
Jamesville	Town of Jamesville	Willis Williams	Mayor Pro Tem
Oak City	Town of Oak City	Vonetta Porter	Town Clerk/Finance Officer
Oak City	Town of Oak City	Sue Harrell	Commissioner
Parmelee	Town of Parmelee	Jerry McCrary	Mayor
Parmelee	Town of Parmelee	Glenda Barnes	Commissioner
Robersonville	Town of Robersonville	Elizabeth "Libby" Jenkins	Town Manager
Robersonville	Town of Robersonville Fire Dept.	William "Mutt" Smith	Fire Chief
Williamston	Town of Williamston	Cameron Braddy	Town Planner & Zoning Administrator
Williamston	Town of Williamston	John O'Daniel	Town Administrator
Tyrrell County	Tyrrell County Administration	David L. Clegg	County Manager/Attorney
Tyrrell County	Tyrrell County Emergency Management	Wesley Hopkins	Emergency Mgmt Coordinator
Columbia	Town of Columbia	Rhett White	Town Manager
Columbia	Town of Columbia	Hal Fleming	Alderman

### 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.

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**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"> <li>1) Introduction to DMA, CRS, and FMA requirements and the planning process</li> <li>2) Review of HMPC responsibilities and the project schedule.</li> </ol>	February 6, 2019 2:00 p.m.	Town of Plymouth Council Chambers, 132 E. Water Street, Plymouth, NC
HMPC Mtg. #2	<ol style="list-style-type: none"> <li>1) Review and update plan goals</li> <li>2) Brainstorm a vision statement</li> <li>3) Report on status of actions from the 2017 plan</li> <li>4) Complete the capability self-assessment</li> </ol>	February 27, 2019 2:00 p.m.	Former Quintiles Space (beside NC Telecenter) 411 East Boulevard, Williamston, NC
HMPC Mtg. #3	<ol style="list-style-type: none"> <li>1) Review Draft Hazard Identification &amp; Risk Assessment (HIRA)</li> <li>2) Draft objectives and Mitigation Action Plans</li> </ol>	July 26, 2019 10:00 a.m.	Hyde County Government Center Multi-Purpose Room, 30 Oyster Creek Road, Swan Quarter, NC
HMPC Mtg. #4	<ol style="list-style-type: none"> <li>1) Review the Draft Hazard Mitigation Plan</li> <li>2) Solicit comments and feedback</li> </ol>	March 10, 2020 3:30 p.m.	Bertie County Commissioners’ Room, 106 Dundee Street, Windsor, NC 27983

### 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.

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**Table 2.6 – Summary of Public Meetings**

Meeting Title	Meeting Topic	Meeting Date	Meeting Location
Public Meeting #1	1) Introduction to DMA, CRS, and FMA requirements and the planning process 2) Review of HMPC responsibilities and the project schedule.	February 27, 2019 6:00 p.m.	Former Quintiles Space (beside NC Telecenter) 411 East Boulevard, Williamston, NC
Public Meeting #2	1) Review “Draft” Hazard Mitigation Plan 2) Solicit comments and feedback	March 10, 2020 5:30 p.m.	Bertie County Commissioners’ Room, 106 Dundee Street, Windsor, NC 27983

### 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.

**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	2/18/2019	Public Meeting #1 announcements 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	7/30/2019	Draft HIRA made available for review and comment online
Plan website - Draft Plan	3/9/2020	Full draft plan made available for review and comment online
Mitigation Flyer	Ongoing	Information flyer made available online and at meetings

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 on November 14, 2018 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, 13 survey responses were received.

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

- ▶ 15.4% of respondents say they feel not at all prepared for a hazard event; 61.5% feel somewhat prepared.
- ▶ 61.5% of respondents do know where evacuation centers or storm shelters are located; additionally, 100% 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.
- ▶ Over 20% of respondents do not know where to get more information on hazard risk and preparedness.

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- ▶ Hurricane was rated the most significant hazard, followed by flood, and extreme heat. Earthquake was rated the least significant hazard, followed by drought and sinkhole.
- ▶ Residents responded that flooding, and issues relating to flooding, were important for the planning committee to consider. Specific mention was made of flood control and drainage improvements.
- ▶ 81.8% of respondents feel structural projects, such as storm drain improvements and hazardous tree removal, would be most effective. This is most closely followed by property protection and public information at 36.4% each.
- ▶ Residents who reported taking action to mitigate hazard risk individually have obtained necessary equipment, such as generators, and prepared emergency food and water supplies. Others have planned to remove trees.

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 a representative from a volunteer fire department, a local business owner, and local residents. Representatives from NCEM 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
<b>Bertie County</b>	<b>2</b>	<b>2</b>	<b>12</b>
Askewville	2	2	10
Aulander	2	2	10
Colerain	2	2	10
Kelford	2	2	10
Lewiston-Woodville	2	2	10
Powellsville	2	2	10
Roxobel	2	2	10
Windsor	2	2	10
<b>Hyde County</b>	<b>2</b>	<b>3</b>	<b>13</b>
<b>Martin County</b>	<b>0</b>	<b>2</b>	<b>11</b>
Bear Grass	0	2	9
Everetts	0	2	9
Hamilton	0	2	9
Hassell	0	2	9
Jamesville	0	2	9
Oak City	0	2	9
Parmele	0	2	9
Robersonville	0	2	9

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Jurisdiction	Completed	Deleted	Carried Forward
Williamston	0	2	9
<b>Tyrrell County</b>	<b>1</b>	<b>3</b>	<b>9</b>
Columbia	1	3	7
<b>Washington County</b>	<b>1</b>	<b>0</b>	<b>13</b>
Creswell	1	0	10
Plymouth	1	0	11
Roper	1	0	10
<b>Counties Total</b>	<b>6</b>	<b>10</b>	<b>58</b>

Table 2.9 on the following pages details all completed and deleted actions from the 2017 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 2017 Northeastern NC Regional Hazard Mitigation Plan**

2017 Action #	Jurisdictions	Description	2019 Status	Status Comments/ Explanation
<b>Bertie County</b>				
B8	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, Windsor	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development within flood hazard areas.	Deleted	Strategy addressed by B2
B14	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, Windsor	Continue to support enforcement of the NC State Building Code.	Completed	Day to day function
B15	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, Windsor	Support Bertie County in maintaining a hazard warning system to alert citizens of the possibility of a natural hazard event.	Deleted	Strategy addressed by B14
B16	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, Windsor	Continue to monitor trees and branches in public areas at risk of breaking or falling in windstorms, or any other natural hazardous event.	Completed	Day to day function
<b>Hyde County</b>				
H4	Hyde County	Continue to monitor drainage conditions throughout both the mainland and barrier island portions of the county. Additionally, the county will continue to enforce and support the following programs relating to stormwater management: NCDEQ Coastal Stormwater Rules, NCDEQ Sedimentation & Erosion Control Regulations, NCDEQ Statewide Stormwater Regulations, NCDEQ CAMA Regulations, US Army Corps of Engineers Non-Coastal Wetland Regulations	Completed	Day to day function
H10	Hyde County	Review the county's Flood Damage Prevention Ordinance on an annual basis to assess whether any revisions and/or updates have been mandated by FEMA or NCEM.	Deleted	Strategy addressed by H1
H12	Hyde County	Continue to enforce all regulations outlined under the NC State Building Code. Although not a requirement, the county will encourage the use of wind resistant design techniques for all new residential construction.	Completed	Day to day function
H15	Hyde County	Continue to provide detailed information regarding properties located within flood hazard areas as outlined under CRS Manual Section 322.a through 322.g.	Deleted	Strategy addressed by H12

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2017 Action #	Jurisdictions	Description	2019 Status	Status Comments/ Explanation
H17	Hyde County	Seek grant funding for mitigation reconstruction projects within the county's political boundaries. This action will be based upon the needs and willing participation of property owners in Hyde County.	Deleted	Strategy addressed by H7
<b>Martin County</b>				
M8	Martin County, Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Maintain a proactive stance toward structural mitigation projects. The county will continue to monitor repetitive loss properties following storm events. If and when structures become eligible for mitigation funding, the county will assist property owners with this effort.	Deleted	Strategy addressed by M11
M12	Martin County, Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Apply for hazard mitigation grant funding following a disaster to assist with clean-up and post-disaster recovery needs. Potential funding will be utilized to mitigate against potential future losses.	Deleted	No longer applicable
<b>Tyrrell County</b>				
T1	Tyrrell County, Columbia	Apply for hazard mitigation grant funding following a disaster to assist with clean-up and post-disaster recovery needs. Potential funding will be utilized to mitigate against potential future losses.	Deleted	No longer applicable
T2	Tyrrell County, Columbia	Work closely with the Regional HMPC and LEPC to closely plan for man-made and natural disaster events. This effort will involve the planning of exercises and annual corrective action planning. The Regional MAC will involve utility service providers in these discussions.	Completed	Ongoing staff responsibility
T9	Tyrrell County, Columbia	Educate property owners about the importance of keeping private drives and curtilage free of debris to ensure access for emergency service vehicles. The county will advertise this policy through county newsletters, informational handouts, and website.	Deleted	Strategy addressed in T6
T13	Tyrrell County, Columbia	Seek grant funding for mitigation reconstruction projects within the County's political boundaries. This action will be based upon the needs and willing participation of property owners in Tyrrell County.	Deleted	Vague and ambiguous
<b>Washington County</b>				
W8	Washington County, Creswell, Plymouth, Roper	Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA). 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	Day to day function

## 3 Planning Area Profile

This section provides an overview of the current conditions and characteristics of the Region. As Bertie, Hyde, Martin, Tyrrell, and Washington Counties collectively comprise the Northeastern NC 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 jurisdiction containing pertinent information regarding natural functions, demographics such as population, housing, and economic characteristics, and land development trends. Much of the demographic, housing, and economic data is derived from American Community Survey (ACS) 5-Year Estimates.

The following provides an overview of the sections:

- ▶ 3.1 Regional Characteristics

This section discusses the Region’s 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, outlines the presence of threatened and endangered species, and provides Region-wide mapping.

- ▶ 3.2 Bertie County Characteristics
- ▶ 3.3 Hyde County Characteristics
- ▶ 3.4 Martin County Characteristics
- ▶ 3.5 Tyrrell County Characteristics
- ▶ 3.6 Washington County Characteristics

Each of the county profiles contains the following information: an overview of each county’s hydrology, a discussion of parks/open space; demographic data for all participating jurisdictions including total population counts, racial composition, housing characteristics, and employment and industry statistics; 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

Bertie, Hyde, Martin, Tyrrell, and Washington counties are located in the Coastal Plain region of eastern North Carolina. Washington County is flanked to the west by Martin County and to the east by Tyrrell County, with Bertie County to the north of Martin County and Hyde County to the south of Tyrrell County (see Figure 3.1). US Highway 64 traverses east to west through Martin, Washington, and Tyrrell counties with US Highway 264 traversing through Hyde County, and US Highway 17 travels north-south through Martin and Bertie counties, then to the east in Bertie County alone. US Highway 13 also travels north-south through Martin and Bertie counties. Other roadway transportation in the area includes NC Highways 12, 32, 34, 42, 45, 94, 99, 125, 142, 171, 305, 308, and 903. Railway transportation in the area is provided by the North Carolina and Virginia Railroad (Bertie County), CSX Railway (Martin County) and Carolina Coastal Railway (Washington County). General aviation airports in the area include Hyde County Airport in Engelhard, Ocracoke Island Airport in Ocracoke (Hyde County), Martin County Airport in Williamston, and Plymouth Municipal Airport in Plymouth (Washington County).

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An abundance of water courses surround the area: the Albemarle Sound to the north of Washington and Tyrrell counties; the Alligator and Scuppernong Rivers in Tyrrell County; Intracoastal Waterway to Tyrrell’s east; the Roanoke River to Washington’s and Martin’s north and Bertie’s south and west; the Chowan River to the east of Bertie County; Phelps Lake and Pungo Lake in Washington County; Pamlico Sound to the southeast of Hyde County; and Alligator Lake and Lake Mattamuskeet occupying a large percentage of Hyde County’s area. The area is also rich in wildlife refuges, with the Roanoke River National Wildlife Refuge in Bertie County and to the north of Martin County, the Mattamuskeet and Swan Quarter National Wildlife Refuges in Hyde County, the Pocosin Lakes National Wildlife Refuge lying in Hyde, Washington and Tyrrell counties, and part of the Alligator River National Wildlife Refuge lying in Hyde and Tyrrell County as well. The area’s countryside is enhanced by streams and brooks, natural lakes and ponds, and swampy woodlands.

The following table, Table 3.1, provides the area in square miles for all jurisdictions participating in the Northeastern NC Regional Hazard Mitigation Plan Update.

**Table 3.1 – Northeastern NC Region Total Land Area**

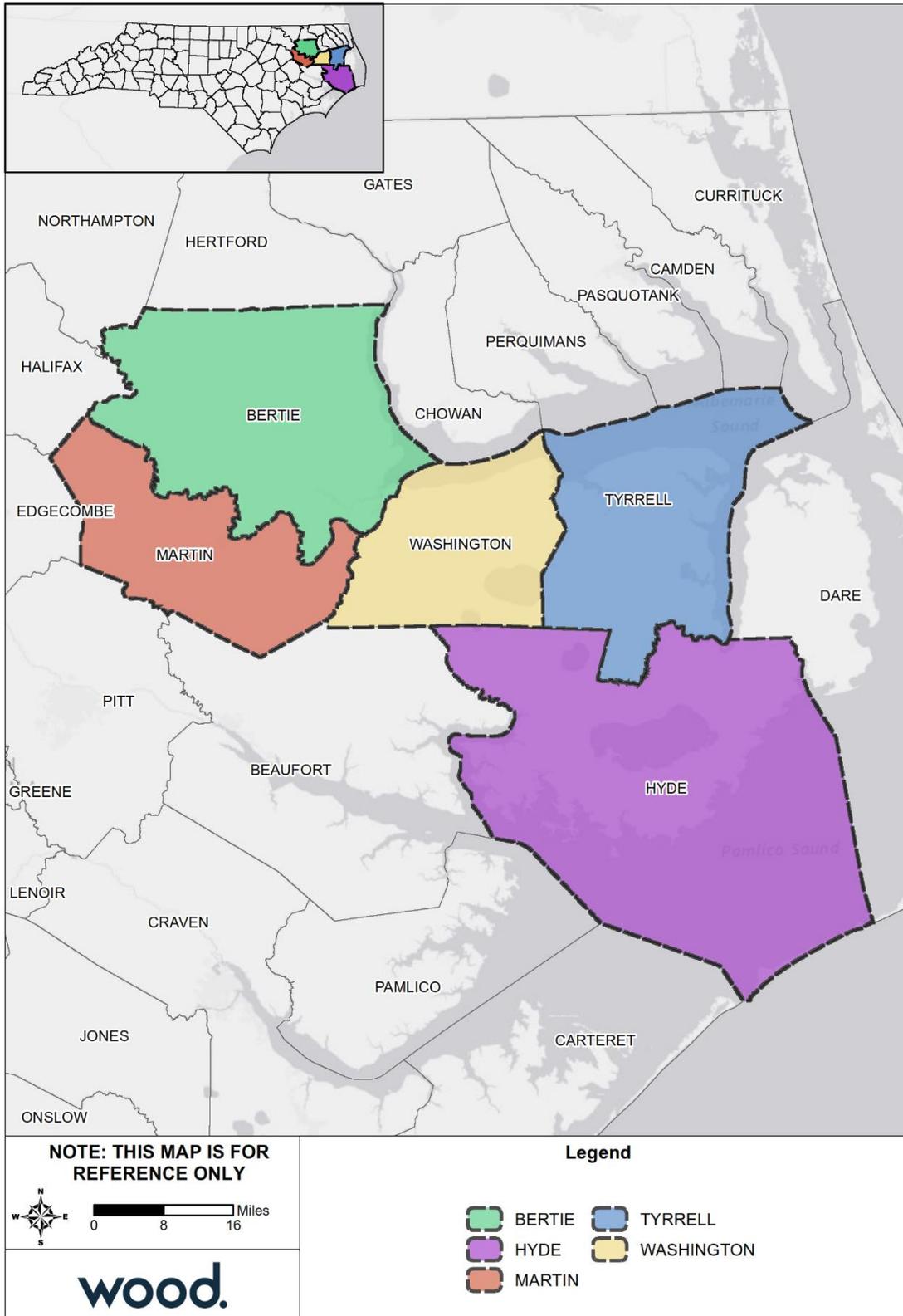
Jurisdiction	Total Land Area (Square Miles)
<b>Bertie County</b>	<b>741</b>
Askewville	0.5
Aulander	1.5
Colerain	0.3
Kelford	0.5
Lewiston-Woodville	2.0
Powellsville	0.3
Roxobel	1.0
Windsor	2.8
<b>Hyde County</b>	<b>1,424</b>
<b>Martin County</b>	<b>462</b>
Bear Grass	0.3
Everetts	0.5
Hamilton	0.5
Hassell	0.3
Jamesville	1.3
Oak City	0.5
Parmele	1.2
Robersonville	1.2
Williamston	3.7
<b>Tyrrell County</b>	<b>594</b>
Columbia	0.5
<b>Washington County</b>	<b>424</b>
Creswell	0.4
Plymouth	3.9
Roper	0.9

Source: County Profiles - Wikipedia.

Figure 3.3 shows the population density across the Northeastern NC Region, and Figure 3.4 shows Social Vulnerability Index (SVI) ratings across the Region. Details on population and social vulnerability are discussed by county in the following sections.

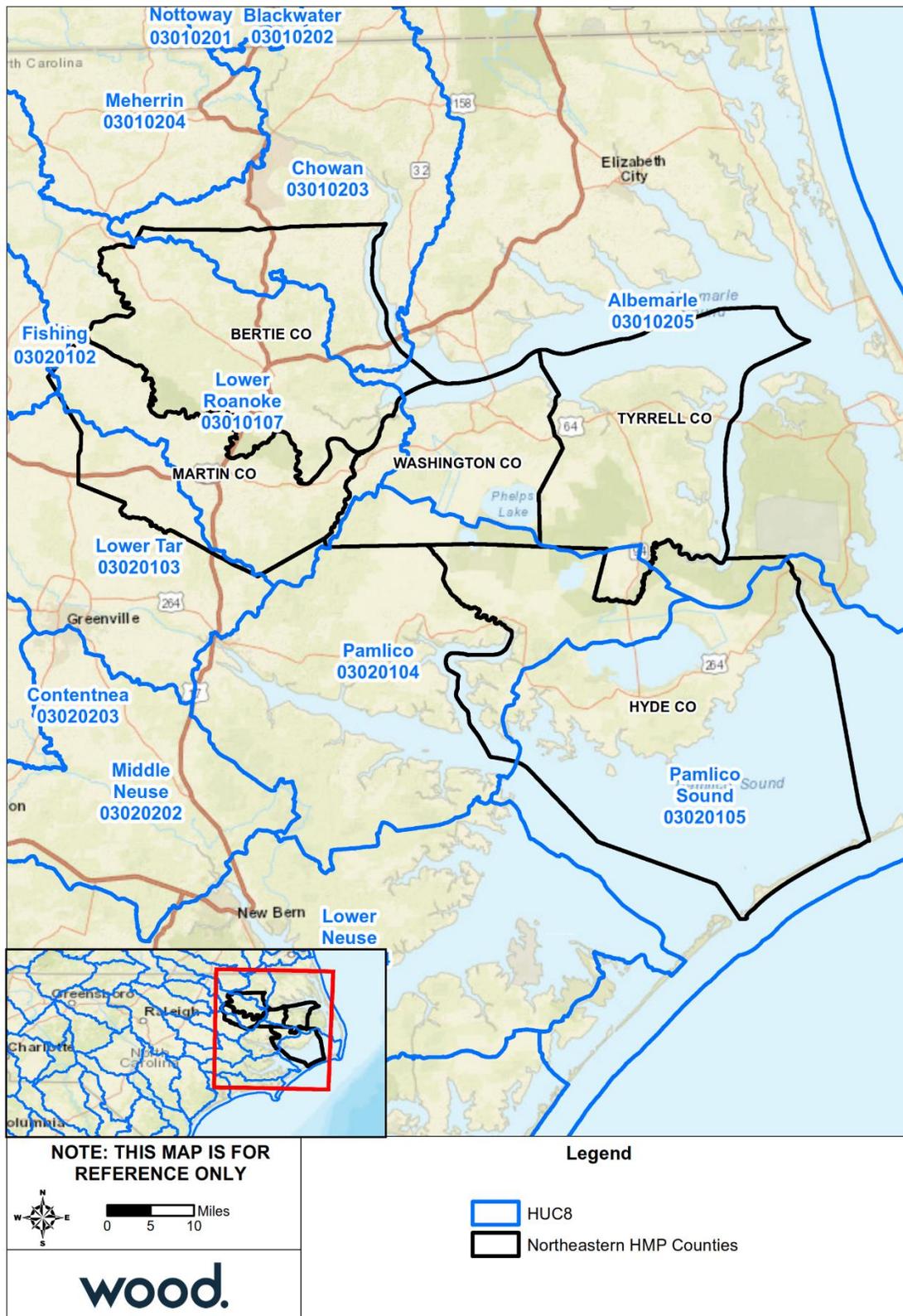
SECTION 3: PLANNING AREA PROFILE

Figure 3.1 – Northeastern NC Region Location Map



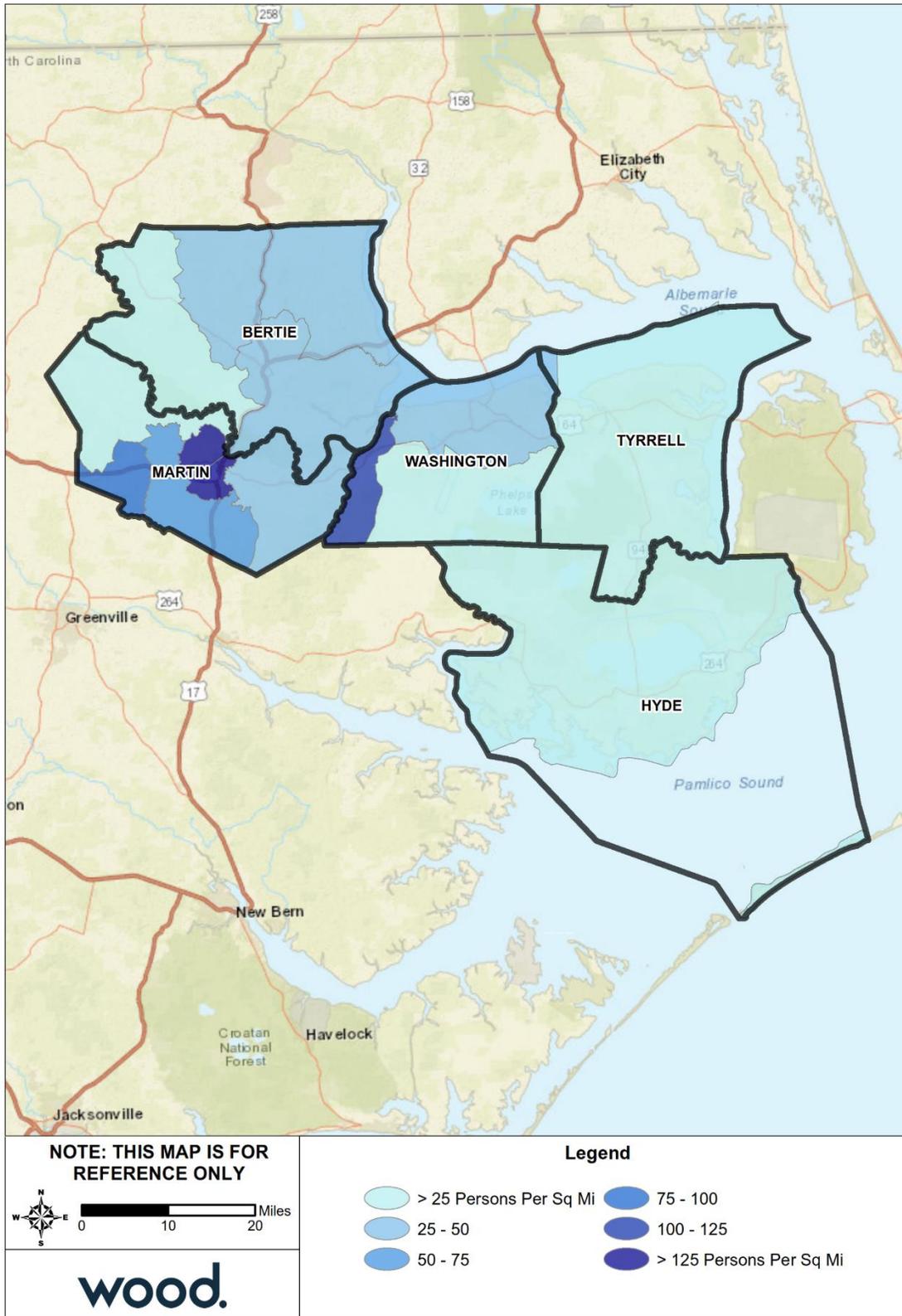
Source: U.S. Census Bureau

Figure 3.2 – Northeastern NC Region, HUC-8 Drainage Basins



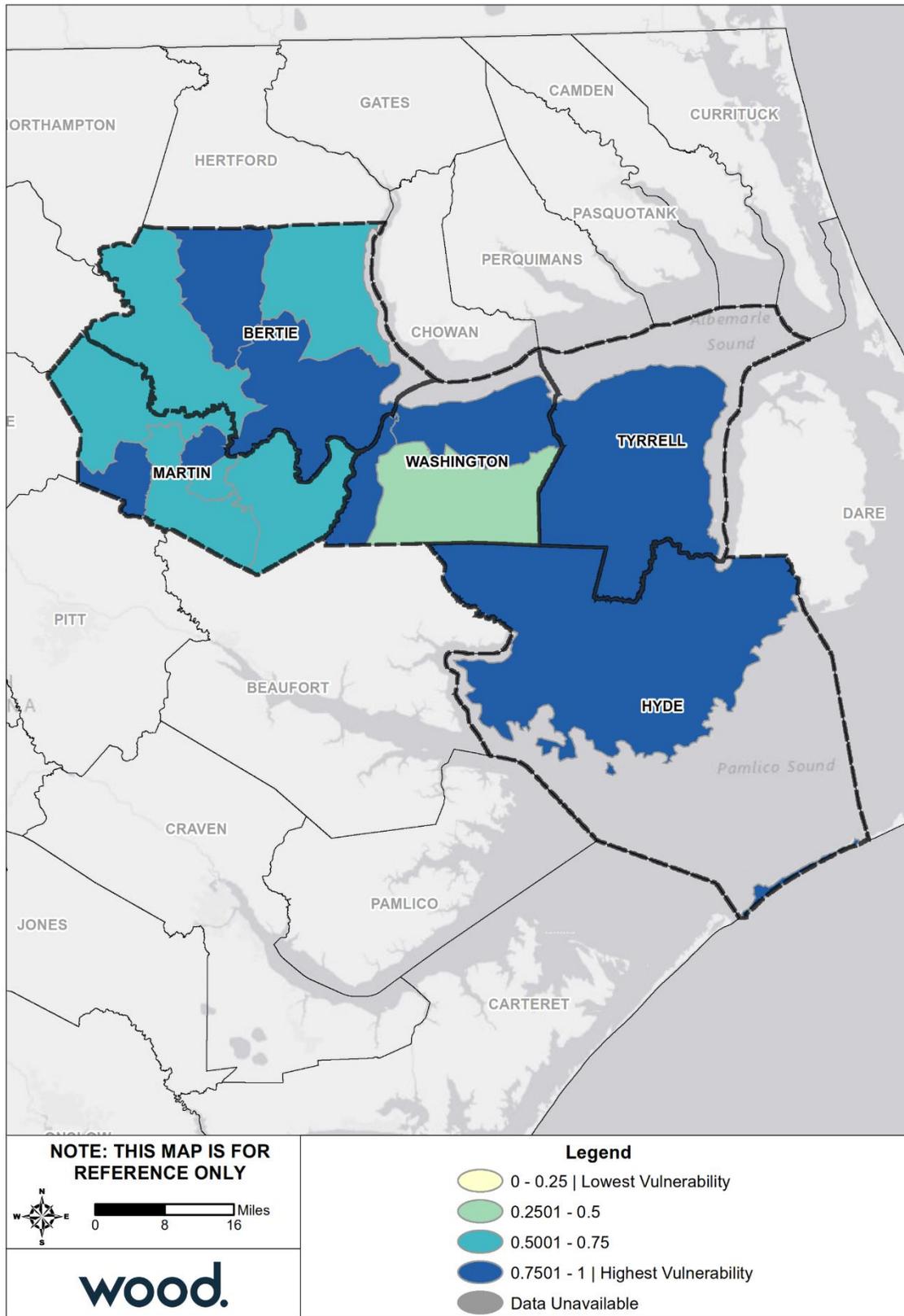
Source: National Hydrology Dataset

Figure 3.3 – Northeastern NC Region, Population Density



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

Figure 3.4 – Northeastern NC Region, Social Vulnerability Index



Source: CDC 2016

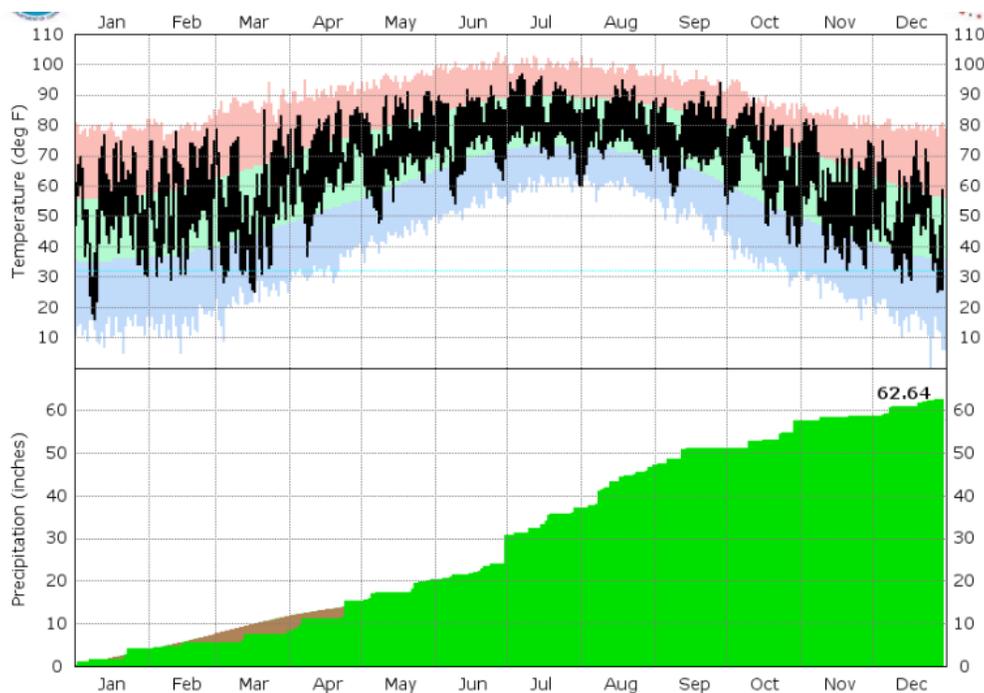
## SECTION 3: PLANNING AREA PROFILE

The Northeastern NC Region has cool, short winters and long, hot, and humid summers, with peak temperatures occurring in July and August. 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.

Average annual maximum temperature is 72 degrees F and the average minimum temperature is 49.9 degrees F. Average maximum temperatures range from 51.4 degrees F in January to 89.3 degrees F in July. Average minimum temperatures range from 30.9 degrees F in January to 69 degrees F in July. Rainfall is usually fairly well distributed throughout the year, with an average annual precipitation of 50.24 inches. Snowfall is rare, with less than one inch to 1.3 inches falling in December, January, February, and March, for an annual average of 3.1 inches.

Figure 3.5 provides a summary of climate conditions for the region relating to annual temperature and precipitation. Maximum temperatures are shown in red, average temperatures in green, and minimum temperatures in blue. The black link indicates the average daily temperature over the period of record.

**Figure 3.5 – Northeastern NC Climate Conditions**



Source: National Oceanic and Atmospheric Administration

### Wetlands

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.

The following table, Table 3.2 provides a summary of wetland coverage within each County located in the Northeastern NC Region as reported by the U.S. Fish and Wildlife Service's National Wetlands Inventory.

## SECTION 3: PLANNING AREA PROFILE

**Table 3.2 – Northeastern NC Region, Wetlands Acreage**

County	Wetland Acreage	% of Total County Acreage
Bertie County	154,028	36.3%
Hyde County	249,523	27.8%
Martin County	72,601	24.6%
Tyrrell County	161,602	42.5%
Washington County	102,027	37.6%
<b>Total</b>	<b>739,781</b>	<b>31.7%</b>

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

### 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. There are a range of species that are listed throughout the Northeastern NC Region. Table 3.3 provides the status of threatened or endangered species within each participating County.

**Table 3.3 – Northeastern NC Region, Threatened and Endangered Species**

Group	Common Name	Scientific Name	Federal Status	Counties Identified
Amphibians	Neuse River waterdog	<i>Necturus lewisi</i>	Proposed Threatened	M
Birds	Piping Plover	<i>Charadrius melodus</i>	Threatened	H
Birds	Red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	B,H,T,W
Birds	Red knot	<i>Calidris canutus rufa</i>	Threatened	B,H,T,W
Clams	Tar River spiny mussel	<i>Elliptio steinstansana</i>	Endangered	M
Clams	Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	Endangered	M
Clams	Yellow lance	<i>Elliptio lanceolate</i>	Threatened	M
Clams	Atlantic pigtoe	<i>Fusconaia masoni</i>	Proposed Threatened	M
Fishes	Carolina madtom	<i>Noturus furiosus</i>	Proposed Endangered	M
Flowering Plants	Sensitive joint-vetch	<i>Aeschynomene virginica</i>	Threatened	H
Flowering Plants	Seabeach amaranth	<i>Amaranthus pumilus</i>	Threatened	H
Mammals	West Indian Manatee	<i>Trichechus manatus</i>	Threatened	H
Mammals	Red wolf	<i>Canis rufus</i>	Experimental Population, Non-Essential	H,T,W
Mammals	Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	Threatened	B,H,M,T,W
Mammals	Little brown bat	<i>Myotis lucifugus</i>	Under Review	B
Reptiles	American alligator	<i>Alligator mississippiensis</i>	Similarity of Appearance (Threatened)	H,T,W
Reptiles	Hawksbill sea turtle	<i>Eretmochelys imbricate</i>	Endangered	H
Reptiles	Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	H
Reptiles	Kemp's ridley sea turtle	<i>Lepidochelys kempi</i>	Endangered	H
Reptiles	Green sea turtle	<i>Chelonia mydas</i>	Threatened	H
Reptiles	Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened	H

Source: U.S. Fish & Wildlife Service

Note: B = Bertie, H = Hyde, M = Martin, T = Tyrrell, W = Washington

## 3.2 BERTIE COUNTY

### 3.2.1 Hydrology

Bertie County falls predominantly within the Roanoke River Basin, and the Northeastern portion of the County is situated within the Chowan River Basin. The location of these two river basins in relation to Bertie County is provided in Figure 3.6. The following provides a summary of the characteristics of these two river basins.

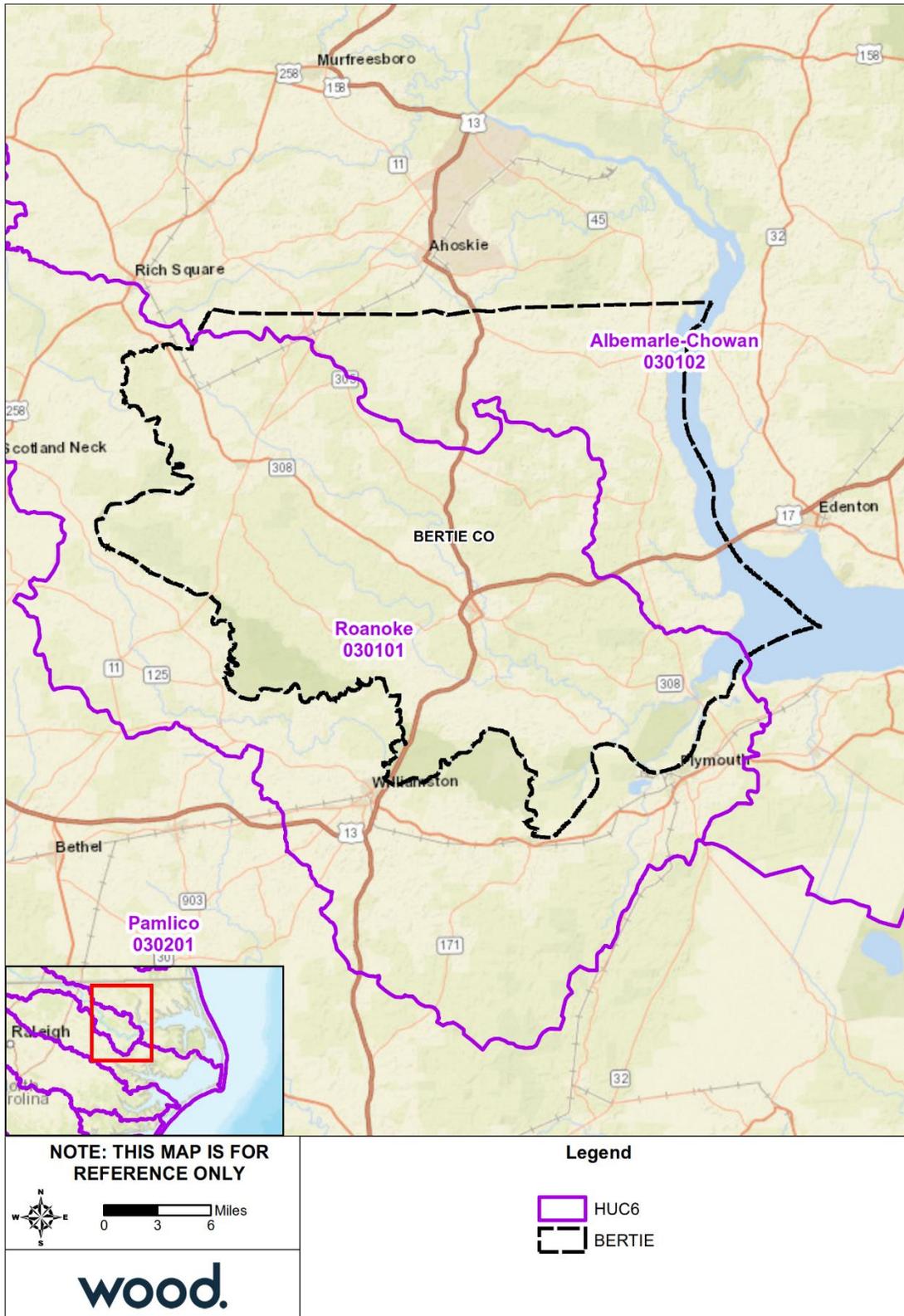
The Chowan River basin is located in the northeastern coastal plain of North Carolina and southeastern Virginia. The North Carolina portion includes all or part of Northampton, Hertford, Gates, Bertie and Chowan counties. The Chowan River is formed at the border of Virginia and North Carolina by the 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 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.

The Roanoke River Basin begins in the Blue Ridge Mountains of Virginia and ends in the Albemarle Sound of North Carolina. The Basin covers nearly 10,000 square miles with 3,500 falling within North Carolina making it the State's 6th largest of its 17 river basins. The basin encompasses 126 HUs that range in size from less than 1 square mile to 113. There are five Catalog Units (8-digit watershed delineations) in the Basin with the major rivers including the Dan, Smith, Mayo, and Roanoke. Large reservoirs in the Basin include the Hyco, Mayo, Kerr, and Lake Gaston.

Cities and towns inside or bordered by the Roanoke Basin include Eden, Reidsville, Walnut Cove, Mayodan, Wentworth, Yanceyville, Roxboro, Henderson, Roanoke Rapids, Williamston, Windsor, and Plymouth. The Basin includes all or portions of 19 counties and North Carolina's Office of State Budget and Management (OSBM) figures for these counties estimates 2007 population at 1.7 million.

Figure 3.6 – HUC-6 River Basins, Bertie County



Source: National Hydrology Dataset

### 3.2.2 Parks and Open Space

Bertie County has several passive and active recreational opportunities throughout the County. Additionally, the Town of Windsor is widely recognized for the Town’s Cashie River Walk and Livermon Park and Mini Zoo, which provides a regional educational opportunity for school aged children and visitors. Within Bertie County, the following outdoor recreational facilities are available:

- ▶ Aulander Elementary (Under Shared Use Agreement)
- ▶ West Bertie Elementary (Under Shared Use Agreement)
- ▶ Colerain Elementary (Under Shared Use Agreement)
- ▶ Windsor Elementary (Under Shared Use Agreement)
- ▶ Aulander Walking Track
- ▶ Kelford Community Park
- ▶ Cashie River Walk (Windsor)
- ▶ Livermon Park and Mini Zoo (Windsor)

### 3.2.3 Demographics

#### Total Population

Bertie County is the only unincorporated area throughout the Northeastern NC Region that has experienced a population increase dating back to the year 2000. Although modest, the County overall has had a growth rate of 0.7% since the 2000 Census. The County’s incorporated areas experienced a much more rapid growth rate, showing an overall increase of 29.7% over the same period. The Towns of Windsor and Kelford experienced the most rapid growth increasing by 54.8% and 54.7%, respectively.

Table 3.4 provides a breakdown of total population for Bertie County and the participating municipalities for the years 2000, 2010, and 2017.

**Table 3.4 – Bertie County Total Population**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Askeville	180	241	224	33.9%	-7.1%	24.4%
Aulander	888	895	962	0.8%	7.5%	8.3%
Colerain	221	204	236	-7.7%	15.7%	6.8%
Kelford	245	251	379	2.4%	51.0%	54.7%
Lewiston-Woodville	613	549	575	-10.4%	4.7%	-6.2%
Powellsville	259	276	205	6.6%	-25.7%	-20.8%
Roxobel	263	240	306	-8.7%	27.5%	16.3%
Windsor	2,283	3,630	3,534	59.0%	-2.6%	54.8%
<b>Municipalities</b>	<b>4,952</b>	<b>6,286</b>	<b>6,421</b>	<b>26.9%</b>	<b>2.1%</b>	<b>29.7%</b>
Unincorporated Areas	14,821	14,996	13,492	1.2%	-10.0%	-8.9%
<b>Bertie County</b>	<b>19,773</b>	<b>21,282</b>	<b>19,913</b>	<b>7.6%</b>	<b>-6.4%</b>	<b>0.7%</b>

Source: US Census Bureau, American Community Survey.

#### Growth Trends

Table 3.5 provides population forecasts through the year 2050 for Bertie 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, Bertie County overall is expected to decrease in population at a rate of 7.1% through 2050 (a total of 1,055 individuals).

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**Table 3.5 – Bertie County Population Projections, 2017-2050**

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Askewville	224	234	266	298	330	83.5%
Aulander	962	976	1,023	1,070	1,118	25.9%
Colerain	236	239	248	258	267	20.9%
Kelford	379	416	538	659	781	218.9%
Lewiston-Woodville	575	569	548	527	506	-17.5%
Powellsville	205	197	172	147	122	-52.9%
Roxobel	306	315	344	374	403	53.3%
Windsor	3,534	3,876	5,015	6,154	7,293	219.5%
<b>Municipalities</b>	<b>6,421</b>	<b>6,821</b>	<b>8,154</b>	<b>9,487</b>	<b>10,820</b>	<b>118.5%</b>
Unincorporated Areas	13,492	13,517	13,600	13,683	13,756	-7.1%
<b>Bertie County</b>	<b>19,913</b>	<b>20,338</b>	<b>21,754</b>	<b>23,170</b>	<b>24,586</b>	<b>24.3%</b>

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

### Racial Demographics

Bertie County's population base is predominantly African American in terms of racial composition. The African American population comprises 62% of the population base, while slightly over 35% is Caucasian. Throughout the County, the Hispanic population only comprises 2.1% of the overall population; however, the Towns of Aulander and Roxobel maintain a slightly higher Hispanic population base at 10.5% and 9.2%, respectively. Table 3.6 below provides a detailed breakdown of racial composition for Bertie County overall, as well as all participating municipal jurisdictions.

**Table 3.6 – Bertie County Racial Composition**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Askewville	93.8%	0.0%	0.0%	6.2%	0.0%	4.5%
Aulander	30.8%	62.0%	0.0%	7.2%	0.0%	10.5%
Colerain	92.8%	2.5%	0.0%	4.7%	0.0%	4.2%
Kelford	24.3%	74.4%	0.0%	0.0%	1.3%	0.0%
Lewiston-Woodville	12.7%	83.0%	0.9%	1.3%	2.1%	1.4%
Powellsville	47.8%	52.2%	0.0%	0.0%	0.0%	0.0%
Roxobel	36.3%	53.3%	1.0%	4.8%	4.6%	9.2%
Windsor	36.7%	57.8%	1.9%	1.6%	2.0%	3.0%
<b>Bertie County</b>	<b>35.3%</b>	<b>62.0%</b>	<b>0.6%</b>	<b>1.2%</b>	<b>0.9%</b>	<b>2.1%</b>

\*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

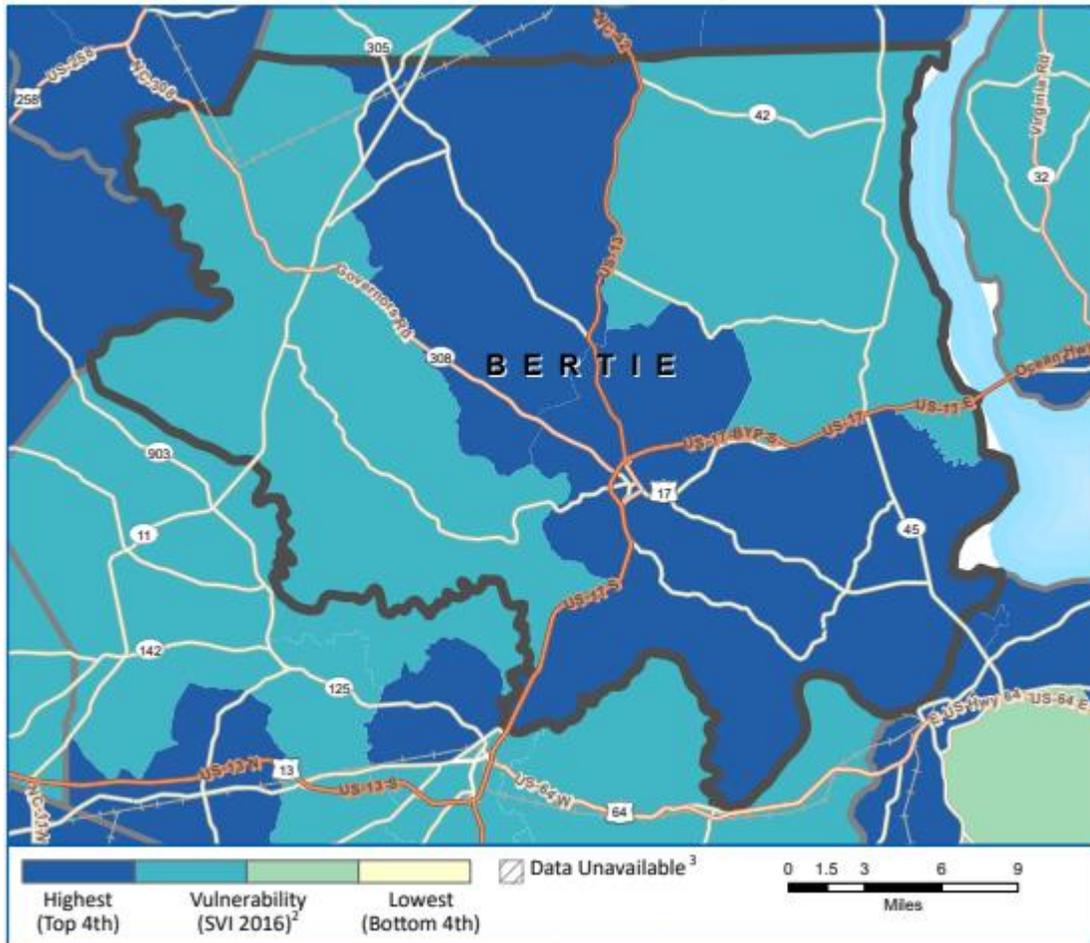
Figure 3.7 below displays social vulnerability information for Bertie County by census tract according to 2016 data and analysis by the Centers for Disease Control and Prevention (CDC). The CDC's Social Vulnerability Index (SVI) indicates the relative vulnerability within census tracts based on 15 social 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

## SECTION 3: PLANNING AREA PROFILE

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.

Bertie County, like the other counties located throughout the Northeastern Region, has a high social vulnerability index. This high SVI index can be attributed to the County's rural population and limited service base. Bertie County does maintain a more active emergency management system than several other counties included in the plan, but the dispersed population and limited transportation infrastructure impact the overall SVI Index.

Figure 3.7 – Bertie County Social Vulnerability



Source: CDC 2016

### 3.2.4 Housing Characteristics

Housing development has been sporadic throughout Bertie County; however, several of the County's municipalities have experienced fairly rapid growth. Overall, Bertie County's housing stock has increased at a rate of 0.3% since the 2010 Census. Although the County at-large has seen slow growth, nearly all of the County's municipalities have seen growth rates exceeding 15% including Colerain (17.5%), Lewiston-Woodville (27.1%), and Roxobel (25.8%). Most homes throughout the County are owner-occupied (81.1%). The County's municipal jurisdictions also maintain a housing stock that is primarily owner-occupied.

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Table 3.7 below provides a summary of housing characteristics for Bertie County, as well as participating municipal jurisdictions.

**Table 3.7 – Bertie County Housing Characteristics**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Askewville	108	118	9.3%	91.5%	8.5%
Aulander	450	453	0.7%	74.2%	25.8%
Colerain	120	141	17.5%	71.6%	28.4%
Kelford	130	148	13.8%	79.7%	20.3%
Lewiston-Woodville	262	333	27.1%	68.8%	31.2%
Powellsville	150	112	-25.3%	76.8%	23.2%
Roxobel	128	161	25.8%	92.5%	7.5%
Windsor	1,193	1,194	0.1%	89.4%	10.6%
<b>Bertie County</b>	<b>9,822</b>	<b>9,853</b>	<b>0.3%</b>	<b>81.1%</b>	<b>18.9%</b>

Source: US Census Bureau American Community Survey.

### 3.2.5 Wages, Employment and Industry

According to 2017 ACS data, median household income in Bertie County is \$31,287. An estimated 22.0% of individuals live below the poverty level. The percentage of the population currently in the labor force throughout Bertie County is 43.8%. The unemployment rate for the County overall is 12.7%; however, several of the County's municipalities maintain a much lower unemployment rate including Askewville (2.0%), Colerain (0.9%), and Windsor (7.4%). Most of the County's population is employed by either the production, transportation, and material moving industry (29.0%), or the management, business, science and arts industry (23.7%).

The following tables, Table 3.8 and Table 3.9, provide a summary of key economic indicators and population employed by occupation for incorporated and unincorporated portions of Bertie County.

**Table 3.8 – Bertie County Key Economic Indicators, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Askewville	102	50.0%	1.0%	49.0%	2.0%
Aulander	331	41.5%	9.4%	49.2%	18.4%
Colerain	106	55.0%	0.5%	44.5%	0.9%
Kelford	105	38.5%	6.9%	54.5%	15.2%
Lewiston-Woodville	326	68.6%	7.2%	24.2%	9.5%
Powellsville	65	33.1%	3.4%	63.5%	9.2%
Roxobel	127	42.1%	6.9%	51.0%	14.2%
Windsor	1,029	31.1%	2.5%	66.5%	7.4%
<b>Bertie County</b>	<b>8,367</b>	<b>43.8%</b>	<b>6.4%</b>	<b>49.8%</b>	<b>12.7%</b>

Source: US Census Bureau American Community Survey.

Table 3.9 – Bertie County Employment by Occupation, 2017

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Askewville	30.0%	6.0%	18.0%	28.0%	18.0%
Aulander	10.0%	35.2%	11.9%	13.3%	29.6%
Colerain	49.5%	13.3%	13.3%	21.0%	2.9%
Kelford	10.1%	25.8%	13.5%	14.6%	36.0%
Lewiston-Woodville	24.1%	17.6%	23.4%	7.1%	27.8%
Powellsville	28.8%	18.6%	25.4%	5.1%	22.0%
Roxobel	25.7%	19.3%	28.4%	9.2%	17.4%
Windsor	24.9%	22.6%	20.7%	8.1%	23.8%
<b>Bertie County</b>	<b>23.7%</b>	<b>16.0%</b>	<b>18.6%</b>	<b>12.7%</b>	<b>29.0%</b>

Source: US Census Bureau American Community Survey.

The top employers in Bertie County represent the management, business, science and arts; production, transportation, and material moving, and service occupations. These employers include:

- ▶ Perdue Products, Inc.
- ▶ Bertie County Board of Education
- ▶ NC Department of Public Safety
- ▶ Qsi
- ▶ County of Bertie
- ▶ Vidant Medical Center
- ▶ Solid Foundation
- ▶ Avoca, Inc.
- ▶ Liberty Healthcare Group LLC
- ▶ Home Life Care, Inc.

### 3.2.6 Historic Properties

As of September 2019, Bertie County had 22 listings on the National Register of Historic Places. This list includes 19 historic structures/sites, 1 archeological site, and 2 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 listing of all Nationally Registered Properties in Bertie County:

- ▶ Ashland (Ashland vicinity) 4/18/2003
- ▶ Bertie County Courthouse (Windsor) 5/10/1979
- ▶ Bertie Memorial Hospital (Windsor) 6/22/2004
- ▶ Elmwood (Windsor vicinity) 6/8/1982
- ▶ Elmwood (Merry Hill vicinity) 1/15/2003
- ▶ Freeman Hotel (Windsor) 9/9/1982
- ▶ Garrett-White House (Trap vicinity) 6/28/1982
- ▶ The Hermitage (Ashland vicinity) 6/8/1982
- ▶ Hope Plantation (Windsor vicinity) 4/17/1970
- ▶ Jordan House (Windsor vicinity) 8/26/1971
- ▶ King House (Windsor vicinity) 8/26/1971

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- ▶ King-Freeman-Speight House (Republican vicinity) 12/2/1982
- ▶ William H. Lee House (Lewiston vicinity) 4/16/2012
- ▶ Liberty Hall (Grabtown vicinity) 6/8/1982
- ▶ Oaklana (Roxobel vicinity) 4/15/1982
- ▶ Pineview (Roxobel vicinity) 6/28/1982
- ▶ Rhodes Site (31BR90) (Archaeology) (Hamilton vicinity) 8/28/1986
- ▶ Rosefield (Windsor) 8/26/1982
- ▶ Saint Frances Methodist Church (Lewiston) 4/29/1982
- ▶ Scotch Hall (Merry Hill vicinity) 4/29/1982
- ▶ Windsor Historic District (Windsor) 7/29/1991
- ▶ Woodbourne (Roxobel vicinity) 8/26/1971
- ▶ Woodville Historic District (Lewiston-Woodville) 8/28/1998

### 3.2.7 Land Development Trends

Although Bertie County has several municipalities situated throughout its jurisdiction, these municipalities maintain small population bases and generally support the County's agriculture industry. Nearly all of the County's development occurs within or around one of the County's municipal main streets. The Town of Windsor serves as the County seat and provides a bulk of the County's commercial and service base. As noted above, growth has occurred throughout the County, but in terms of raw numbers this growth has been modest. Additionally, new development within the Town of Windsor has been stagnant dating back to 2000. The impacts of natural disasters since Hurricane Floyd have had a significant impact on commercial and residential investment. Table 3.10 shows the developed and undeveloped parcels in Bertie County.

**Table 3.10 – Bertie County Developed and Undeveloped Parcel Counts**

Jurisdiction	Developed Parcels	Undeveloped Parcels	% Developed
Askewville	125	45	26.5%
Aulander	419	205	32.9%
Colerain	157	32	16.9%
Kelford	132	93	41.3%
Lewiston-Woodville	249	125	33.4%
Powellsville	108	59	35.3%
Roxobel	150	89	37.2%
Windsor	1,204	421	25.9%
<b>Bertie County</b>	<b>6,782</b>	<b>8,263</b>	<b>54.9%</b>

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

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

## 3.3 HYDE COUNTY

### 3.3.1 Hydrology

A majority of Hyde County is situated within the Tar-Pamlico River Basin, while a small portion of Hyde County falls within the Pasquotank River Basin. The location of these two river basins in relation to Hyde County is provided in Figure 3.8. The following provides a summary of the characteristics of these two river basins.

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The Tar River originates in north central North Carolina in Person, Granville and Vance counties and flows southeasterly until it reaches tidal waters near Washington and becomes the Pamlico River and empties into the Pamlico Sound. The entire basin is classified as Nutrient Sensitive Waters (NSW). Based on the 2011 National Land Cover Data, the Tar-Pamlico River Basin's estimated developed area is ~7%, agriculture ~29%, wetlands ~23% grassland/scrub ~12% and forest ~27%. Development and population growth center around Greenville, Rocky Mount, Washington and in rural areas within commuting distance to Raleigh.

The Pasquotank River basin (USGS CU 03010205) begins in the Great Dismal Swamp in Virginia. The Pasquotank River Basin is an expansive area of flat to gently sloping land surrounding the Albemarle Sound. Several major river systems flow into the Albemarle, 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. This Pasquotank is about 2,140 square miles including both land and open water.

Edenton, Hertford/Winfall, Elizabeth City and Kitty Hawk/Kill Devil Hills/Nags Head 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.

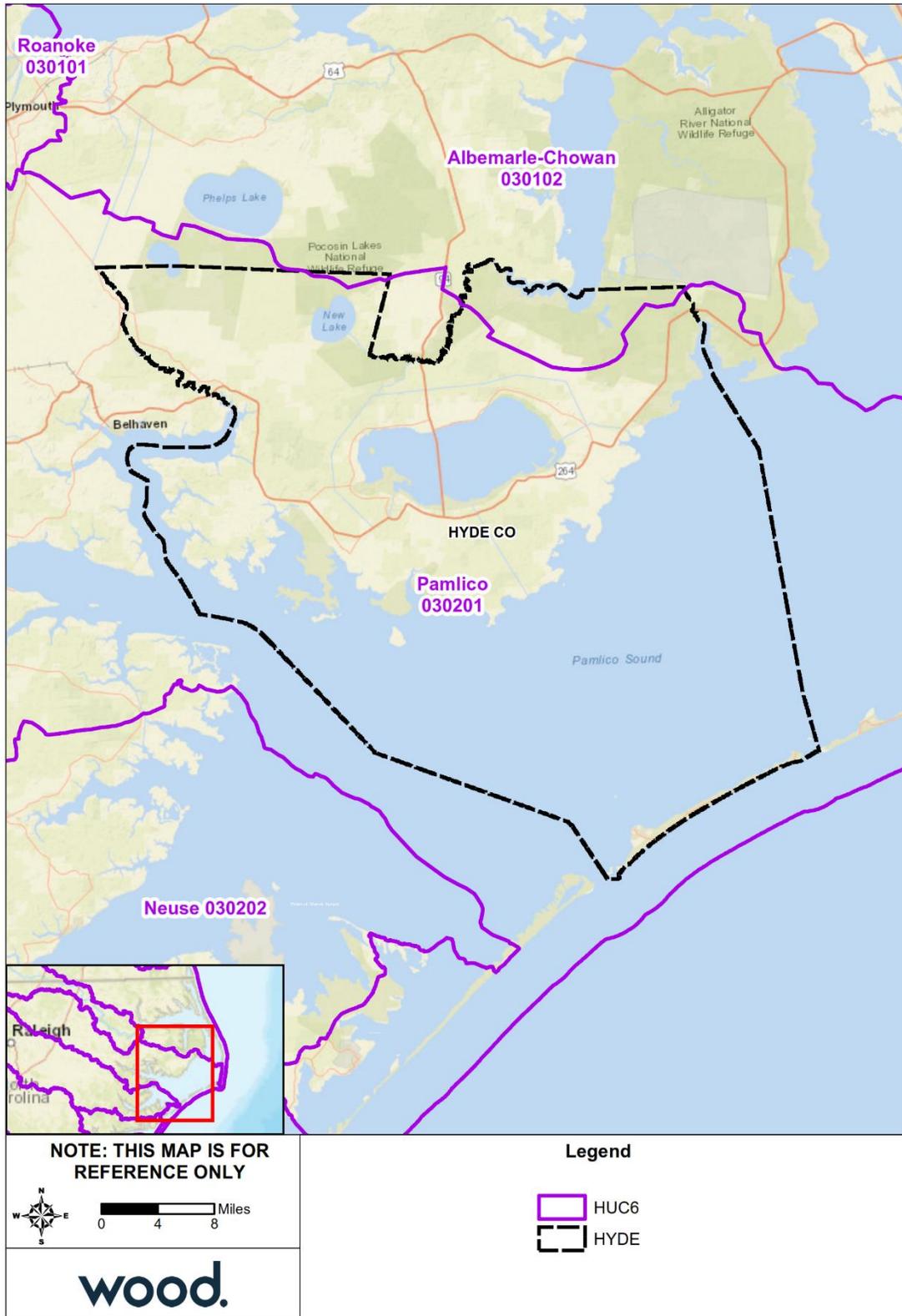
Figure 3.8 shows Hyde County in relation to HUC-6 drainage basins. HUC-8 drainage basins are shown in Figure 3.2.

### 3.3.2 Parks and Open Space

Hyde County maintains several park facilities that serve a variety of community needs ranging from neighborhood parks to schools with athletic fields available through Joint Use Agreements with the County school system. Hyde County is very rural in nature; however, the County has an abundance of both active and passive recreational opportunities. The 2014 Hyde County Parks and Recreation Plan summarizes the County's park facilities by the following categories:

- ▶ Mini Parks:
  - Swan Quarter Community Park
  - Neighborhood Parks:
    - Davis Youth Center/Engelhard Community Park
    - Ponzer Community Center/Park
    - Hyde County Health Department Facilities
    - Ocracoke Community Park
- ▶ School parks:
  - Matamuskeet School
  - OA Peay School
  - Ocracoke School
- ▶ Special Use Parks:
  - Pleasant Grove Community Garden
  - Sladesville Baptist Church (Fellowship Hall)
  - Ocracoke Community Center
  - Ocracoke Lighthouse
- ▶ Natural Resource Areas:
  - Lake Matamuskeet National Wildlife Refuge
  - Pungo National Wildlife Refuge
  - Swan Quarter National Wildlife Refuge
  - Gull Rock Refuge
  - Alligator River National Wildlife Refuge
  - Springers Point Nature Preserve
  - Cape Hatteras National Seashore

Figure 3.8 – HUC-6 River Basins, Hyde County



Source: National Hydrology Dataset

### 3.3.3 Demographics

#### Total Population

Hyde County is nearly twice the size in terms of land area to the other counties throughout the Northeastern Region covering approximately 1,424 square miles. Forty thousand acres of the land area is covered by Lake Mattamuskeet which is centrally located within the County. Although Hyde County is substantial in terms of land area, the County is home to the second smallest population in the State. With a total population of 5,507 persons as of 2017, the only county with a smaller population base is Tyrrell County, which is also situated in the Northeastern Region. Hyde County does not have any incorporated municipal jurisdictions; therefore, all data is presented at the County level.

The following table, Table 3.11, provides a breakdown of total population for Hyde County for the years 2000, 2010, and 2017.

**Table 3.11 – Hyde County Total Population**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Hyde County	5,826	5,810	5,507	-0.3%	-5.2%	-5.5%

Source: US Census Bureau American Community Survey.

#### Growth Trends

Table 3.12 provides population forecast through the year 2050 for Hyde County. These forecasts are based on established trends between the years 2010 and 2017, as the US Census began compiling estimates based on the County’s Census Designated Places in 2010. According to these estimates, Hyde County overall is expected to decrease in population by 10.1% through 2050 (a total loss of 558 individuals).

**Table 3.12 – Hyde County Population Projections, 2017-2050**

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Hyde County	5,507	5,456	5,287	5,118	4,949	-10.1%

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

#### Racial Demographics

The population throughout Hyde County is predominantly Caucasian (68.2%), with the remainder of the County’s citizen base being African American (30.7%). Additionally, the County is home to a fairly substantial Hispanic population in comparison to other counties throughout the region. The 8.4% of the population being of Hispanic or Latino origin have historically provided critical workforce associated with the agriculture and seafood industries.

Table 3.13 below provides a summary of racial composition for Hyde County, as well as all participating municipal jurisdictions.

**Table 3.13 – Hyde County Racial Composition**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Hyde County	68.2%	30.7%	0.0%	0.1%	1.0%	8.4%

\*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.

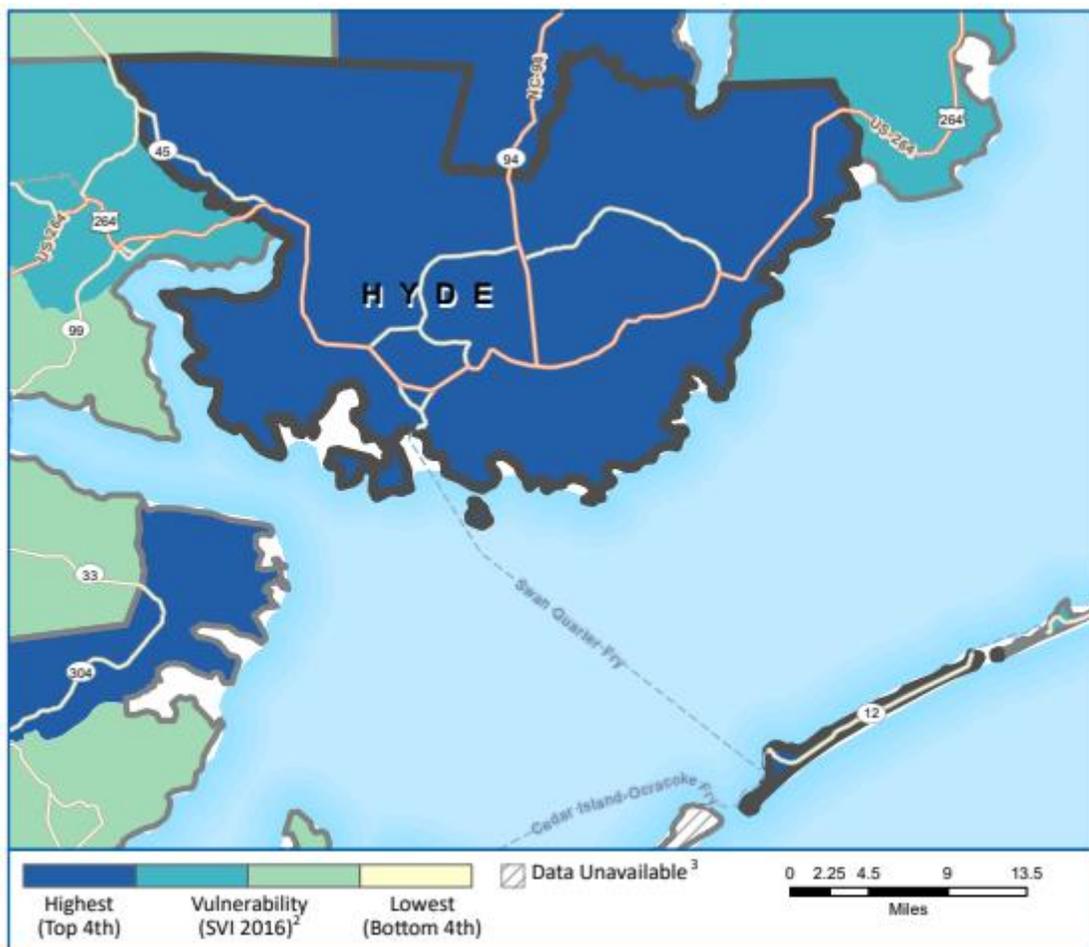
### SECTION 3: PLANNING AREA PROFILE

#### Social Vulnerability

Figure 3.9 displays social vulnerability information for Hyde 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 to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Hyde County maintains the second lowest population base in the State of North Carolina. This is coupled with the fact that the County does not have any defined municipal jurisdictions. Both of these facts result in a scenario whereby emergency management, as well as capital resources, are extremely limited. The response capability within Hyde County is limited not only by resources, but also mobility. Hyde County faces a range of challenges from a geographic standpoint, including the fact that the Village of Ocracoke is only accessible via ferry from Swan Quarter in Hyde County and Hatteras Village in Dare County.

Figure 3.9 – Hyde County Social Vulnerability



Source: CDC 2016

### 3.3.4 Housing Characteristics

Housing stats within Hyde County have been extremely slow since the 2010 Census. In fact, new housing development has been stagnant for some time within the County. Dating back to the 2000 US Census, only nine additional new residential structures have been reported. A majority of homes within the County are occupied; however, this percentage is only slightly above fifty percent. Throughout Hyde County, there a number of residential structures that are utilized for seasonal use, especially within the Village of Ocracoke.

Table 3.14 provides a summary of housing characteristics for Hyde County.

**Table 3.14 – Hyde County Housing Characteristics**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Hyde County	3,347	3,311	-1.1%	55.4%	44.6%

Source: US Census Bureau American Community Survey.

### 3.3.5 Wages, Employment and Industry

The American Community Survey reports that roughly 50% of the Hyde County population is currently within the labor force. This percentage is quite a bit lower than the state average of 62%. This figure is generally indicative of an aging and declining population base. The County’s unemployment rate of 11.0% is generally in line with other County’s throughout the region; however, much higher than the State of North Carolina overall (4.1%). Median household income in Hyde County is \$40,532. An estimated 20.3% of individuals live below the poverty level.

The following tables, Table 3.15 and Table 3.16, provide a summary of key economic indicators and population employed by occupation for Hyde County.

**Table 3.15 – Hyde County Key Economic Indicators, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Hyde County	50.9%	45.3%	5.6%	49.1%	11.0%

Source: US Census Bureau American Community Survey.

**Table 3.16 – Hyde County Employment by Occupation, 2017**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Hyde County	24.2%	14.2%	24.3%	22.0%	15.3%

Source: US Census Bureau American Community Survey.

The top employers in Hyde County represent the sales and office; service; and management, business, science and arts industries. These employers include:

- ▶ NC Department of Public Safety
- ▶ Hyde County Board of Education
- ▶ Rose Acre Farms
- ▶ County of Hyde
- ▶ ITW
- ▶ Ocracoke Island Realty

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- ▶ Mattamuskeet Seafood
- ▶ NC Department of Transportation
- ▶ Liberty Healthcare Group LLC
- ▶ Sawyers Land Developing Company, Inc.

### 3.3.6 Historic Properties

As of September 2019, Hyde County had 10 listings on the National Register of Historic Places. This list includes 7 historic structures/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 Hyde County.

- ▶ George V. Credle House and Cemetery (Rose Bay vicinity) 7/29/1985
- ▶ Fairfield Historic District (Fairfield) 7/5/1985
- ▶ Old Hyde County Courthouse (Swan Quarter) 5/10/1979
- ▶ The Inkwell (Amity vicinity) 9/1/1978
- ▶ Lake Landing Historic District (Lake Landing vicinity) 3/13/1986
- ▶ Lake Mattamuskeet Pump Station (New Holland vicinity) 5/28/1980
- ▶ Ocracoke Historic District (Ocracoke) 9/28/1990
- ▶ Ocracoke Light Station (Ocracoke) 11/25/1977
- ▶ Albin B. Swindell House and Store (Swindell Fork vicinity) 8/14/1986
- ▶ Wynne's Folly (Engelhard vicinity) 12/6/1977

### 3.3.7 Land Development Trends

A majority of parcels throughout Hyde County are undeveloped. Due to the overall population and rural nature of the County, development is generally clustered around one of the County's four Census Designated Places including Fairfield, Swan Quarter, Engelhard, and Ocracoke. Although not municipalities, these areas serve as focal points within the County for the provision of services and retail resources. Outside of these areas, development is sparse and is generally associated with agricultural operations and service bases for the seafood industry.

Table 3.17 summarizes the developed and undeveloped parcels in Hyde County.

**Table 3.17 – Hyde County Developed and Undeveloped Parcel Counts**

Jurisdiction	Developed Parcels	Undeveloped Parcels	% Developed
Hyde County	2,921	4,625	38.7%

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

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

## 3.4 MARTIN COUNTY

### 3.4.1 Hydrology

Martin County is evenly split between the Tar-Pamlico and Roanoke River Basins. A summary of each respective river basin is provided under the Bertie County profile (Roanoke) in Section 3.2.1 and Hyde County profile (Tar-Pamlico) in Section 3.3.1. Figure 3.10 on the following page shows Martin County in relation to HUC-6 drainage basins. HUC-8 drainage basins are shown in Figure 3.2.

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Figure 3.10 – HUC-6 Drainage Basins, Martin County



Source: National Hydrology Dataset

### 3.4.2 Parks and Open Space

Martin County does not maintain a dedicated Parks and Recreation Department. However, there are several recreation areas within the county that are either operated by a municipal jurisdiction or the State of North Carolina. The Towns of Williamston, Hamilton, Jamesville, and Oak City all maintain park facilities that allow public access. Additionally, the Roanoke River is an exceptional natural resource and offers opportunity for passive open space. The following provides a summary of county-wide park facilities:

- ▶ Devil’s Gut Preserve – The Nature Conservancy
- ▶ Gaylord Perry Park – Town of Williamston
- ▶ Hamilton Recreation Park – Town of Hamilton
- ▶ Junior League Park – Town of Jamesville
- ▶ Melvin D. Harrell – US Fish and Wildlife
- ▶ Park Development (Oak City) – Town of Oak City
- ▶ Roanoke River (TNC/GP Partnership) – The Nature Conservancy
- ▶ Roanoke River Bottomlands – Wildlife Resources Commission
- ▶ Roanoke River Wetlands Game Land – Wildlife Resources Commission
- ▶ Robersonville Playfield – Town of Robersonville
- ▶ Williamston Youth Park – Town of Williamston
- ▶ WRC Hamilton Access Area – Wildlife Resources Commission
- ▶ WRC Roanoke River Wetlands – Wildlife Resources Commission
- ▶ Moratoc Park – Martin County
- ▶ Godwin-Coppage Park – Williamston
- ▶ Kehukee Park – Martin County

### 3.4.3 Demographics

#### Total Population

Martin County is by far the largest County within the Northeastern NC Region regarding overall population. Martin County has nine incorporated municipal jurisdictions. Overall, population growth throughout the County has been in decline; however, several of the County’s municipalities have experienced modest to substantial population increases. Since the 2000 Census, population for the Town of Bear Grass has increased at a rate of 143%. In addition to Bear Grass, the Towns of Hassell (6.9%), Jamesville (12.7%), and Parmele (10.7%) have also experienced population growth. Figure 3.3 shows the population density of the Northeastern NC Region.

The following table, Table 3.18, provides a breakdown of total population in Martin County for the years 2000, 2010, and 2017.

**Table 3.18 – Martin County Total Population**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Bear Grass	53	73	129	37.7%	76.7%	143.4%
Everetts	179	164	155	-8.4%	-5.5%	-13.4%
Hamilton	516	408	409	-20.9%	0.2%	-20.7%
Hassell	72	84	77	16.7%	-8.3%	6.9%
Jamesville	502	491	566	-2.2%	15.3%	12.7%
Oak City	339	317	292	-6.5%	7.9%	-13.8%
Parmele	290	278	321	-4.1%	15.5%	10.7%
Robersonville	1,731	1,488	1,588	-14.0%	6.7%	-8.3%

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Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Williamston	5,843	5,511	5,398	-5.7%	-2.1%	-7.6%
<b>Municipalities</b>	<b>9,525</b>	<b>8,814</b>	<b>8,935</b>	<b>-7.5%</b>	<b>1.4%</b>	<b>-6.2%</b>
Unincorporated Areas	16,068	15,691	14,292	-2.3%	-8.9%	-11.1%
<b>Martin County</b>	<b>25,593</b>	<b>24,505</b>	<b>23,227</b>	<b>-4.3%</b>	<b>-5.2%</b>	<b>-9.2%</b>

Source: US Census Bureau American Community Survey.

### Growth Trends

Table 3.19 provides population forecast through the year 2050 for Martin 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, Martin County overall is expected to decrease in population at a rate of 28.5% through 2050 by a total of 4,086 individuals.

**Table 3.19 – Martin County Population Projections, 2017-2050**

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Bear Grass	129	162	270	379	488	278.4%
Everetts	155	151	139	127	115	-26.0%
Hamilton	409	394	344	294	244	-40.3%
Hassell	25	78	81	84	87	13.5%
Jamesville	566	579	621	664	706	24.7%
Oak City	292	285	261	237	213	-26.9%
Parmele	321	327	347	367	388	20.8%
Robersonville	1,588	1,565	1,488	1,411	1,333	-16.0%
Williamston	5,398	5,325	5,084	4,842	4,600	-14.8%
<b>Municipalities</b>	<b>8,935</b>	<b>8,866</b>	<b>8,636</b>	<b>8,405</b>	<b>8,175</b>	<b>-8.5%</b>
Unincorporated Areas	14,292	13,913	12,650	11,387	10,124	-29.2%
<b>Total</b>	<b>23,227</b>	<b>22,779</b>	<b>21,286</b>	<b>19,792</b>	<b>18,299</b>	<b>-21.2%</b>

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

### Racial Demographics

The racial composition of Martin County overall is somewhat evenly split, with a majority of the County's citizen base being Caucasian (54.4%), while the remaining population base is predominantly African American (41.9%). Martin County's reported Hispanic population is fairly low at 3.7%.

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

**Table 3.20 – Martin County Racial Composition**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Bear Grass	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Everetts	44.5%	55.5%	0.0%	0.0%	0.0%	0.0%
Hamilton	41.8%	51.8%	0.0%	0.0%	6.4%	7.3%
Hassell	64.0%	36.0%	0.0%	0.0%	0.0%	0.0%
Jamesville	60.1%	35.7%	0.0%	1.9%	2.3%	17.3%
Oak City	39.0%	61.0%	0.0%	0.0%	0.0%	3.4%
Parmele	10.6%	89.4%	0.0%	0.0%	0.0%	0.0%

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Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Robersonville	28.2%	65.9%	0.0%	4.3%	1.6%	6.9%
Williamston	36.4%	57.3%	4.0%	1.0%	1.3%	2.2%
<b>Martin County</b>	<b>54.4%</b>	<b>41.9%</b>	<b>1.2%</b>	<b>1.3%</b>	<b>1.2%</b>	<b>3.7%</b>

\*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.

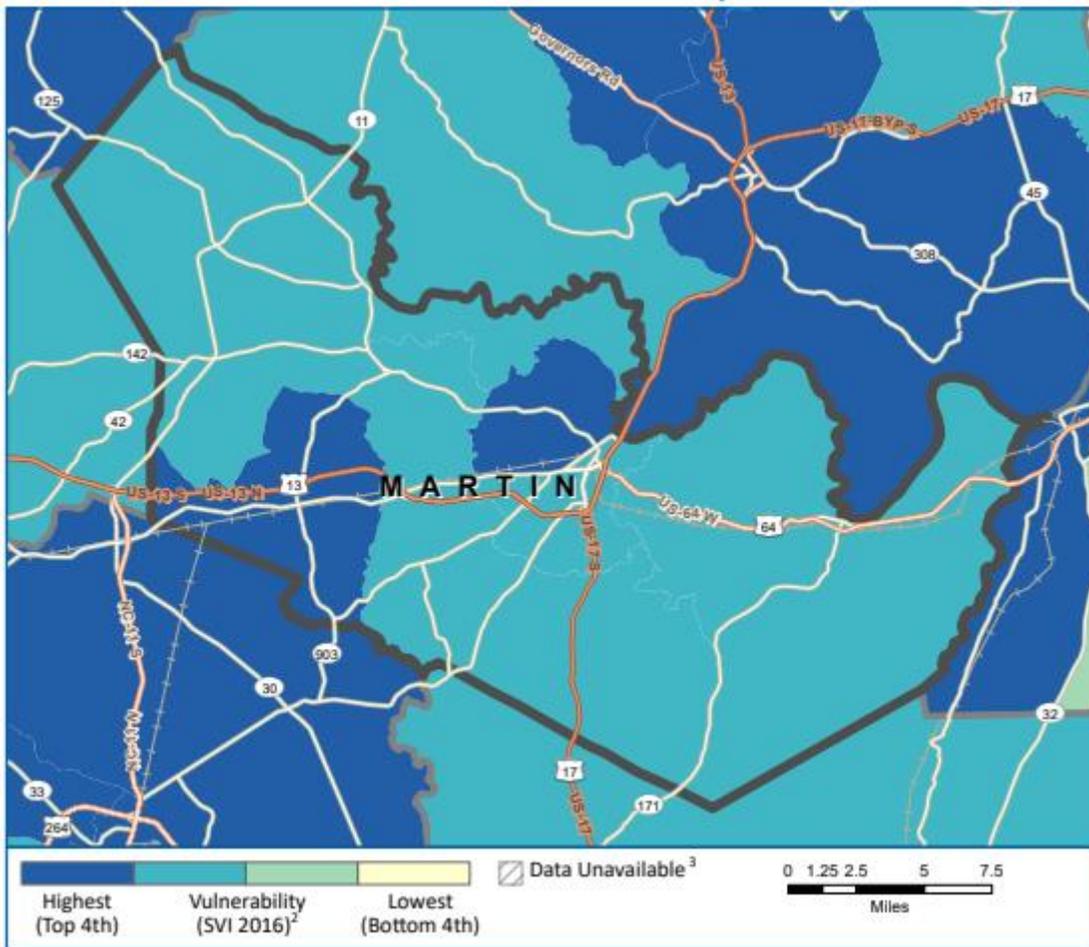
Source: US Census Bureau American Community Survey.

### Social Vulnerability

Figure 3.11 below displays social vulnerability information for Martin 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 to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Martin County maintains a lower Social Vulnerability Index than most counties located throughout the region, principally due to the greater concentration of population base. Additionally, the County has a robust transportation system providing immediate access to most of the County's rural areas. Although, having a lower index than most of the other counties, Martin County's SVI is still fairly high. Like all other counties with the region, Martin County is extremely rural in nature and the availability of municipal resources, including emergency management, is somewhat limited.

Figure 3.11 – Martin County Social Vulnerability Index



Source: CDC 2016

### 3.4.4 Housing Characteristics

Like several other communities within the Northeastern NC region, the American Community Survey Data presented for housing growth appears to be slightly inaccurate in some instances. An example of this fact is the reported 47.5% housing unit decrease within the Town of Hassell. The Town of Hassell has actually experienced a population increase; however, the housing unit increases reported are in severe decline. When reviewing this information, these factors should be considered. Overall, the County has experienced no true increase in residential development. This factor is not unusual within counties located throughout the Northeastern NC Region. This nominal development activity is supported by the County’s reported building permit activity.

Table 3.21 below provides a summary of housing characteristics for Martin County, as well as participating municipal jurisdictions.

Table 3.21 – Martin County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Bear Grass	40	47	17.5%	95.7%	4.3%
Everetts	88	95	8.0%	80.0%	20.0%

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Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Hamilton	224	219	2.2%	78.1%	21.9%
Hassell	40	21	-47.5%	52.4%	47.6%
Jamesville	256	263	2.7%	83.3%	16.7%
Oak City	188	178	-5.3%	73.6%	26.4%
ParmeLe	145	157	8.3%	73.2%	26.8%
Robersonville	799	873	9.3%	80.2%	19.8%
Williamston	2,685	2,820	5.0%	79.1%	20.9%
<b>Martin County</b>	<b>11,704</b>	<b>11,610</b>	<b>-0.8%</b>	<b>82.9%</b>	<b>17.1%</b>

Source: US Census Bureau American Community Survey.

### 3.4.5 Wages, Employment and Industry

According to 2017 ACS data, median household income in Martin County is \$35,969. An estimated 19.2% of individuals live below the poverty level. The percentage of the population throughout Martin County in the labor force is approximately 50% for both the County at-large, as well as each participating municipality. The Towns of Hamilton (35.0%) and Bear Grass (36.5%) are slightly lower; however, it should be noted that these communities maintain an aging population and do not provide locally based job opportunities. Martin County (9.6%) has an unemployment rate nearly double that of North Carolina overall (4.2%). The unemployment rates of the Towns of Everetts and Hassell exceed 25%. It should be noted that the Town of Bear Grass reports an unemployment rate of zero.

The following tables, Table 3.22 and Table 3.23, provide a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Martin County.

**Table 3.22 – Martin County Key Economic Indicators**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Bear Grass	36.5%	36.5%	0.0%	63.5%	0.0%
Everetts	63.7%	45.2%	18.5%	36.3%	29.1%
Hamilton	35.0%	26.2%	8.8%	65.0%	25.2%
Hassell	52.0%	48.0%	4.0%	48.0%	7.7%
Jamesville	52.9%	43.5%	9.4%	47.1%	17.8%
Oak City	56.1%	51.5%	4.6%	43.9%	8.2%
ParmeLe	52.6%	43.7%	8.9%	47.4%	16.9%
Robersonville	49.5%	45.4%	4.1%	50.5%	8.3%
Williamston	55.9%	50.1%	5.8%	44.1%	10.4%
<b>Martin County</b>	<b>54.3%</b>	<b>49.0%</b>	<b>5.2%</b>	<b>45.7%</b>	<b>9.6%</b>

Source: US Census Bureau American Community Survey.

**Table 3.23 – Martin County Employment by Occupation**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Bear Grass	48.4%	16.1%	35.5%	0.0%	0.0%
Everetts	14.3%	33.9%	19.6%	17.9%	14.3%
Hamilton	30.3%	12.4%	23.6%	7.9%	25.8%
Hassell	25.0%	8.3%	0.0%	0.0%	66.7%

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Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Jamesville	21.1%	15.1%	22.7%	14.1%	27.0%
Oak City	20.7%	17.0%	17.0%	16.3%	28.9%
Parmelee	5.5%	21.1%	26.6%	6.3%	40.6%
Robersonville	17.8%	27.0%	22.8%	5.4%	27.0%
Williamston	30.0%	28.2%	25.3%	1.5%	15.0%
<b>Martin County</b>	<b>28.3%</b>	<b>19.5%</b>	<b>23.7%</b>	<b>10.6%</b>	<b>17.9%</b>

Source: US Census Bureau American Community Survey.

The top employers in Martin County represent the production, transportation, and material moving; service; and sales and office industries. These employers include:

- ▶ Martin County Board of Education
- ▶ Ann's House of Nuts, Inc.
- ▶ Wal-Mart Associates, Inc.
- ▶ Martin General Hospital
- ▶ County of Martin
- ▶ Martin Community College
- ▶ Industrial Manufacturing Company, LLC
- ▶ Parkdale America, LLC
- ▶ Piggly Wiggly
- ▶ Town of Williamston

### 3.4.6 Historic Properties

As of September 2019, Martin County had 29 listings on the National Register of Historic Places. This list includes 24 historic structures/sites and 5 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 Martin County.

- ▶ Bear Grass Primitive Baptist Church (Bear Grass) 4/28/2005
- ▶ Bear Grass School (Bear Grass) 6/1/2005
- ▶ Asa Biggs House (Williamston) 10/10/1979
- ▶ Burras House (Jamesville) 3/30/1978
- ▶ Conoho Creek Historic District (Hassell vicinity) 3/12/1998
- ▶ Darden Hotel (Hamilton) 12/30/1975
- ▶ Everetts Christian Church (Everetts) 4/28/2005
- ▶ Everetts Historic District (Everetts) 12/2/2014
- ▶ First Christian Church (Robersonville) 4/28/2005
- ▶ Fort Branch (Archaeology) (Hamilton vicinity) 6/18/1973
- ▶ W. W. Griffin Farm (Williamston vicinity) 10/20/2001
- ▶ Hamilton Historic District (Hamilton) 6/3/1980
- ▶ Hickory Hill (Hamilton vicinity) 12/20/1984
- ▶ Jamesville Primitive Baptist Church and Cemetery (Jamesville) 12/20/1984
- ▶ Jesse Fuller Jones House (Spring Green vicinity) 4/29/1982
- ▶ W.J. Little House (Robersonville) 9/19/1985

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- ▶ Old Martin County Courthouse (Williamston) 5/10/1979
- ▶ Oak City Christian Church (Oak City) 4/28/2005
- ▶ Roberson-Everett-Roebuck House (Robersonville) 8/30/2010
- ▶ Robersonville Primitive Baptist Church (Robersonville) 4/20/2005
- ▶ Sherrod Farm (Hamilton vicinity) 12/20/1984
- ▶ Skewarkey Primitive Baptist Church (Williamston) 4/28/2005
- ▶ Smithwick's Creek Primitive Baptist Church (Farm Life vicinity) 4/20/2005
- ▶ Spring Green Primitive Baptist Church (Hamilton vicinity) 4/20/2005
- ▶ Sunny Side Inn (Williamston) 11/29/1995
- ▶ West Martin School (Oak City) 1/25/2018
- ▶ Williamston Colored School (Williamston) 7/25/2014
- ▶ Williamston Commercial Historic District (Williamston) 3/9/1995
- ▶ Williamston Historic District (Williamston) 10/12/2001

### 3.4.7 Land Development Trends

An analysis of land development patterns for Martin County was not completed within the context of this planning process. The spatial data available for the County does not include data related to improved building value or year structure built. Due to this fact, the land development table has not been included.

As noted, Martin County is home to nine separate municipal jurisdictions. Several of these Towns including the Towns of Williamston and Robersonville serve as the largest municipal jurisdictions in the Northeastern NC Region. The size of these municipalities results in these areas providing a retail and service industry base for not only Martin County, but the Northeastern NC Region overall. A majority of development throughout Martin County is situated either within or around one of the municipalities, or along the US Highway 64 or 17 corridors.

Detailed summaries of future land development trends, including Future Land Use Maps, for each jurisdiction that participates in the Community Rating System program are provided in the county annexes.

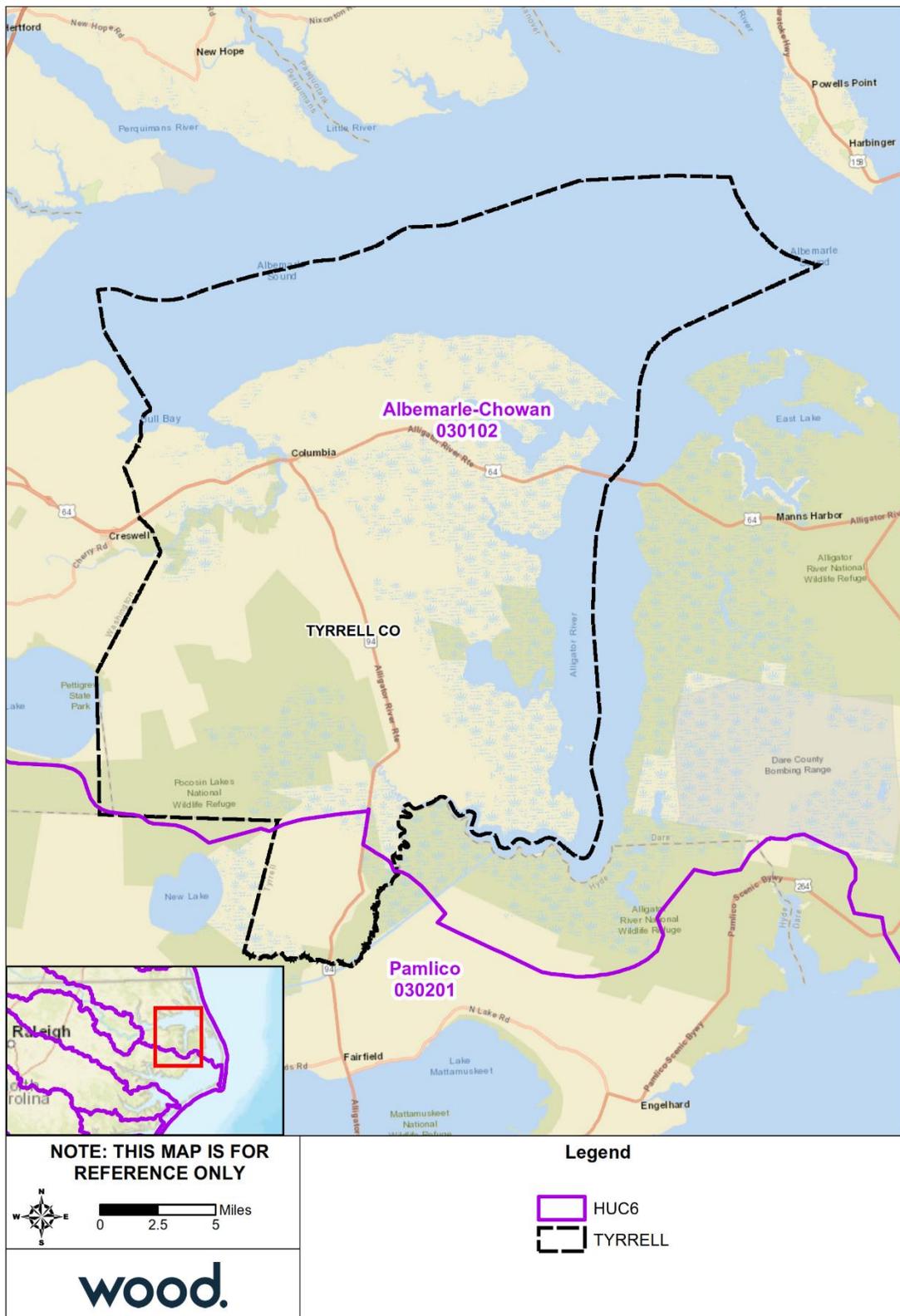
## 3.5 TYRRELL COUNTY

### 3.5.1 Hydrology

Nearly all of Tyrrell County is located within the Pasquotank River Basin; however, a small portion falls with the Tar-Pamlico Basin towards the southern extent of the County's boundary.

An overview of each respective river basin is provided under the Hyde County profile in Section 3.3.1. Figure 3.12 shows Tyrrell County in relation to HUC-6 drainage basins. HUC-8 drainage basins are shown in Figure 3.2.

Figure 3.12 – HUC-6 Drainage Basins, Tyrrell County



Source: National Hydrology Dataset

### 3.5.2 Parks and Open Space

Tyrrell County has a recreation committee that oversees a summer baseball and softball league. The league is open to youth ages 4 to 18 and uses the Columbia High School ballfields when they are not being used by the school. The Town of Columbia has two parks: Children’s Park and Kiddie Park. Children’s Park, located on the corner of Fonsoe and Scuppernong Streets, has a tennis court, a picnic shelter, a play unit for preschoolers, a play unit for youth ages 6-12, and a 1/2-basketball court. The Kiddie Park is located on Luddington Drive and provides swings and slides. The Scuppernong River Boardwalk is an additional recreational facility.

### 3.5.3 Demographics

#### Total Population

As discussed earlier in this section, Tyrrell is the smallest county in the state in terms of population. The County is extremely rural in nature, and large portions of the County’s land mass are impacted by coastal and freshwater wetlands. Overall, population within the County has remained consistent dating back to the 2000 Census; however, the Town of Columbia has experienced some growth with a 14.7% population increase over the same period. This growth has been gradual over this seventeen-year period.

Table 3.24 provides a breakdown of total population throughout Tyrrell County for the years 2000, 2010, and 2017.

**Table 3.24 – Tyrrell County Total Population**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Columbia	819	891	939	8.8%	5.4%	14.7%
Unincorporated Areas	3,338	3,516	3,151	5.3%	-10.4%	-5.6%
<b>Tyrrell County</b>	<b>4,149</b>	<b>4,407</b>	<b>4,090</b>	<b>6.2%</b>	<b>-7.2%</b>	<b>-1.4%</b>

Source: US Census Bureau American Community Survey.

#### Growth Trends

Table 3.25 provides population forecasts through the year 2050 for Tyrrell County, as well as the Town of Columbia. These forecasts are based on established trends between the years 2000 and 2017. According to these estimates, Tyrrell County overall is expected to decrease in population by 3.1% through 2050 with a reduction of 89 individuals.

**Table 3.25 – Tyrrell County Population Projections, 2017-2050**

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Columbia	939	963	1,044	1,125	1,206	28.4%
Unincorporated Areas	3,151	3,120	3,016	2,912	2,808	-10.9%
<b>Tyrrell County</b>	<b>4,090</b>	<b>4,078</b>	<b>4,040</b>	<b>4,001</b>	<b>3,962</b>	<b>-3.1%</b>

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

#### Racial Demographics

Much like the other counties within the Northeastern NC Region, racial composition within Tyrrell County is predominantly Caucasian (55.1%). The Town of Columbia; however, has a much more diverse citizen base regarding race. Unlike the County overall, the Town of Columbia is a majority African American (45.9%). Additionally, nearly 20% of the Town’s population reported being Other race, meaning that they

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do not define their race as either Caucasian, African American, or Asian. Columbia is also home to a large Hispanic population (27.8%).

Table 3.26 below provides a summary of racial composition for Tyrrell County, as well as all participating municipal jurisdictions.

**Table 3.26 – Tyrrell County Racial Composition**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Columbia	32.9%	45.9%	0.0%	19.5%	1.7%	27.8%
<b>Tyrrell County</b>	<b>55.1%</b>	<b>35.7%</b>	<b>0.4%</b>	<b>6.4%</b>	<b>2.4%</b>	<b>7.6%</b>

\*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.

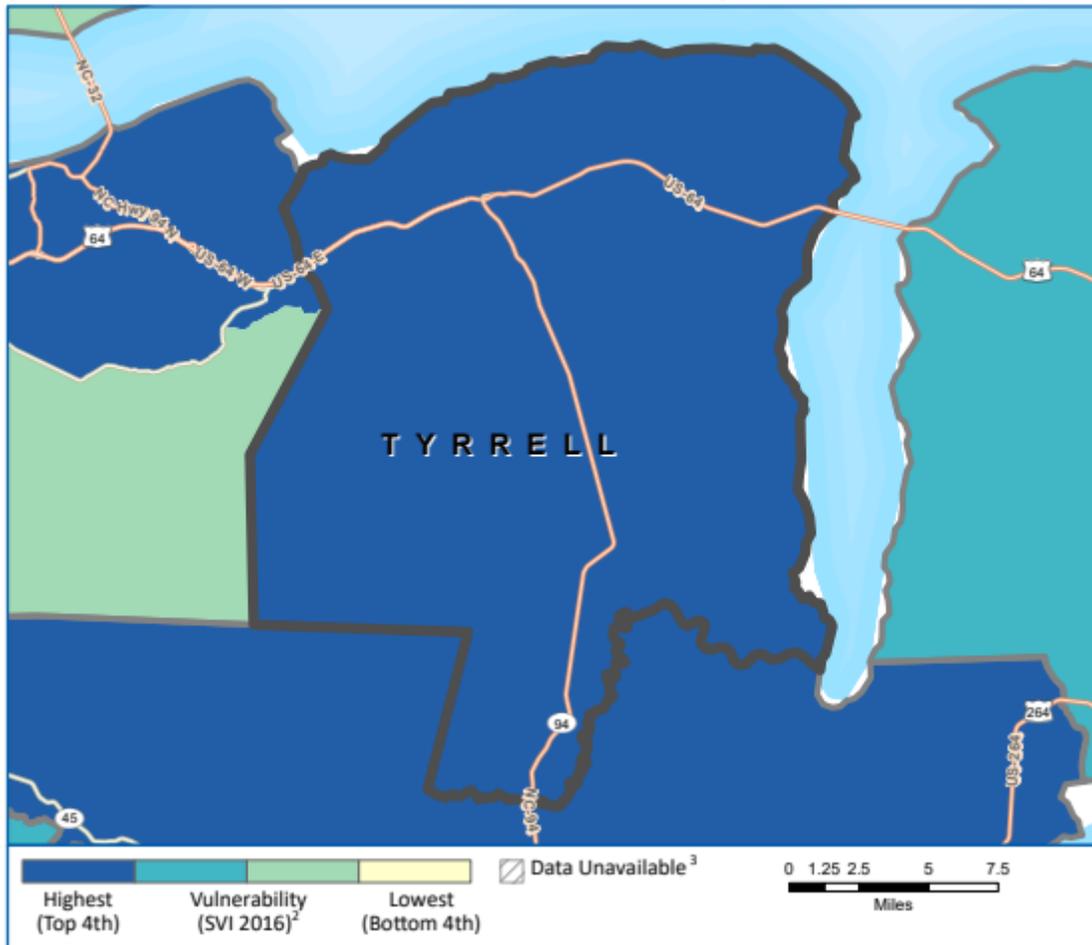
Source: US Census Bureau American Community Survey.

### Social Vulnerability

Figure 3.13 below displays social vulnerability information for Tyrrell 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 to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Tyrrell County is extremely rural in nature; however, this can be attributed more to the landscape than the availability of County resources. US Highway 64 traverses through the Town of Columbia and serves as the gateway to North Carolina's Outer Banks Communities. Although this corridor serves a key connector for the region at large, transportation access to the remainder of the County is extremely limited. There are portions of the County, including the Alligator Community whereby access is very limited due to fluctuating conditions. This issue continues to be a pertinent discussion regarding hurricane mitigation and response.

Figure 3.13 –County Social Vulnerability Index



Source: CDC 2016

### 3.5.4 Housing Characteristics

Housing development within Tyrrell County has been slow but steady dating back to the 2010 Census. Unincorporated Tyrrell County has experienced an increase of 84 housing units (4.1%) over this period, while the Town of Columbia experienced an increase of 67 homes (15.5%). The majority of homes within Columbia, as well as the County, are occupied. Seasonal housing is not as big a factor in Tyrrell County as with other counties throughout the Northeastern NC Region.

Table 3.27 provides a summary of housing characteristics for Tyrrell County and the Town of Columbia.

Table 3.27 – Tyrrell County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Columbia	433	500	15.5%	72.4%	27.6%
<b>Tyrrell County</b>	<b>2,068</b>	<b>2,152</b>	<b>4.1%</b>	<b>71.5%</b>	<b>28.5%</b>

Source: US Census Bureau American Community Survey.

### 3.5.5 Wages, Employment and Industry

According to 2017 ACS data, median household income in Tyrrell County is \$32,411. An estimated 26.8% of individuals live below the poverty level. Overall, roughly half of the Tyrrell County population is currently within the labor force. This figure is slightly higher within Columbia (53.2%), than within unincorporated Tyrrell County (47.6%). The Town of Columbia’s unemployment rate is fairly high at 16.6%, while the County’s rate is more in line with the North Carolina statewide rate of 4.2%. A majority of the County’s labor force either work within a local service industry, or within sales/office, which includes one of the many government jobs available throughout the County.

The following tables, Table 3.28 and Table 3.29, provide a summary of key economic indicators and population employed by occupation for both incorporated and unincorporated portions of Tyrrell County.

**Table 3.28 – Tyrrell County Key Economic Indicators**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Columbia	53.2%	44.4%	8.8%	46.8%	16.6%
<b>Tyrrell County</b>	<b>47.6%</b>	<b>43.6%</b>	<b>4.0%</b>	<b>52.4%</b>	<b>8.5%</b>

Source: US Census Bureau American Community Survey.

**Table 3.29 – Tyrrell County Employment by Industry**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Columbia	6.9%	36.4%	20.5%	16.9%	19.3%
<b>Tyrrell County</b>	<b>16.8%</b>	<b>28.6%</b>	<b>24.5%</b>	<b>17.0%</b>	<b>13.1%</b>

Source: US Census Bureau American Community Survey.

The top employers in Tyrrell County represent the sales and office industry and the service industry. These employers include:

- ▶ NC Department of Public Safety
- ▶ Tyrrell County Board of Education
- ▶ Whitecap Linen
- ▶ County of Tyrrell
- ▶ Food Lion
- ▶ Capt Charles Seafood, Inc.
- ▶ Cherry Farms Seed Company, Inc.
- ▶ Black Gold Farms, Inc.
- ▶ Armstrong & Son Heating & Air, LLC
- ▶ Eagle Mart 2

### 3.5.6 Historic Properties

As of September 2019, Tyrrell County had 3 listings on the National Register of Historic Places. This list includes 2 historic structures/sites and 1 Historic District. 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 Tyrrell County.

- ▶ Columbia Historic District (Columbia) 3/17/1994
- ▶ Scuppernong River Bridge # 4 (Columbia) 3/5/1992

- ▶ Tyrrell County Courthouse (Columbia) 5/10/1979

**3.5.7 Land Development Trends**

Due to the small population base of Tyrrell County, development is very rural in nature. The largest concentration of residential and non-residential development is centered around the Town of Columbia. Outside of Columbia, there is a fair amount of growth centered along US Highway 64, but beyond that a majority of the County’s built environment takes the form of housing and or business/industrial operations supporting the County’s many agricultural operations.

Table 3.30 summarizes the developed and undeveloped parcels in Tyrrell County.

**Table 3.30 – Tyrrell County Developed and Undeveloped Parcel Counts**

Jurisdiction	Developed Parcels	Undeveloped Parcels	% Developed
Columbia	367	152	282
<b>Tyrrell County</b>	<b>2,155</b>	<b>1,943</b>	<b>1,204</b>

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

Detailed summaries of future land development trends, including Future Land Use Maps, for each jurisdiction that participates in the CRS program are provided in the county annexes.

**3.6 WASHINGTON COUNTY**

**3.6.1 Hydrology**

Washington County is impacted by three separate river basins: the Pasquotank, Roanoke, and Tar-Pamlico. Overviews of the Pasquotank and Tar-Pamlico river basins are provided in the Hyde County profile in Section 3.3.1, and the Roanoke river basin overview is provided in the Bertie County profile in Section 3.2.1. Figure 3.14 on the following page shows Washington County in relation to HUC-6 drainage basins. HUC-8 drainage basins are shown in Figure 3.2.

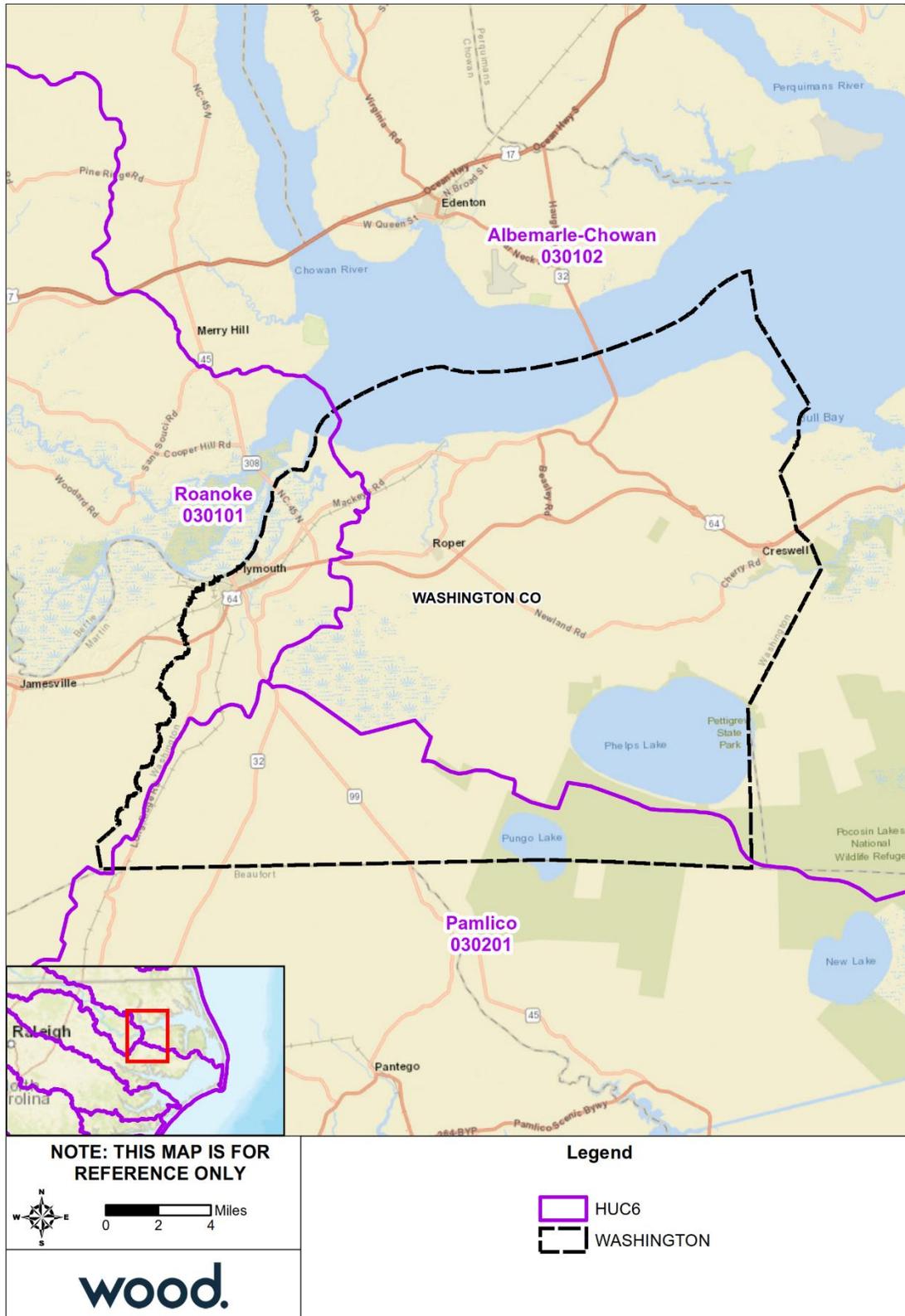
**3.6.2 Parks and Open Space**

The Washington County Parks and Recreation Department provides a range of services and programs for citizens. This includes youth aged programs, as well as activities for the aging population. Additionally, the County maintains four park facilities including:

- ▶ Creswell Town Park
  - Playground
  - Picnic Shelter
- ▶ Wilson Street Park
  - Ballfield
  - Picnic Shelter
  - Playground
- ▶ Washington County Recreation Center
  - Basketball Court
  - Ballfields
  - Picnic Shelter
  - Playground
- ▶ Pea Ridge Park
  - Ball Fields
  - Tennis Courts

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Figure 3.14 – HUC-6 Drainage Basins, Washington County



Source: National Hydrology Dataset

### 3.6.3 Demographics

#### Total Population

There are three incorporated municipalities within Washington County, all of which have experienced population decline since the 2000 Census with the exception of the Town of Roper. Roper experienced slight growth (7.3%), while Creswell (-2.2%) and Plymouth (-12.4%) both experienced declines. The County overall also experienced a declining population base (-10.6%). A majority of this population decline occurred during the years of 2010 and 2017. Figure 3.3 shows the population density of the Northeastern NC Region.

The following table, Table 3.31, provides a breakdown of total population throughout Washington County for the years 2000, 2010, and 2017.

**Table 3.31 – Washington County Total Population**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Creswell	278	276	272	-0.7%	-2.2%	-2.2%
Plymouth	4,107	3,878	3,599	-5.6%	-7.2%	-12.4%
Roper	613	611	658	-0.3%	7.7%	7.3%
<b>Municipalities</b>	<b>4,998</b>	<b>4,765</b>	<b>4,529</b>	<b>-4.7%</b>	<b>-5.0%</b>	<b>-9.4%</b>
Unincorporated Areas	8,725	8,463	7,802	-3.0%	-7.8%	-10.6%
<b>Washington County</b>	<b>13,723</b>	<b>13,228</b>	<b>12,331</b>	<b>-3.6%</b>	<b>-6.8%</b>	<b>-10.1%</b>

Source: US Census Bureau American Community Survey.

#### Growth Trends

Table 3.32 provides population forecast through the year 2050 for Washington 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 Washington County overall is expected to decrease in population at a rate of 27.5% through 2050 with a reduction of 3,776 individuals.

**Table 3.32 – Washington County Population Projections, 2017-2050**

Jurisdiction	2017	2020	2030	2040	2050	% Change 2017-2050
Creswell	272	271	268	264	261	-4.2%
Plymouth	3,599	3,520	3,259	2,997	2,735	-24.0%
Roper	658	667	695	723	752	14.3%
<b>Municipalities</b>	<b>4,529</b>	<b>4,458</b>	<b>4,221</b>	<b>3,984</b>	<b>3,747</b>	<b>-17.3%</b>
Unincorporated Areas	7,802	7,656	7,171	6,685	6,200	-20.5%
<b>Washington County</b>	<b>12,331</b>	<b>12,114</b>	<b>11,392</b>	<b>10,669</b>	<b>9,947</b>	<b>-19.3%</b>

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

#### Racial Demographics

Racial composition throughout Washington County is quite varied. The Towns of Roper and Plymouth are both predominantly African American, while Creswell's citizen base is more evenly split between Caucasian and African American citizens. The largest Hispanic population throughout the County resides in the Town of Roper at 13.4%.

Table 3.33 below provides a summary of racial composition for Washington County, as well as all participating municipal jurisdictions.

**Table 3.33 – Washington County Racial Composition**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Creswell	50.0%	47.4%	0.0%	2.6%	0.0%	13.6%
Plymouth	30.4%	69.5%	0.0%	0.1%	0.0%	0.1%
Roper	6.8%	75.2%	0.0%	15.7%	2.3%	13.4%
<b>Washington County</b>	<b>46.9%</b>	<b>48.2%</b>	<b>0.2%</b>	<b>1.2%</b>	<b>3.5%</b>	<b>5.0%</b>

\*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.

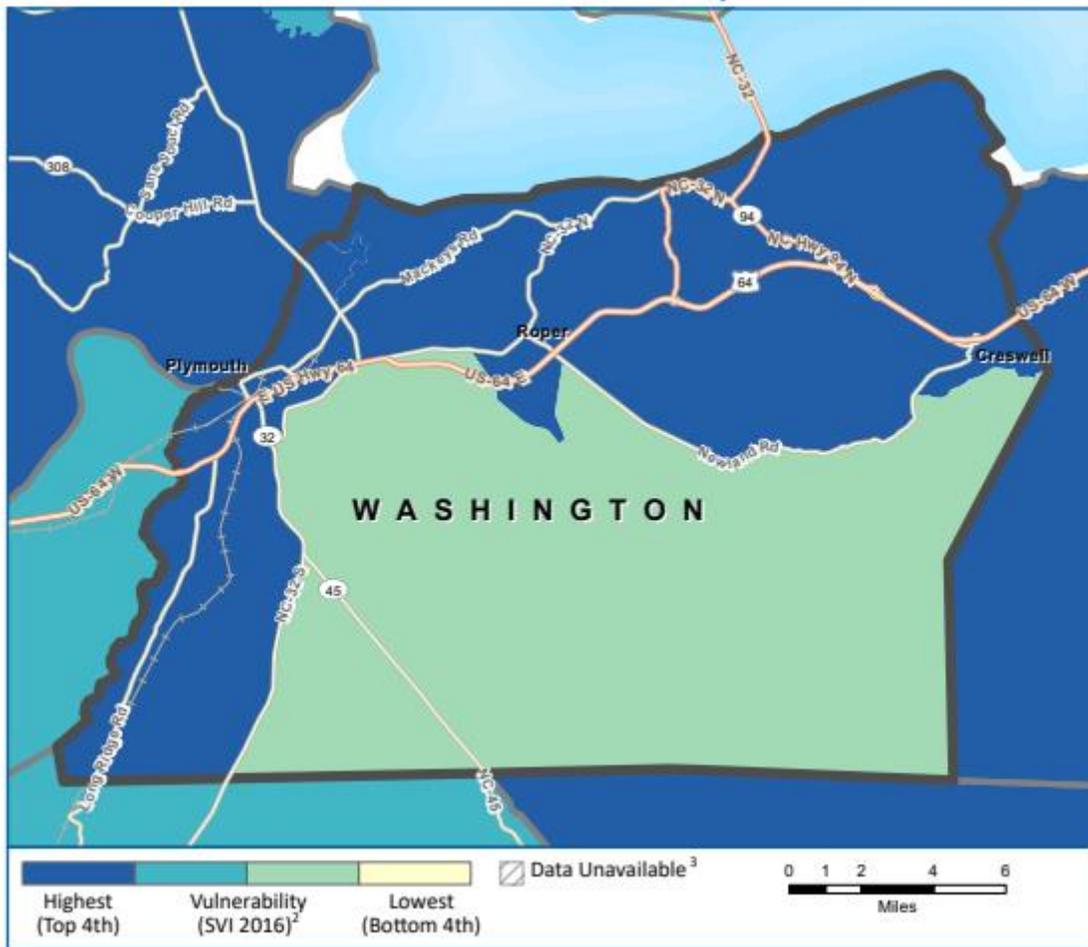
Source: US Census Bureau American Community Survey.

### Social Vulnerability

Figure 3.15 below displays social vulnerability information for Washington 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 to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Washington County’s SVI Index is a bit lower than other Counties throughout the Northeastern NC Region. This fact can be attributed to a more dense population base and availability of more robust municipal jurisdictions, and secondly, the presence of an efficient transportation network serving a majority of the County. These two factors promote a more effective response capability.

Figure 3.15 – Washington County Social Vulnerability Index



Source: CDC 2016

### 3.6.4 Housing Characteristics

Housing development throughout Washington County has varied quite a bit. The Towns of Craswell and Plymouth have seen increases of 12.0% (16 homes) and 20.4% (65 homes), respectively dating back to 2010. Over this same period, housing starts within unincorporated portions of the County have been stagnant. Housing occupancy is over seventy percent for all jurisdictions within the County, the highest of which is the Town of Roper at 83.0%

Table 3.34 provides a summary of housing characteristics for Washington County and incorporated areas.

Table 3.34 – Washington County Housing Characteristics

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Craswell	133	149	12.0%	80.7%	19.3%
Plymouth	1,856	1,797	-3.2%	71.8%	28.2%
Roper	318	383	20.4%	83.0%	17.0%
<b>Washington County</b>	<b>6,491</b>	<b>6,471</b>	<b>-0.3%</b>	<b>70.0%</b>	<b>30.0%</b>

Source: US Census Bureau American Community Survey.

### 3.6.5 Wages, Employment and Industry

According to 2017 ACS data, median household income in Washington County is \$34,557. An estimated 24.1% of individuals live below the poverty level. Within Washington County, approximately 50.6% of the population is considered to be in the labor force. This is generally characteristic of all participating municipal jurisdictions as well, with the exception of Creswell (60.2%). The percentage of this population currently employed within the workforce falls between 40% and 47%, with Creswell being slightly higher (59.7%). According to the American Community Survey, the unemployment rate for Washington County overall was 10.4%. The highest unemployment rate reported throughout the County was Roper (12.3%), while the lowest was the Town of Creswell (0.9%). The largest employment sector within Washington County is the production, transportation, and material moving industries.

The following tables, Table 3.35 and Table 3.36, provide a summary of key economic indicators and population employed by industry for both incorporated and unincorporated portions of Washington County.

**Table 3.35 – Washington County Key Economic Indicators**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Creswell	60.2%	59.7%	0.5%	39.8%	0.9%
Plymouth	51.2%	44.6%	4.5%	48.8%	9.2%
Roper	48.6%	42.6%	6.0%	51.4%	12.3%
<b>Washington County</b>	<b>50.6%</b>	<b>44.8%</b>	<b>5.2%</b>	<b>49.4%</b>	<b>10.4%</b>

Source: US Census Bureau American Community Survey.

**Table 3.36 – Washington County Employment by Occupation**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Creswell	30.7	30.7	11.4	13.2	14.0
Plymouth	13.3	22.7	37.0	6.1	20.9
Roper	9.5	39.1	21.2	16.8	13.4
<b>Washington County</b>	<b>15.8</b>	<b>23.0</b>	<b>23.6</b>	<b>12.3</b>	<b>25.3</b>

Source: US Census Bureau American Community Survey.

The top employers in Washington County represent the production, transportation, and material moving industry. These employers include:

- ▶ Domtar Paper Company, LLC
- ▶ Washington County Board of Education
- ▶ County of Washington
- ▶ Weyerhaeuser Co (A Corp)
- ▶ Principle Long Term Care, Inc.
- ▶ Washington County Hospital
- ▶ Home Life Care, Inc.
- ▶ District Health Dept Martin
- ▶ Mackeys Ferry Sawmill, Inc.
- ▶ Wilcohes, LLC

### 3.6.6 Historic Properties

As of September 2019, Washington County had 10 listings on the National Register of Historic Places. This list includes 8 historic structures/sites and 2 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 Washington County.

- ▶ Belgrade and St. David's Church (Creswell vicinity) 1/26/1978
- ▶ Creswell Historic District (Creswell) 10/10/2002
- ▶ Davenport House (Creswell vicinity) 9/5/2007
- ▶ Garrett's Island House (Plymouth vicinity) 2/2/2001
- ▶ Charles Latham House (Plymouth) 12/12/1976
- ▶ Perry-Spruill House (Plymouth) 4/25/1985
- ▶ Plymouth Historic District (Plymouth) 1/16/1991
- ▶ Rehoboth Methodist Church (Skinnersville vicinity) 5/13/1976
- ▶ Somerset Place State Historic Site (Creswell vicinity) 3/5/1970
- ▶ Washington County Courthouse (Plymouth) 5/10/1979

### 3.6.7 Land Development Trends

Similar to other counties throughout the rural Northeastern NC Region, a majority of the County's developed land is generally situated within or around one of the three incorporated towns. Aside from these areas, the key transportation corridors of US Highway 64 and NC Highway 32 have also historically experienced some development pressure. By far the most densely populated portion of the County is the Town of Plymouth. Not only does Plymouth serve as the County seat, but it is also home to a majority of the County's commercial base. Additionally, Washington County does have several large industrial operations situated within rural portions of the County, including the Domtar Paper manufacturing operation.

Table 3.37 summarizes the developed and undeveloped parcels in Washington County.

**Table 3.37 – Washington County Developed and Undeveloped Parcel Counts**

Jurisdiction	Developed Parcels	Undeveloped Parcels	Pre-Firm Buildings	% Developed Pre-Firm
Creswell	159	76	133	56.6%
Plymouth	1,672	1,020	1,472	54.7%
Roper	269	170	207	47.2%
<b>Washington County</b>	<b>4,280</b>	<b>4,813</b>	<b>2,374</b>	<b>26.1%</b>

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

Detailed summaries of future land development trends, including Future Land Use Maps, for each jurisdiction that participates in the Community Rating System program are provided in the county annex to this plan.

## 4 Risk Assessment

### 4.1 OVERVIEW

This section describes the Hazard Identification and Risk Assessment process for the development of the Northeastern NC 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 Northeastern NC 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 county and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. This risk assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:



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

- ▶ **Section 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 2017 Northeastern NC 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.

## SECTION 4: RISK ASSESSMENT

Table 4.1 – Full Range of Hazards Evaluated

Hazard	Included in 2018 State HMP?	Included in 2017 Northeastern NC Regional HMP?
Flooding	Yes	Yes
Hurricanes and Coastal Hazards	Yes	Yes
Nor'easters	No	Yes
Severe Winter Weather (Freezing Rain, Snowstorms, 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	No
Sinkholes	Yes	Yes
Coastal Erosion	Yes	No
Tsunami	No	Yes
Hazardous Materials Incident	Yes	No
Radiological Emergency	Yes	No
Terrorism	Yes	No
Infectious Disease	Yes	No
Cyber Threat	Yes	No
Electromagnetic Pulse	Yes	No

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 2017 Northeastern NC 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 690 records of severe weather events that occurred in Bertie, Hyde, Martin, Tyrrell, and Washington Counties in the 20-year period from November 1998 through October 2018. Table 4.2 summarizes these events.

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**Table 4.2 – NCEI Severe Weather Reports for the Northeastern NC Region Counties, 1999 – 2018**

Type	# of Events	Property Damage	Crop Damage	Deaths	Injuries
Blizzard	0	\$0	\$0	0	0
Coastal Flood	6	\$0	\$0	0	0
Cold/Wind Chill	0	\$0	\$0	0	0
Drought	11	\$0	\$0	0	0
Extreme Cold/Wind Chill	0	\$0	\$0	0	0
Excessive Heat	1	\$0	\$0	0	0
Flash Flood	44	\$215,000	\$0	1	0
Flood	13	\$10,010,000	\$2,000,000	5	0
Frost/Freeze	7	\$0	\$0	0	0
Hail	101	\$20,000	\$1,000	0	0
Heat	1	\$0	\$0	0	0
Heavy Rain	17	\$0	\$0	0	0
Heavy Snow	23	\$0	\$0	0	0
High Wind	29	\$55,000	\$0	0	0
Hurricane	39	\$53,557,000	\$85,650,000	0	0
Ice Storm	2	\$0	\$0	0	0
Lightning	0	\$0	\$0	0	0
Storm Surge	7	\$61,100,000	\$0	0	0
Strong Wind	3	\$2,000	\$0	0	0
Thunderstorm Wind	184	\$500,300	\$0	0	1
Tornado	48	\$5,389,500	\$1,400,000	12	67
Tropical Storm	48	\$18,458,200	\$51,000,000	0	0
Wildfire	0	\$0	\$0	0	0
Winter Storm	59	\$25,000	\$0	0	0
Winter Weather	42	\$0	\$0	0	0
<b>Total:</b>	<b>690</b>	<b>\$149,332,000</b>	<b>\$140,051,000</b>	<b>18</b>	<b>68</b>

Source: National Center for Environmental Information Events Database, accessed June 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 Bertie, Hyde, Martin, Tyrrell, and Washington 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, Bertie, Hyde, Martin, Tyrrell, and Washington Counties have been designated in 16 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
Bertie	12
Hyde	11
Martin	8

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County	Major Declarations Received
Tyrrell	8
Washington	7

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

**Table 4.4 – FEMA Major Disaster Declarations for Northeastern NC Region Counties**

County*	Disaster #	Date	Incident Type	Event Title
B, H, T	4393	9/14/2018	Hurricane	Hurricane Florence
B, H, M, T, W	4285	10/10/2016	Hurricane	Hurricane Matthew
B, H, M, T, W	4019	8/31/2011	Hurricane	Hurricane Irene
B, T	1969	4/19/2011	Severe Storm(s)	Severe Storms, Tornadoes, And Flooding
B, M, T, W	1942	10/14/2010	Severe Storm(s)	Severe Storms, Flooding, And Straight-Line Winds
H	1608	10/7/2005	Hurricane	Hurricane Ophelia
B, H, M, T, W	1490	9/18/2003	Hurricane	Hurricane Isabel
B, H, M, T, W	1292	9/16/1999	Hurricane	Hurricane Floyd Major Disaster Declarations
H	1291	9/9/1999	Hurricane	Hurricane Dennis
B, H, M, T, W	1240	8/27/1998	Hurricane	Hurricane Bonnie
B, H, M	1134	9/6/1996	Hurricane	Hurricane Fran
H	1127	7/18/1996	Hurricane	Hurricane Bertha
B	1087	1/13/1996	Snow	Blizzard of 96
H	818	12/12/1988	Tornado	Severe Storms & Tornadoes
B	699	3/30/1984	Tornado	Severe Storms & Tornadoes
B, M, W	234	2/10/1968	Severe Ice Storm	Severe Ice Storm

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

\*County code: B = Bertie, H = Hyde, M = Martin, T = Tyrrell, W = Washington

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 2017 Northeastern NC plan and 2018 State plan addressed this hazard. Multiple disaster declarations for the region are related to flooding. NCEI reports 87 flood-related events.
Hurricane and Tropical Storm	Yes	The 2017 Northeastern NC 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 (Freezing Rain, Snowstorms, Blizzards, Wind Chill, Extreme Cold)	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard. The region has received several past disaster declarations related to this hazard. NCEI reports 134 severe winter weather related events.

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Hazard	Included in this plan update?	Explanation for Decision
Extreme Heat	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard. NCEI reports 2 heat events for the region.
Earthquake	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard. The region could face minimal impacts from the Eastern Tennessee Seismic zone and the Charleston fault.
Wildfire	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard.
Dam & Levee Failure	Yes	The 2018 State plan addressed dam failure and there are multiple dams in the region. The 2017 Northeastern NC plan addressed dam and levee failure. The USACE's National Levee Database identifies several levees in the region.
Drought	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard. There have been multiple past instances of severe drought.
Severe Thunderstorm, Lightning, and Hail	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard. NCEI reports 318 related events in the past 20 years.
Tornado	Yes	The 2017 Northeastern NC plan and 2018 State plan addressed this hazard. NCEI reports 48 tornado segments passing through the region in the past 20 years.
Landslide	No	The 2018 State plan addressed this hazard, but did not find significant risk in the eastern portion of the state. The 2017 Northeastern NC plan did not address this hazard.
Sinkholes	Yes	The 2017 Northeastern NC plan addressed this hazard. USGS data shows there is geological basis for sinkhole risk in parts of the region despite it being an unlikely occurrence.
Erosion	Yes	The 2018 State plan addressed this hazard. Past hurricane activity and part of region's coastal location indicate this is a significant hazard.
Tsunami	No	The 2017 Northeastern NC plan addressed this hazard but found it unlikely. There were no past events in or near the planning area. The 2018 State plan does not address this hazard.
Hazardous Materials Incident	No	The 2018 State plan addressed this hazard, but the 2017 Northeastern NC did not. The region considers this hazard more appropriately addressed by emergency operations planning and local staff training.
Radiological Emergency	No	The 2018 State plan addressed this hazard, but the 2017 Northeastern NC did not. No part of the region falls within the EPZ or IPZ of a nuclear facility.
Terrorism	No	The 2018 State plan addressed this hazard, but the 2017 Northeastern NC did not. The region considers this hazard more appropriately addressed at the State level.
Infectious Disease	No	The 2018 State plan addressed this hazard, but the 2017 Northeastern NC did not. 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 2018 State plan addressed this hazard, but the 2017 Northeastern NC did not. The region considers this hazard more appropriately addressed by emergency operations planning and local staff training.
Electromagnetic Pulse	No	The 2018 State plan addressed this hazard, but the 2017 Northeastern NC did not. The region considers this hazard more appropriately addressed at the State level.

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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
- ▶ Sinkholes
- ▶ Tornado
- ▶ Wildfire

### 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 Northeastern NC 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 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 Northeastern NC 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 or 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 Northeastern NC 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 Northeastern NC 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 Northeastern NC 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**

<b>RISK ASSESSMENT CATEGORY</b>	<b>LEVEL</b>	<b>DEGREE OF RISK CRITERIA</b>	<b>INDEX</b>	<b>WEIGHT</b>
<b>PROBABILITY</b> 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	
<b>IMPACT</b> 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	
<b>SPATIAL EXTENT</b> How large of an area could be impacted by a hazard event? Are impacts localized or regional?	NEGLECTIBLE	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	
<b>WARNING TIME</b> 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	
<b>DURATION</b> 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 Northeastern NC 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

NCEM's 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, the 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)
<b>Bertie</b>			
Bertie County (Unincorporated Area)	13,731	2,359	759
Town of Askeville	551	95	30
Town of Aulander	1,055	181	58
Town of Colerain	394	68	22
Town of Kelford	248	43	14
Town of Lewiston-Woodville	931	160	51
Town of Powellsville	257	44	14
Town of Roxobel	240	41	13
Town of Windsor	3,877	666	214
<b>Subtotal Bertie</b>	<b>21,284</b>	<b>3,657</b>	<b>1,175</b>
<b>Hyde</b>			
Hyde County (Unincorporated Area)	5,809	875	293
<b>Martin</b>			
Martin County (Unincorporated Area)	13,965	2,450	798
Town of Bear Grass	55	10	3
Town of Everetts	164	29	9
Town of Hamilton	390	68	22
Town of Hassell	83	15	5
Town of Jamesville	481	84	27
Town of Oak City	327	57	19
Town of Parmele	229	40	13
Town of Robersonville	1,410	247	81
Town of Williamston	7,393	1,297	423
<b>Subtotal Martin</b>	<b>24,497</b>	<b>4,297</b>	<b>1,400</b>
<b>Tyrrell</b>			
Tyrrell County (Unincorporated Area)	3,621	610	191
Town of Columbia	786	132	42
<b>Subtotal Tyrrell</b>	<b>4,407</b>	<b>742</b>	<b>233</b>
<b>Washington</b>			
Washington County (Unincorporated Area)	7,168	1,309	465
Town of Creswell	461	84	30
Town of Plymouth	4,682	855	303
Town of Roper	912	167	59
<b>Subtotal Washington</b>	<b>13,223</b>	<b>2,415</b>	<b>857</b>
<b>Region Total</b>	<b>69,220</b>	<b>11,986</b>	<b>3,958</b>

Source: NCEM IRISK Database; 2010 Decennial Census

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### 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 is likely an underestimate of actual present-day exposure. Section 3 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
<b>Bertie</b>		
Bertie County (Unincorporated Area)	9,047	\$438,905,810
Town of Askewville	425	\$17,755,146
Town of Aulander	675	\$27,861,911
Town of Colerain	377	\$18,231,581
Town of Kelford	159	\$4,493,327
Town of Lewiston-Woodville	685	\$21,784,639
Town of Powellsville	163	\$6,816,198
Town of Roxobel	205	\$6,960,075
Town of Windsor	1,584	\$110,133,511
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>\$652,942,198</b>
<b>Hyde</b>		
Hyde County (Unincorporated Area)	5,225	\$346,900,144
<b>Martin</b>		
Martin County (Unincorporated Area)	10,328	\$873,085,619
Town of Bear Grass	69	\$6,448,256
Town of Everetts	145	\$5,772,990
Town of Hamilton	273	\$75,099,095
Town of Hassell	65	\$2,256,575
Town of Jamesville	276	\$87,227,419
Town of Oak City	287	\$17,767,837
Town of Parmele	137	\$5,813,263
Town of Robersonville	851	\$55,734,937
Town of Williamston	3,900	\$1,071,905,396
<b>Subtotal Martin</b>	<b>16,331</b>	<b>\$2,201,111,387</b>
<b>Tyrrell</b>		
Tyrrell County (Unincorporated Area)	2,632	\$180,812,362
Town of Columbia	512	\$45,259,781
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>\$226,072,143</b>
<b>Washington</b>		
Washington County (Unincorporated Area)	5,271	\$270,027,736
Town of Creswell	365	\$20,828,857
Town of Plymouth	2,657	\$154,067,028
Town of Roper	578	\$31,774,944
<b>Subtotal Washington</b>	<b>8,871</b>	<b>\$476,698,565</b>
<b>Region Total</b>	<b>46,891</b>	<b>\$3,903,724,437</b>

Source: NCEM IRISK Database

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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	Total
<b>Bertie County</b>																		
Bertie County	1,395	1	0	366	1	136	0	42	23	0	0	0	0	52	0	3	6	<b>2,025</b>
Town of Askewville	61	2	0	17	0	9	0	5	0	0	0	0	0	3	0	1	0	<b>98</b>
Town of Aulander	15	2	0	50	0	21	0	7	2	0	0	0	0	1	0	0	0	<b>98</b>
Town of Colerain	22	2	0	29	0	19	0	8	1	0	0	0	0	1	0	1	0	<b>83</b>
Town of Kelford	5	0	0	10	0	0	0	1	2	0	0	0	0	0	0	1	0	<b>19</b>
Town of Lewiston-Woodville	24	1	0	67	0	25	0	2	2	0	0	0	0	5	0	1	0	<b>127</b>
Town of Powellsville	2	0	0	12	0	1	0	2	1	0	0	0	0	1	0	1	0	<b>20</b>
Town of Roxobel	10	2	0	30	0	9	0	1	0	0	0	0	0	1	0	1	0	<b>54</b>
Town of Windsor	31	6	0	150	1	69	1	33	28	0	0	0	0	13	1	6	0	<b>339</b>
<b>Hyde County</b>																		
Hyde County	494	4	0	261	1	35	0	52	7	0	0	0	0	41	11	8	3	<b>917</b>
<b>Martin County</b>																		
Martin County	2,600	1	0	388	0	255	0	49	12	0	0	0	0	80	0	0	7	<b>3,392</b>
Town of Bear Grass	1	0	0	2	0	0	0	12	0	0	0	0	0	3	0	0	0	<b>18</b>
Town of Everetts	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	<b>7</b>
Town of Hamilton	0	1	0	31	0	2	0	9	1	0	0	0	0	3	0	0	1	<b>48</b>
Town of Hassell	6	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	<b>11</b>
Town of Jamesville	2	1	0	26	0	8	0	17	1	0	0	0	0	8	0	0	4	<b>67</b>
Town of Oak City	2	0	0	5	0	0	0	1	0	0	0	0	0	3	0	0	0	<b>11</b>
Town of Parmele	5	0	0	11	0	0	0	0	1	0	0	0	0	0	0	0	0	<b>17</b>
Town of Robersonville	5	2	0	57	0	28	0	3	0	0	0	0	0	20	0	0	0	<b>115</b>
Town of Williamston	197	11	0	450	0	115	0	127	54	0	0	0	0	81	1	0	6	<b>1,042</b>
<b>Tyrrell County</b>																		

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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	Total
Tyrrell County	456	0	0	72	0	2	0	23	2	0	0	0	0	3	0	3	0	561
Town of Columbia	8	2	0	54	0	1	0	26	3	0	0	0	0	4	1	4	0	103
<b>Washington County</b>																		
Washington County	1,277	0	0	114	0	35	0	26	4	0	0	1	0	5	0	2	8	1,472
Town of Creswell	30	1	0	41	0	5	0	10	1	0	0	1	1	2	0	1	0	93
Town of Plymouth	87	8	0	239	2	30	0	36	18	0	0	0	1	7	0	4	0	432
Town of Roper	48	3	0	38	0	1	0	8	1	0	0	0	2	0	0	1	3	105
<b>Total</b>	<b>6,789</b>	<b>50</b>	<b>0</b>	<b>2,522</b>	<b>5</b>	<b>806</b>	<b>1</b>	<b>500</b>	<b>168</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>337</b>	<b>14</b>	<b>38</b>	<b>38</b>	<b>11,274</b>

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
<b>Bertie County</b>								
Bertie County	0	1	1	5	0	1	0	8
Town of Askewville	0	0	0	1	0	0	0	1
Town of Aulander	0	0	0	1	0	0	0	1
Town of Colerain	1	0	0	1	0	0	0	2
Town of Kelford	-	-	-	-	-	-	-	-
Town of Lewiston-Woodville	-	-	-	-	-	-	-	-
Town of Powellsville	-	-	-	-	-	-	-	-
Town of Roxobel	-	-	-	-	-	-	-	-
Town of Windsor	0	4	0	3	0	0	0	7
<b>Hyde County</b>								
Hyde County	1	3	0	5	3	0	2	14
<b>Martin County</b>								
Martin County	6	8	3	6	6	1	7	37
Town of Bear Grass	-	-	-	-	-	-	-	-
Town of Everetts	-	-	-	-	-	-	-	-
Town of Hamilton	0	0	0	0	0	0	1	1
Town of Hassell	-	-	-	-	-	-	-	-
Town of Jamesville	0	0	1	3	0	0	4	8

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Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Town of Oak City	-	-	-	-	-	-	-	-
Town of Parmele	-	-	-	-	-	-	-	-
Town of Robersonville	0	0	1	0	0	0	0	1
Town of Williamston	3	20	3	15	1	0	3	45
<b>Tyrrell County</b>								
Tyrrell County	1	0	0	4	4	1	0	10
Town of Columbia	0	2	0	3	0	0	0	5
<b>Washington County</b>								
Washington County	0	0	1	1	1	0	0	3
Town of Creswell	0	0	0	2	0	0	0	2
Town of Plymouth	0	4	0	2	0	0	0	6
Town of Roper	0	0	0	1	0	0	0	1
<b>Total</b>	<b>12</b>	<b>42</b>	<b>10</b>	<b>53</b>	<b>15</b>	<b>3</b>	<b>17</b>	<b>152</b>

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.

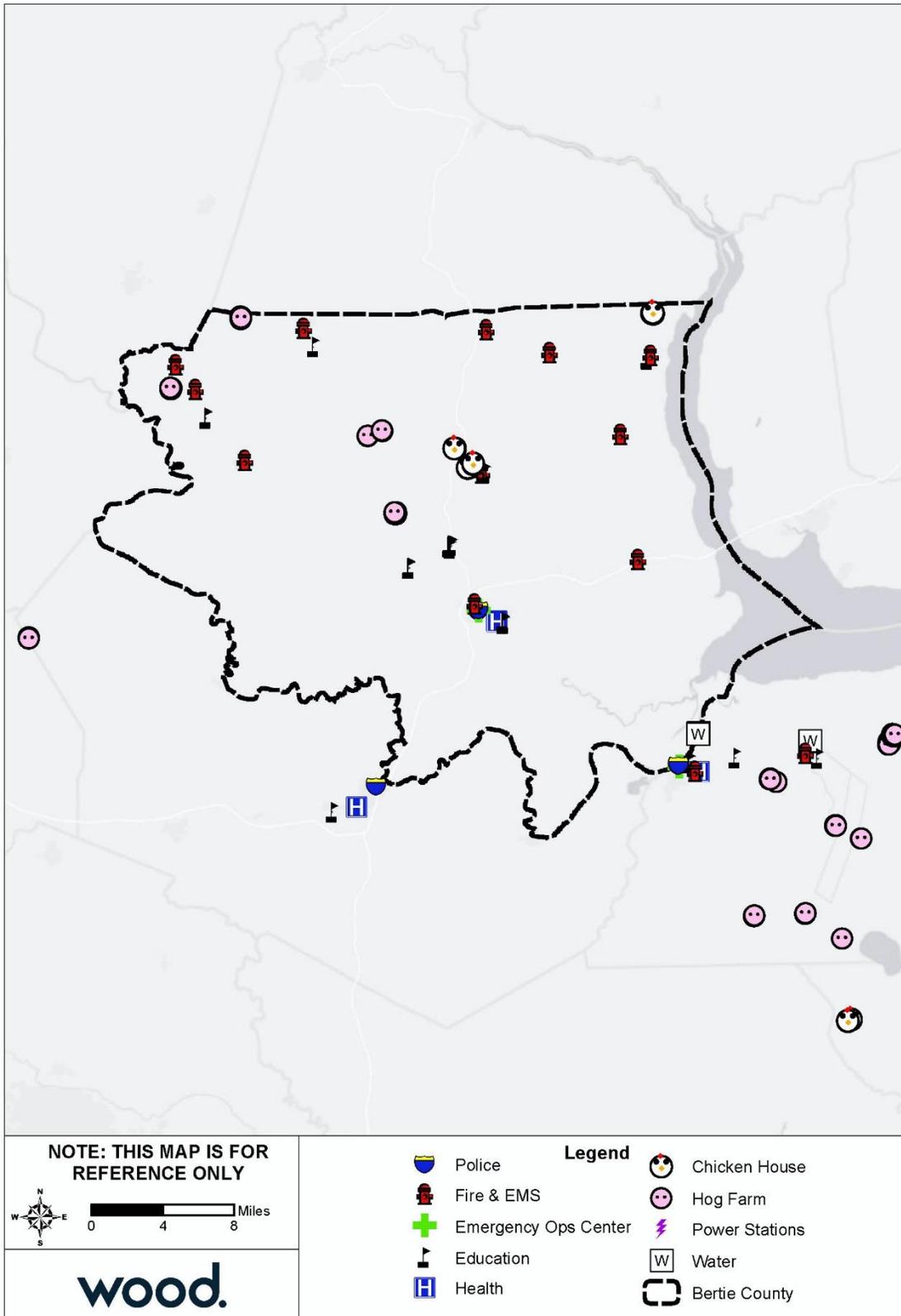
Critical facilities are summarized in Table 4.11 and shown by county in Figure 4.1 through Figure 4.5. In total, there are 50 buildings in the region identified as critical facilities, worth an estimated \$33,038,049.

**Table 4.11 – Critical Facilities, Northeastern NC Region**

Asset Type	Count of Buildings	Sum of Building Value
Emergency Operations Center	3	\$4,258,133
Fire Station	13	\$1,330,931
Hospital	2	\$7,732,977
Police Station	6	\$5,939,001
School	23	\$13,497,707
Treatment Plant	3	\$279,300
<b>Total</b>	<b>50</b>	<b>\$33,038,049</b>

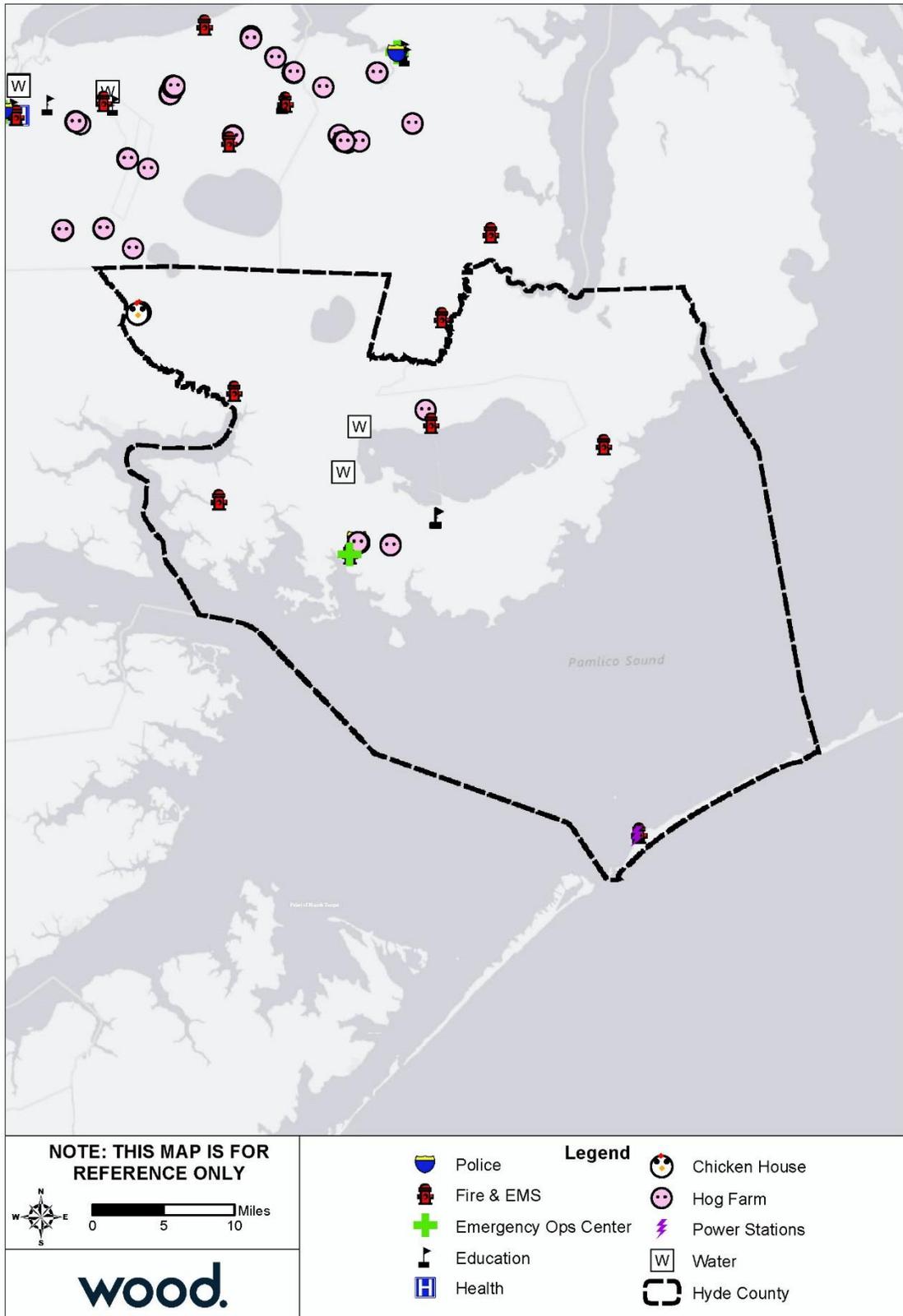
Source: NCEM IRISK Database; GIS analysis

Figure 4.1 – Bertie County Critical Facilities



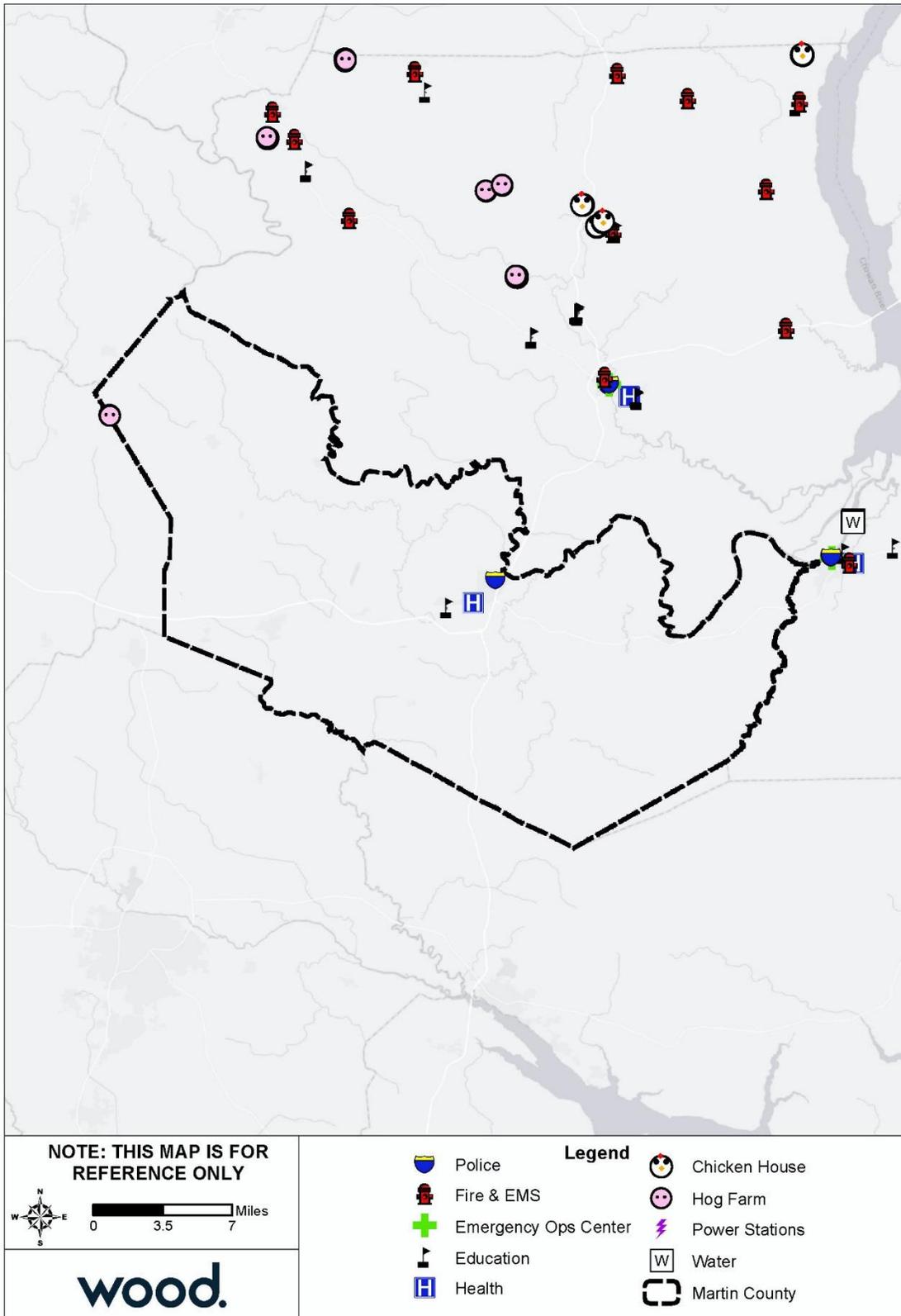
Source: NCEM IRISK Database, GIS Analysis

Figure 4.2 – Hyde County Critical Facilities



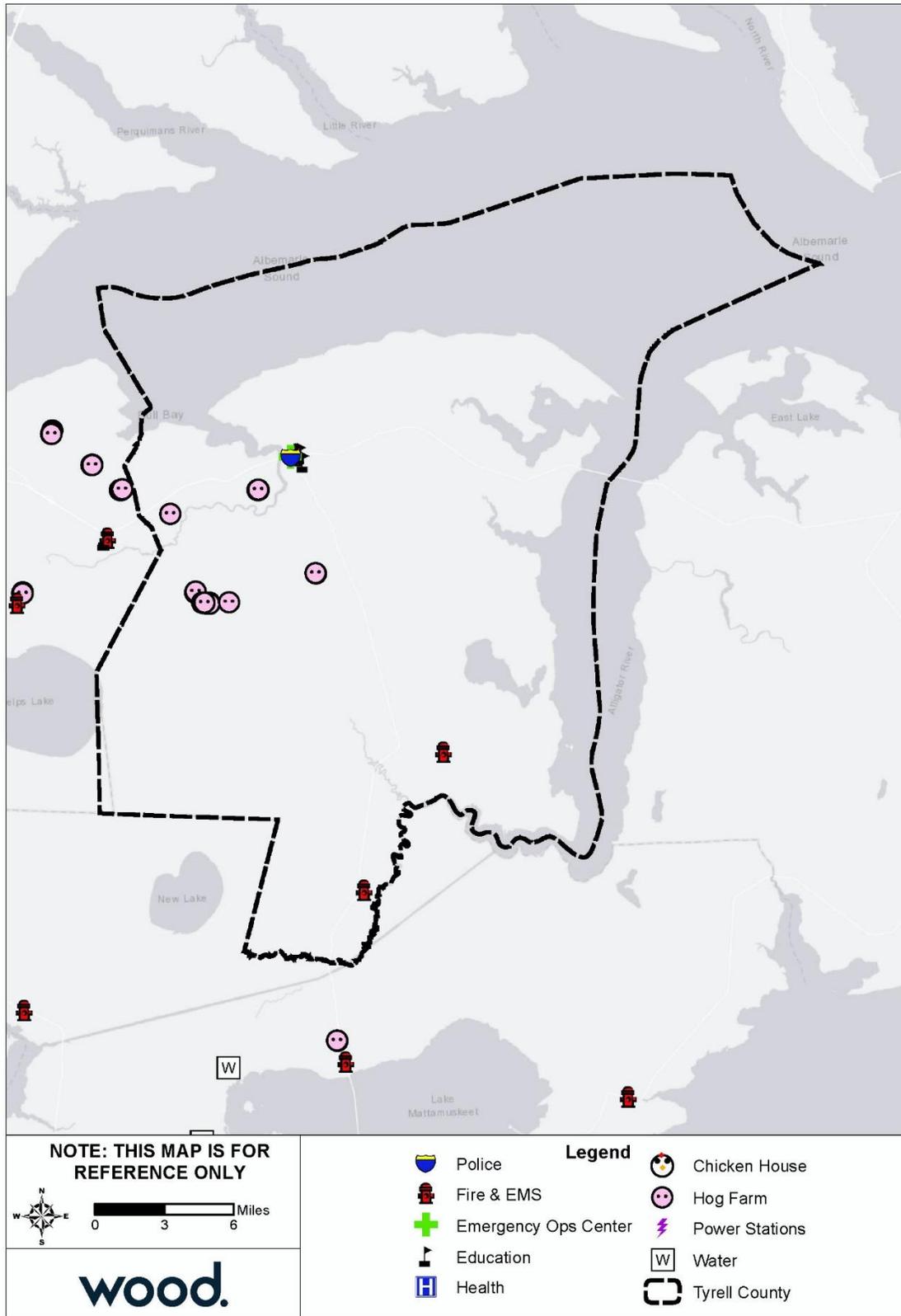
Source: NCEM IRISK Database, GIS Analysis

Figure 4.3 – Martin County Critical Facilities



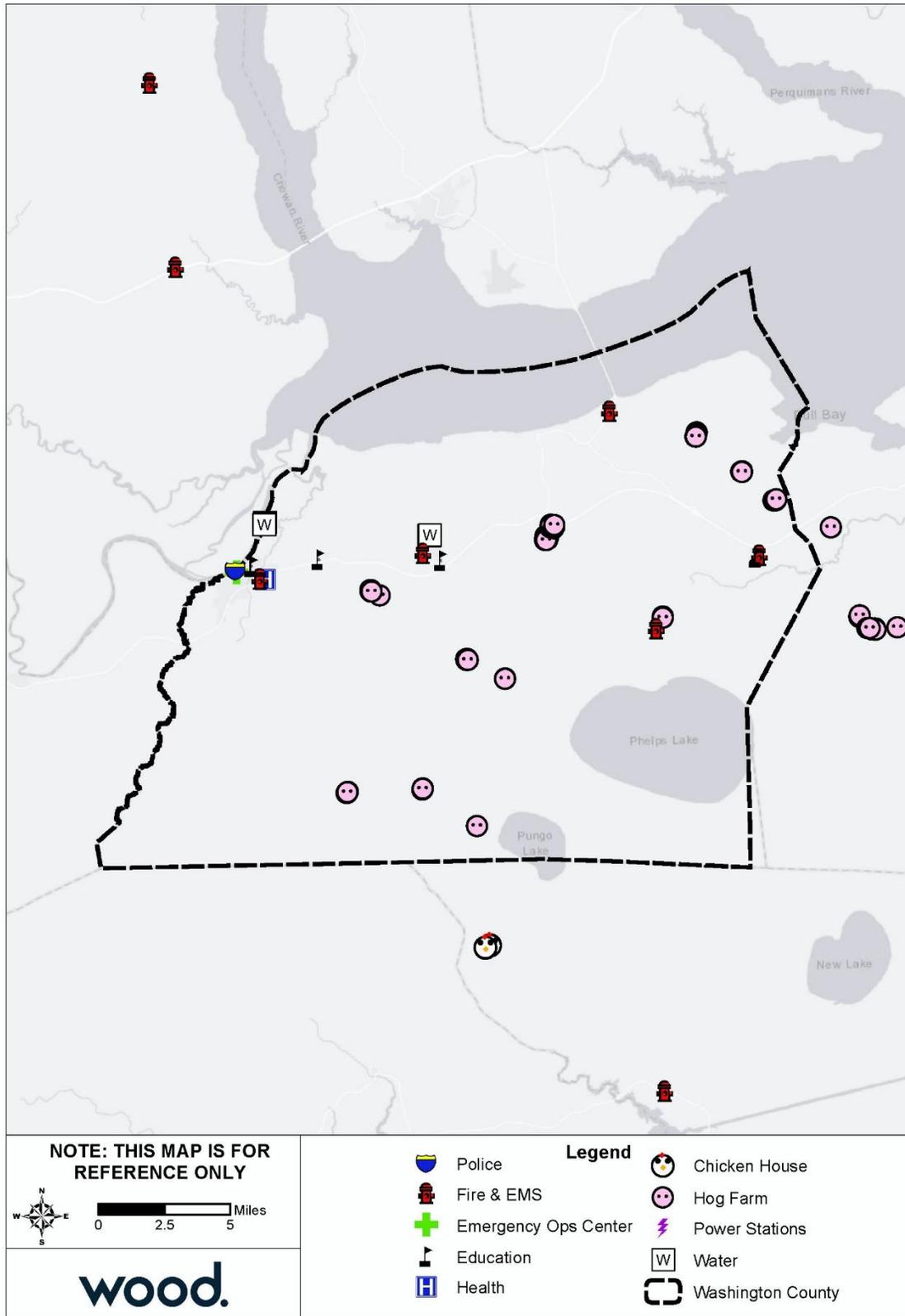
Source: NCEM IRISK Database, GIS Analysis

Figure 4.4 – Tyrrell County Critical Facilities



Source: NCEM IRISK Database, GIS Analysis

Figure 4.5 – Washington 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 Northeastern NC 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
Bertie County	323	148,113	33.1%	78,661 (53.5%)	\$449,008,000
Hyde County	138	124,874	31.9%	64,741 (51.8%)	\$371,344,000
Martin County	332	140,980	48.3%	91,649 (65.0%)	\$377,579,000
Tyrrell County	68	52,946	21.2%	46,362 (87.6%)	\$219,623,000
Washington County	141	79,680	35.9%	62,175 (78%)	\$292,285,000

Source: USDA 2017 Census of Agriculture

### 4.5 HAZARD PROFILES, ANALYSIS, AND VULNERABILITY

#### 4.5.1 Coastal Erosion

##### Hazard Background

Due to its location with on estuarine and marine coastal areas, the Northeastern NC Region is exposed to coastal erosion. Coastal erosion is a process whereby large storms, flooding, strong wave action, sea level rise, and human activities, such as inappropriate land use, alterations, and shore protection structures, wear away the beaches and bluffs along the coast. Erosion undermines and often destroys homes, businesses, and public infrastructure and can have long-term economic and social consequences. According to NOAA, coastal erosion is responsible for approximately \$500 million per year in coastal property loss in the United States, including damage to structures and loss of land. To mitigate coastal erosion, the federal government spends an average of \$150 million 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, 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: 4 – More than 24 hours*

*Duration: 1 – Less than six hours*

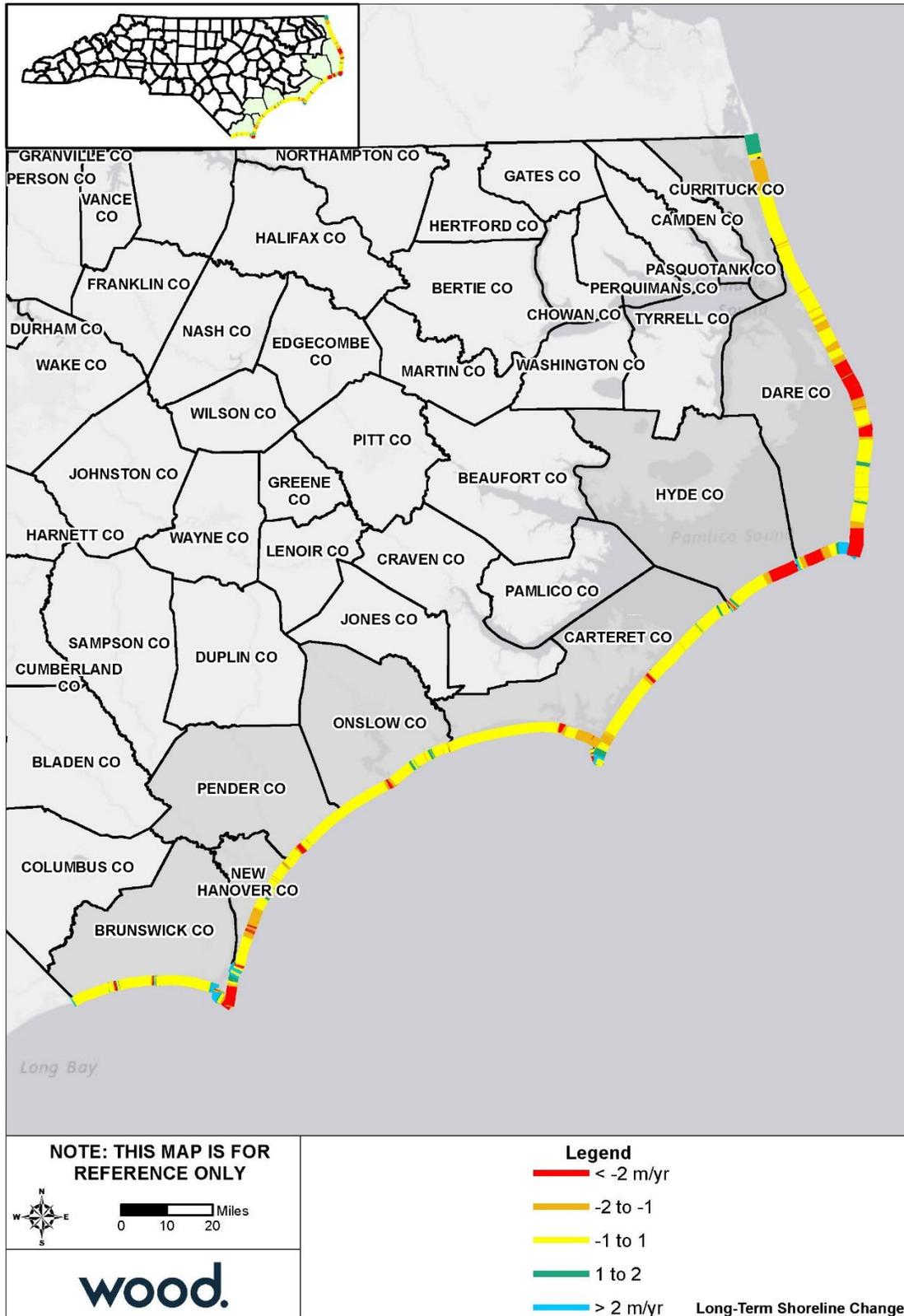
##### Location

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 estuarine shorelines can also occur. In the Northeastern NC Region, Hyde County is the location facing the greatest exposure to erosion.

Figure 4.6 on the following page shows the locations where shoreline change data to measure erosion and accretion rates along the North Carolina coast has been compiled by the USGS. Long-term coastal erosion rates have been most severe along the northern portions of Hyde County’s Atlantic coastline.

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Figure 4.6 – Shoreline Change Along the North Carolina Coast



Source: USGS Coastal and Marine Geology Program

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### Extent

Overall, coastal erosion has a limited impact on the Region. Erosion events may cause property damage when severe but are unlikely to cause injury or death. Erosion is limited to areas along the coastline and surf zone. 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. Portions of Hyde County's Atlantic coastline have experienced an average annual erosion rate of over 2 meters per year.

*Impact: 2 – Limited*

*Spatial Extent: 1 – Negligible*

### Historical Occurrences

Though it can be exacerbated by major storms, erosion is an ongoing occurrence. The characteristics of a shoreline can impact the rate at which erosion occurs. According to a Soundfront Series report on Shoreline Erosion by NC Division of Coastal Management, North Carolina Sea Grant, and North Carolina State University, Tyrrell County has primarily low-bank shorelines for which erosion is typically very severe, while high-bank shorelines, for which erosion rates are high, are most common in Bertie County.

The Soundfront Series report also presents historical erosion rates by county from a 1975 USDA-SCS study. The study examined shoreline positions based on aerial photography available over a range of years between 1949 and 1970. Table 4.13 summarizes these statistics for the Northeastern NC Region coastal counties.

**Table 4.13 – Summary of Historical Shoreline Erosion Data**

County	Length of Shoreline Studied	Portion of Shoreline Eroding	Time Period Studied	Average Bank Height	Average Erosion Rate
Bertie	27 mi	73%	32 yrs	15.7 ft	0.9 ft/yr
Hyde	235 mi	100%	25 yrs	0.8 ft	3.0 ft/yr
Tyrrell	90 mi	100%	22 yrs	1.6 ft	2.0 ft/yr
Washington	26 mi	96%	32 yrs	4.5 ft	4.5 ft/yr

Source: 1975 USDA-SCS study referenced in Soundfront Series Shoreline Erosion Report

While newer data is not readily available, the above statistics indicate that as of 1970 all coastal counties in the Northeastern NC Region were experiencing erosion along at least some portion of their shoreline.

### Probability of Future Occurrence

Erosion and accretion are natural processes that are likely to continue to occur. Although data on historical erosion rates is only available for ocean shorelines, erosion is expected to continue affecting estuarine shorelines as well. The likelihood of significant instances of erosion will likely be tied to the occurrence of hurricane, tropical storm, and nor'easter events.

*Probability: 4 – Highly 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

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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, erosion of dune systems causes areas protected by those dunes to face higher levels of risk.

#### 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 4.14 summarizes the potential negative consequences of erosion.

**Table 4.14 – Consequence Analysis – Coastal 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.
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. Beach renourishment projects to counter erosion are extremely costly.
Public Confidence in the Jurisdiction's Governance	Coastal hazards are unlikely to impact public confidence.

#### Hazard Summary by Jurisdiction

The following table summarizes coastal erosion risk by jurisdiction. Risk to coastal erosion varies across the region and is highest in the region's unincorporated areas along coastal and estuarine shorelines. Inland areas may still experience moderate erosion, but it is less likely than in coastal areas.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Unincorporated Bertie County	4	2	1	4	1	2.5	H
Town of Askewville	1	1	1	4	1	1.3	L
Town of Aulander	1	1	1	4	1	1.3	L

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Town of Colerain	3	2	1	4	1	2.2	M
Town of Kelford	1	1	1	4	1	1.3	L
Town of Lewiston-Woodville	1	1	1	4	1	1.3	L
Town of Powellsville	1	1	1	4	1	1.3	L
Town of Roxobel	1	1	1	4	1	1.3	L
Town of Windsor	1	1	1	4	1	1.3	L
Unincorporated Hyde County	4	2	1	4	1	2.5	H
Unincorporated Martin County	3	2	1	4	1	2.2	M
Town of Bear Grass	1	1	1	4	1	1.3	L
Town of Everetts	1	1	1	4	1	1.3	L
Town of Hamilton	3	2	1	4	1	2.2	M
Town of Hassell	1	1	1	4	1	1.3	L
Town of Jamesville	3	2	1	4	1	2.2	M
Town of Oak City	1	1	1	4	1	1.3	L
Town of Parmele	1	1	1	4	1	1.3	L
Town of Robersonville	1	1	1	4	1	1.3	L
Town of Williamston	2	2	1	4	1	1.9	L
Unincorporated Tyrrell County	4	2	1	4	1	2.5	H
Town of Columbia	4	2	1	4	1	2.5	H
Washington County	4	2	1	4	1	2.5	H
Town of Creswell	2	2	1	4	1	1.9	L
Town of Plymouth	4	2	1	4	1	2.5	H
Town of Roper	2	1	1	4	1	1.6	L

### 4.5.2 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 farmland, 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.

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

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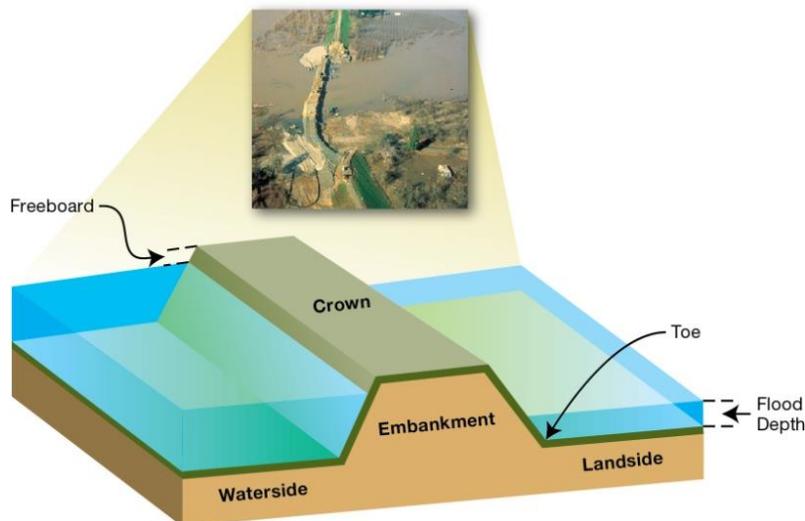
power of the flood wave that would be released by the sudden collapse of a large dam. Dams are innately hazardous structures. Failure or poor operation can result in the release of the reservoir contents—this can include water, mine wastes, or agricultural refuse—causing negative impacts upstream or 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 4.7 shows the components of a typical levee.

Figure 4.7 – 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.

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.

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*Warning Time: 4 – Less than six hours*

*Duration: 3 – Less than one week*

Location

### Dam Failure

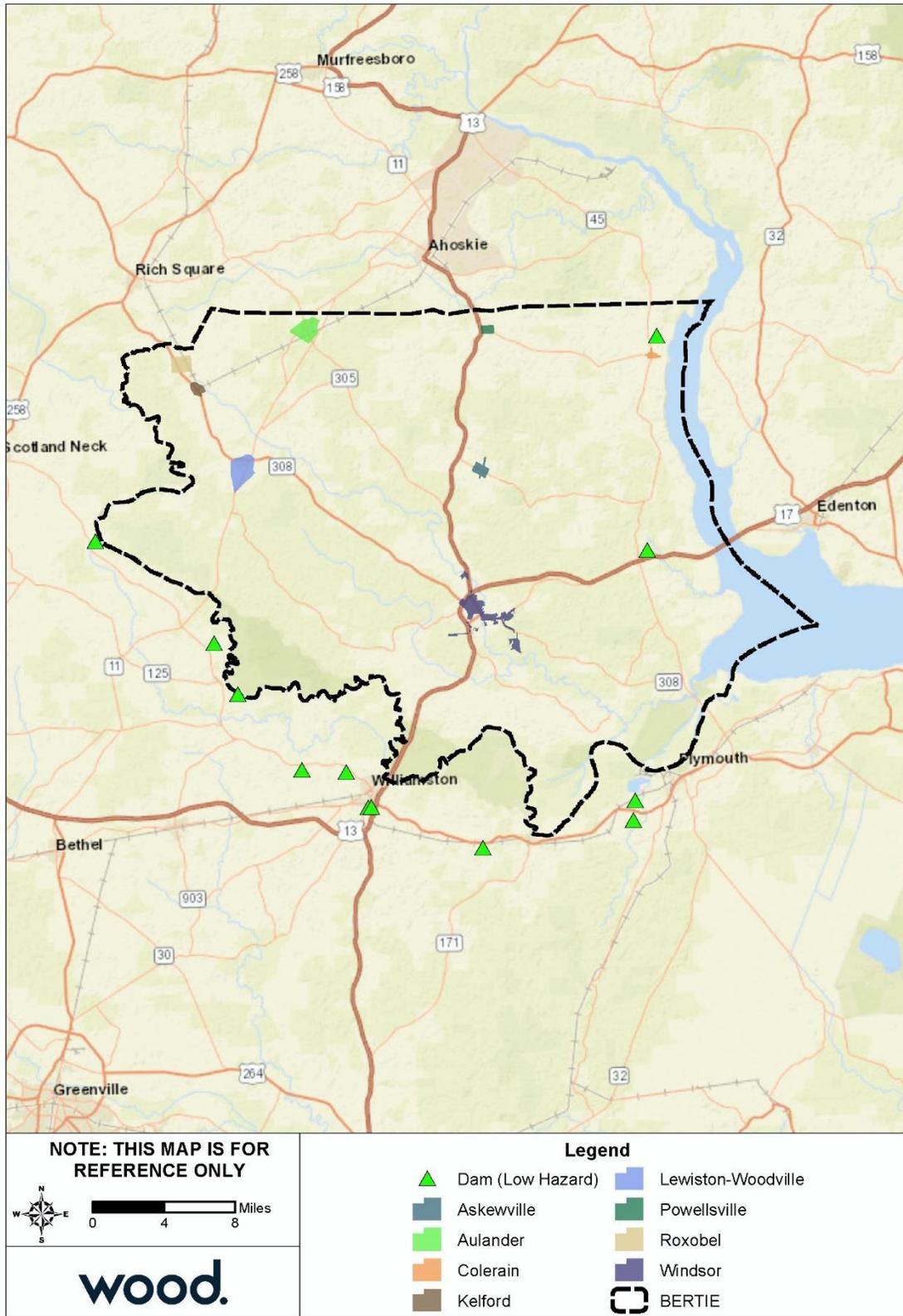
The North Carolina Dam Inventory, maintained by North Carolina Department of Environmental Quality, provides a detailed inventory of all dams in the state. As of July 2018, there are 13 dams in the Northeastern NC Region, all of which are rated low hazard. Of the 13 dams, two are located in Bertie County, one is in Hyde County, and ten are in Martin County. There are no dams in Tyrrell or Washington Counties. Table 4.15 details all dams in the Region by county and Figure 4.8 through Figure 4.10 show the location of all dams.

**Table 4.15 – Dams in the Northeastern NC Region**

Dam Name	NID ID	Condition as of Last Inspection	Max Capacity (Ac-Ft)	Nearest Downstream Location
<b>Bertie County</b>				
Beasley Pond Dam	NC01880		16	Colerain
Taylor-Brown Pond Dam	NC01881		100	
<b>Hyde County</b>				
COOP Plan	NC05893	Not Rated		
<b>Martin County</b>				
Rainbow Pond Dam	NC01059		120	Williamston
Leggett Pond Dam	NC01409		55	Williamston
Lilleys Pond Dam Upper	NC03370		20	Jamesville
Lilleys Pond Dam Lower	NC03371		28	Jamesville
Copeland Pond Dam	NC03372	Satisfactory	91	Williamston
Old Peel Farm Dam	NC03373		110	Hamilton
J. E. Griffin Dam	NC03374		19	Williamston
Davenport Pond Dam	NC03375		76	Plymouth
Knowles Pond Dam	NC03376		19	Plymouth
Modlin Pond Dam	NC03377		32	

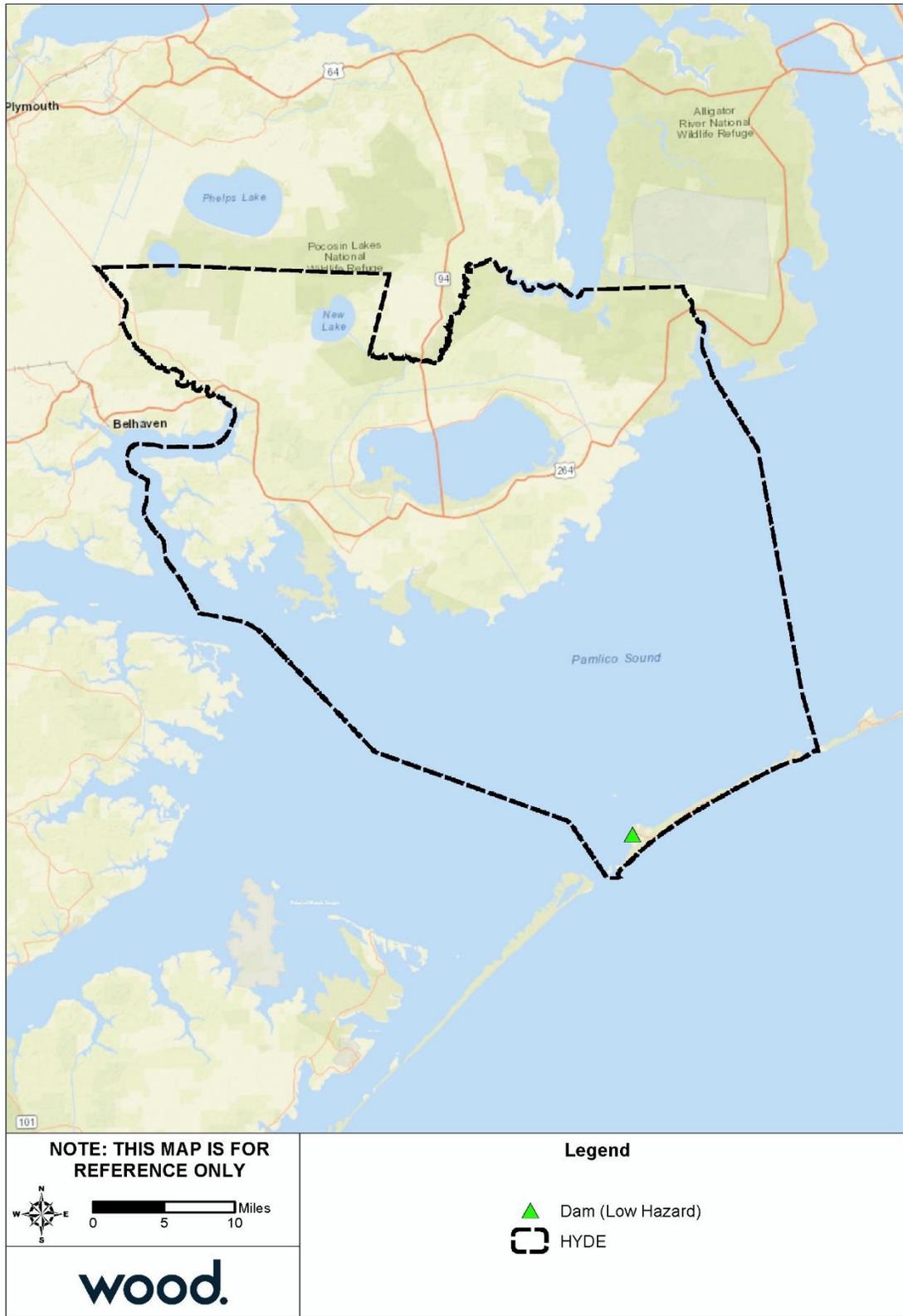
Source: North Carolina Dam Inventory

Figure 4.8 – Dam Locations in Bertie County



Source: North Carolina Dam Inventory, July 2018

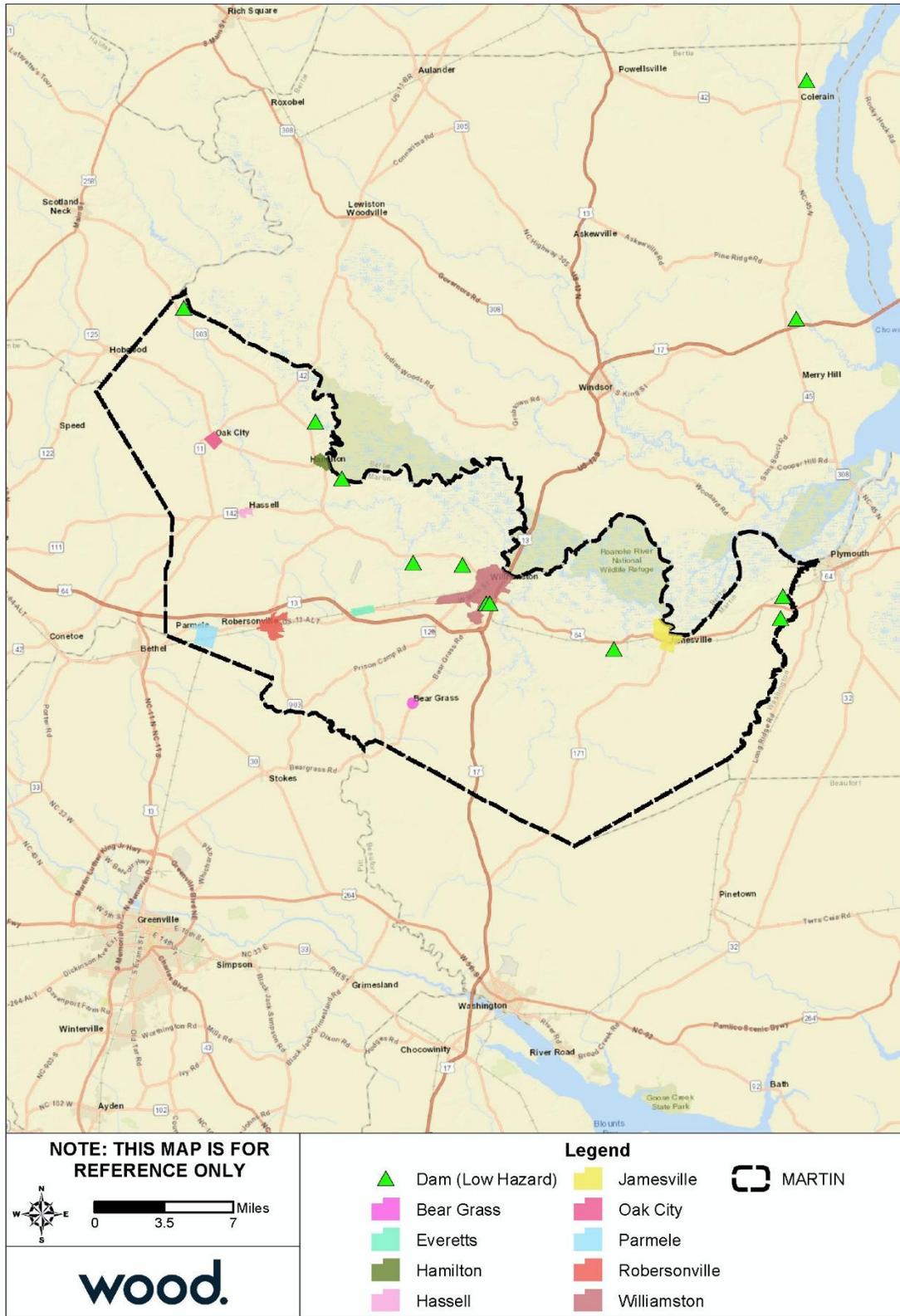
Figure 4.9 – Dam Location in Hyde County



Source: North Carolina Dam Inventory, July 2018

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Figure 4.10 – Dam Locations in Martin County



Source: North Carolina Dam Inventory, July 2018

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### Levee Failure

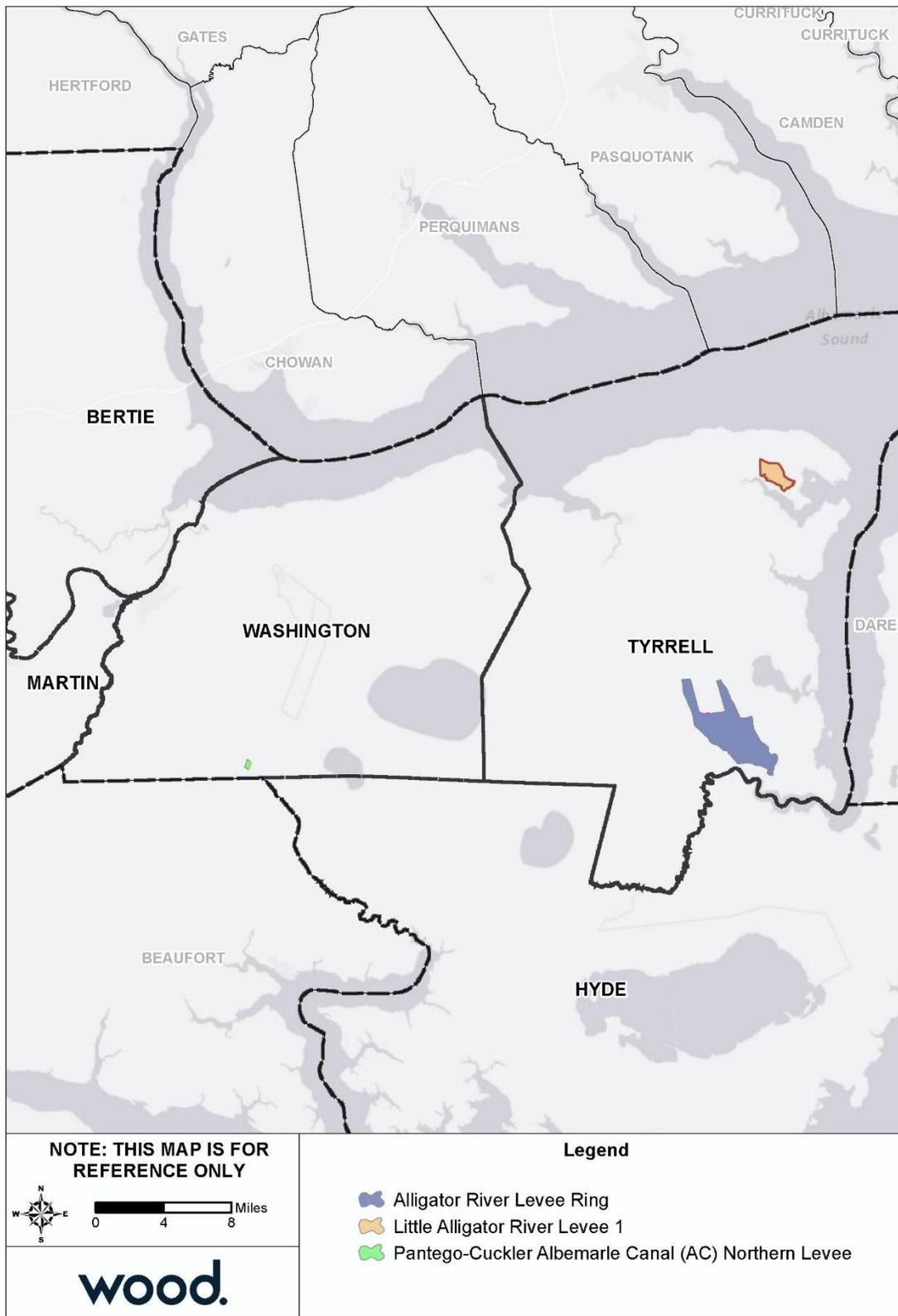
According to the US Army Corps of Engineers' (USACE) National Levee Database (NLD), there are three recognized levees in the Northeastern NC Region, two in Tyrrell County and one in Washington County. These levees are detailed in Table 4.16 and their locations are shown in Figure 4.11.

**Table 4.16 – Levees in the Northeastern NC Region**

Levee Name	Year Constructed	Embankment Length (mi)	Levee Safety Action Classification	People at Risk	Structures at Risk	Property Value
Alligator River Levee Ring	--	22.64	Not Screened	225	126	\$25.8M
Little Alligator River Levee 1	--	6.65	Not Screened	1	1	\$67,200
Pantego-Cuckler Albemarle Canal (AC) Northern Levee	1962	0.41	Low	0	0	\$12,700

Source: National Levee Database

Figure 4.11 – Overview of Levee Locations in the Northeastern NC Region



Source: National Levee Database

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### Extent

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 4.17 – Dam Hazard Classifications**

Hazard Classification	Description	Quantitative Guidelines
<b>Low</b>	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than \$30,000
<b>Intermediate</b>	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
<b>High</b>	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

The risk classification for the levees in Tyrrell County is unknown, however there are approximately 226 people and 127 structures worth over \$25.8 million at risk in the leveed areas. Though the risk of failure is unknown, the exposure within leveed areas suggests failure could have critical impacts. The levee in Washington County is rated as low risk, however there is still \$12,700 at risk in the leveed area. All dams in the Region are also rated as low risk. Overall, failure of a dam or levee would affect only a negligible area but could cause death or property damage within the affected area.

*Impact: 3 – Critical*

*Spatial Extent: 1 – Negligible*

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### Historical Occurrences

The National Performance of Dams Program at Stanford University maintains a database of historical dam incidents. Per NPDP records, there are no known historical failures or near-failures at any dams in the Northeastern NC Region.

### Probability of Future Occurrence

Given the limited presence of levees and lack of intermediate or high hazard dams in the Region as well as the absence of any prior incidents, it can be concluded that dam or levee failure is unlikely. However, it is possible that with heavy rain events becoming more frequent and intense, conditions conducive to failures may occur more frequently in the future.

*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**

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Dam inundation areas were not available for the identified dams; therefore, a quantitative vulnerability assessment could not be completed. Vulnerability to dam failure discussed below is based on anecdotal evidence and theoretical understanding of potential risks. Levee failure risk is based on risk assessment information provided by the USACE's NLD, where available.

#### **People**

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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 226 people are at risk to levee failure in the Northeastern NC Region, all located in Tyrrell County.

#### **Property**

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Vulnerability of the built environment includes damage to the dam or levee itself and any man-made feature located within the inundation area caused by the failure. Downstream of the dam, vulnerability includes potential damage to homes, personal property, commercial buildings and property, and

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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.

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 127 buildings at risk in leveed areas in Tyrrell County, worth an estimated \$25.8 million. An additional \$12,700 in property is at risk in leveed areas in Washington County.

### 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 4.18 summarizes the potential negative consequences of dam and levee failure.

**Table 4.18 – 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.

### Hazard Summary by Jurisdiction

The following table summarizes dam and levee failure hazard risk by jurisdiction. Warning time and duration are inherent to the hazard and remain constant across jurisdictions. Spatial extent of any dam failure will be negligible relative to the planning area. There are no high hazard dams within the planning area, so probability is low across all jurisdictions. Jurisdictions with levees or low hazard dams upstream

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were assigned an impact rating of critical, all other jurisdictions were assigned an impact rating of limited, as there may still be some secondary impacts.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	1	3	1	4	3	2.1	M
Town of Askewville	1	2	1	4	3	1.8	L
Town of Aulander	1	2	1	4	3	1.8	L
Town of Colerain	1	3	1	4	3	2.1	M
Town of Kelford	1	2	1	4	3	1.8	L
Town of Lewiston-Woodville	1	2	1	4	3	1.8	L
Town of Powellsville	1	2	1	4	3	1.8	L
Town of Roxobel	1	2	1	4	3	1.8	L
Town of Windsor	1	2	1	4	3	1.8	L
Hyde County	1	3	1	4	3	2.1	M
Martin County	1	2	1	4	3	1.8	L
Town of Bear Grass	1	2	1	4	3	1.8	L
Town of Everetts	1	2	1	4	3	1.8	L
Town of Hamilton	1	3	1	4	3	2.1	M
Town of Hassell	1	2	1	4	3	1.8	L
Town of Jamesville	1	3	1	4	3	2.1	M
Town of Oak City	1	2	1	4	3	1.8	L
Town of Parmele	1	2	1	4	3	1.8	L
Town of Robersonville	1	2	1	4	3	1.8	L
Town of Williamston	1	3	1	4	3	2.1	M
Tyrrell County	1	3	1	4	3	2.1	M
Town of Columbia	1	2	1	4	3	1.8	L
Washington County	1	3	1	4	3	2.1	M
Town of Creswell	1	2	1	4	3	1.8	L
Town of Plymouth	1	3	1	4	3	2.1	M
Town of Roper	1	2	1	4	3	1.8	L

### 4.5.3 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 4.19.

**Table 4.19 – Types of Drought**

Type	Details
<b>Meteorological Drought</b>	Meteorological Drought is based on the degree of dryness (rainfall deficit) and the length of the dry period.
<b>Agricultural Drought</b>	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.
<b>Hydrological Drought</b>	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.
<b>Socioeconomic Drought</b>	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).

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.

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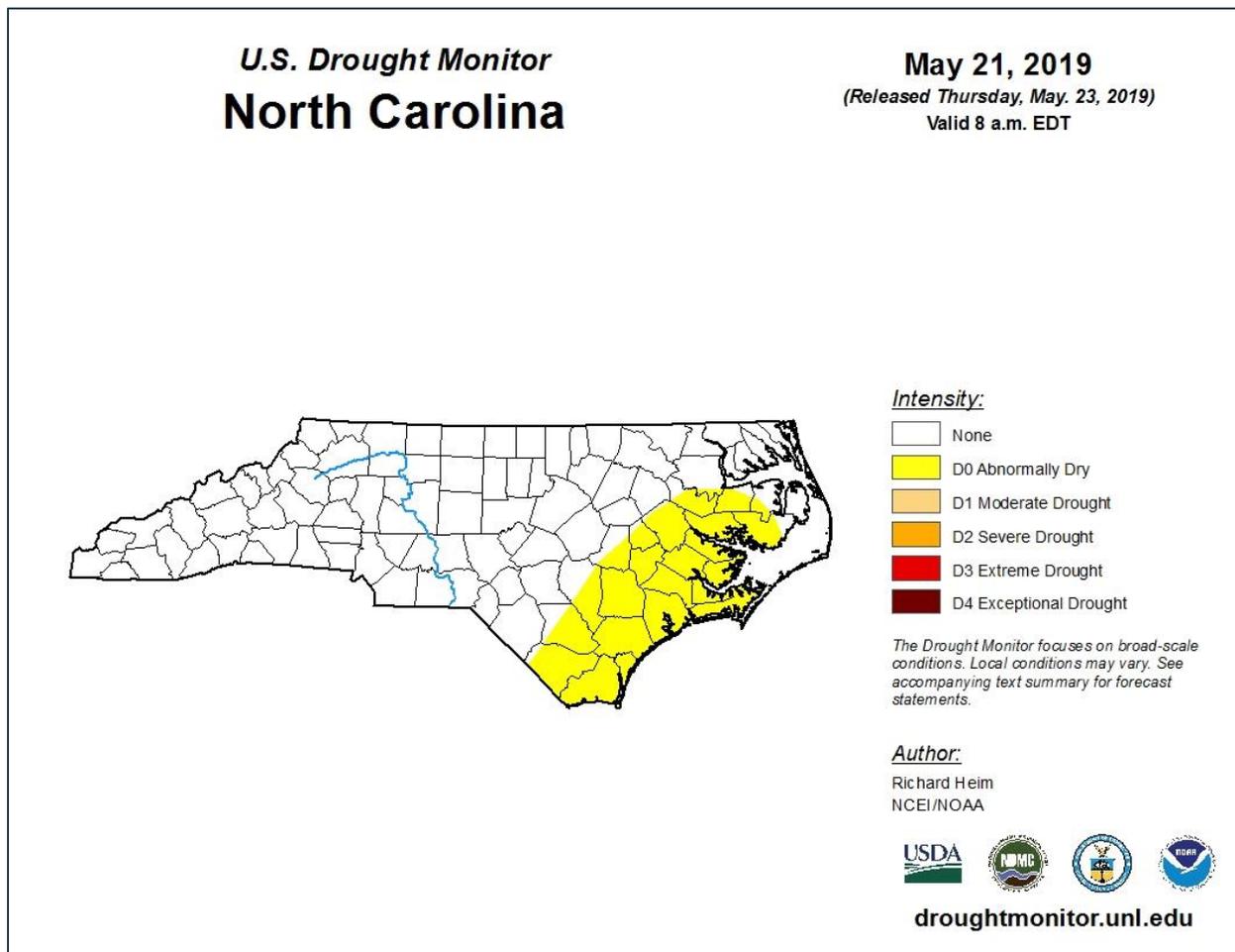
*Warning Time: 1 – More than 24 hours*

*Duration: 4 – More than one week*

### Location

Drought is a regional hazard that can cover an entire the entire planning area, and in some cases the entire state. The figure below notes the U.S. Drought Monitor’s drought ratings for North Carolina as of May 21, 2019; as of that date, portions of the Northeastern NC Region were experiencing abnormally dry conditions. While this map is not an indication of future drought potential, it does illustrate the regional nature of drought conditions.

**Figure 4.12 – US Drought Monitor for Week of May 21, 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 4.13 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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2020

Figure 4.13 – US Drought Monitor Classifications

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: <ul style="list-style-type: none"> <li>short-term dryness slowing planting, growth of crops or pastures</li> </ul> Coming out of drought: <ul style="list-style-type: none"> <li>some lingering water deficits</li> <li>pastures or crops not fully recovered</li> </ul>	-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"> <li>Some damage to crops, pastures</li> <li>Streams, reservoirs, or wells low, some water shortages developing or imminent</li> <li>Voluntary water-use restrictions requested</li> </ul>	-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"> <li>Crop or pasture losses likely</li> <li>Water shortages common</li> <li>Water restrictions imposed</li> </ul>	-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"> <li>Major crop/pasture losses</li> <li>Widespread water shortages or restrictions</li> </ul>	-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"> <li>Exceptional and widespread crop/pasture losses</li> <li>Shortages of water in reservoirs, streams, and wells creating water emergencies</li> </ul>	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Source: US Drought Monitor

The most severe drought to impact the Northeastern NC Region within the past 20 years occurred between March 2007 and May 2008, during which time Bertie and Martin Counties experienced 50 consecutive weeks of drought conditions, and Hyde, Tyrell and Washington Counties experienced 47 consecutive weeks of drought. Conditions were most severe in Bertie and Martin Counties, where some areas experienced “exceptional” drought conditions. In general, drought is not likely to cause any direct injury or death, but economic impacts of drought can be severe, especially to the agricultural industry.

*Impact: 1 – Minor*

*Spatial Extent: 4 – Large*

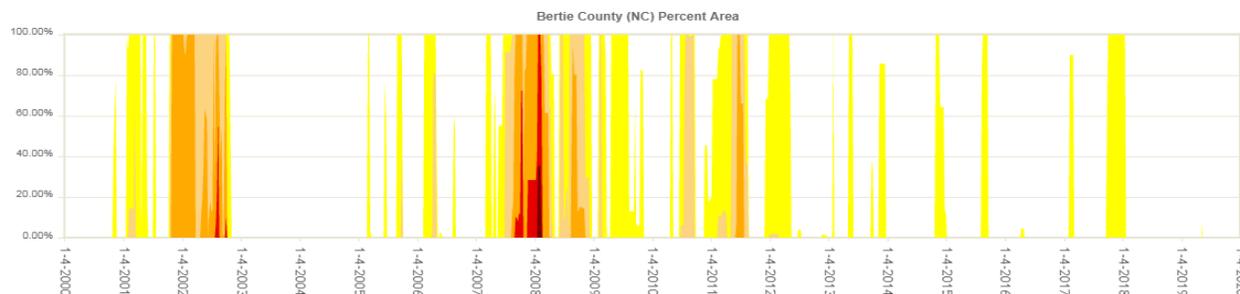
Historical Occurrences

Figure 4.14 through Figure 4.18 show historical periods where each county was considered in some level of drought condition. The color key shown in Figure 4.13 indicates the intensity of the drought.

**Bertie County**

Between 2000 and 2018, Bertie County was in some level of drought 37.5% of the time. The County recorded 97 weeks of in “severe” drought or worse during this timeframe, including 4 weeks in “exceptional” drought conditions.

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



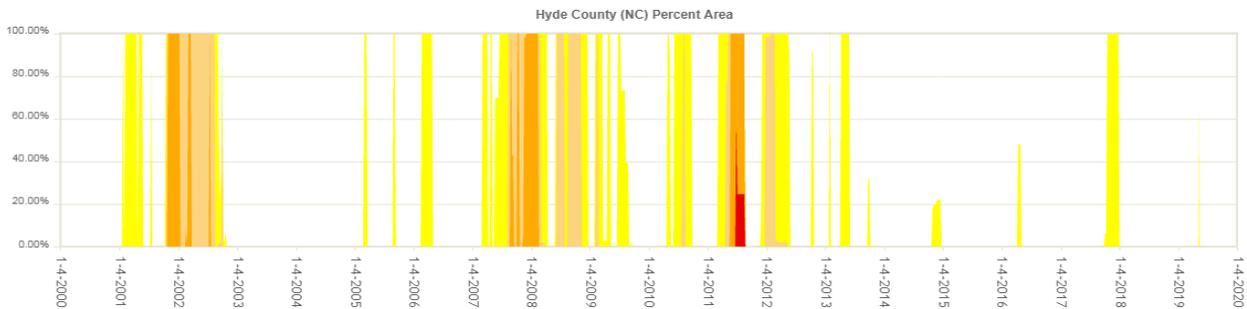
Source: U.S. Drought Monitor

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### Hyde County

Between 2000 and 2018, Hyde County was in some level of drought 31.3% of the time. The County recorded 51 weeks in “severe” drought during this timeframe.

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

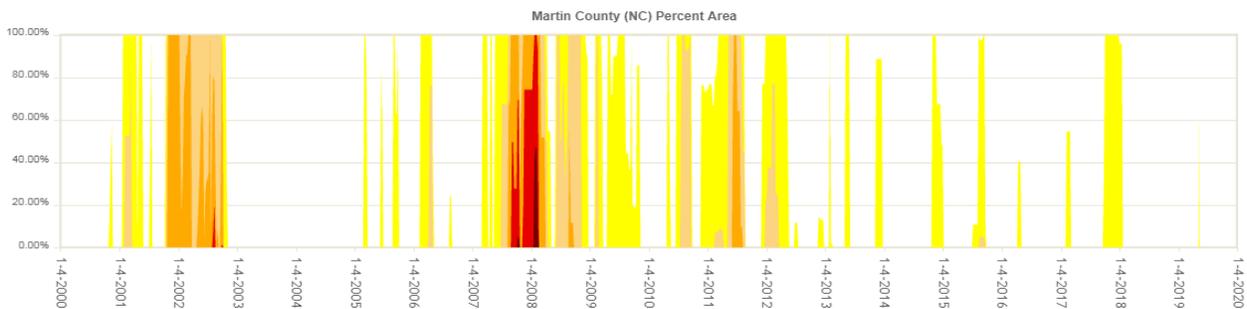


Source: U.S. Drought Monitor

### Martin County

Between 2000 and 2018, Martin County was in some level of drought 37.3% of the time. The County recorded 88 weeks in “severe” drought or worse during this timeframe, including 6 weeks with some areas in “exceptional” drought.

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

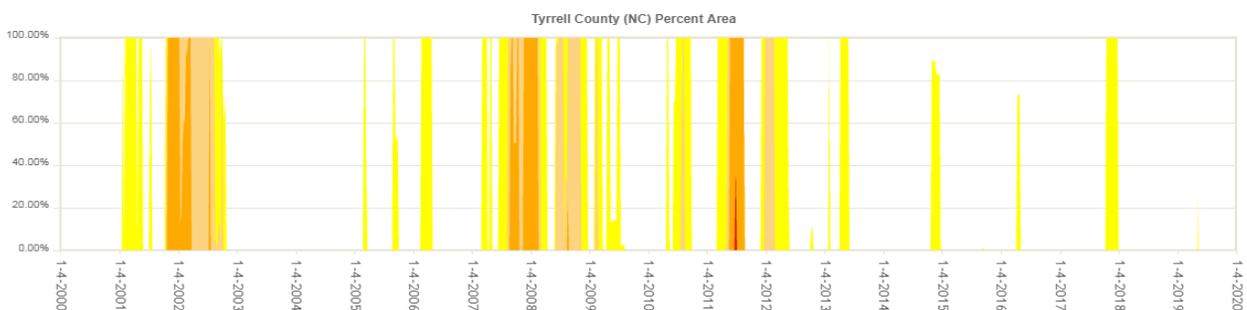


Source: U.S. Drought Monitor

### Tyrrell County

Between 2000 and 2018, Tyrrell County was in some level of drought 30.2% of the time. The County recorded 57 weeks in “severe” drought or worse during this timeframe.

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



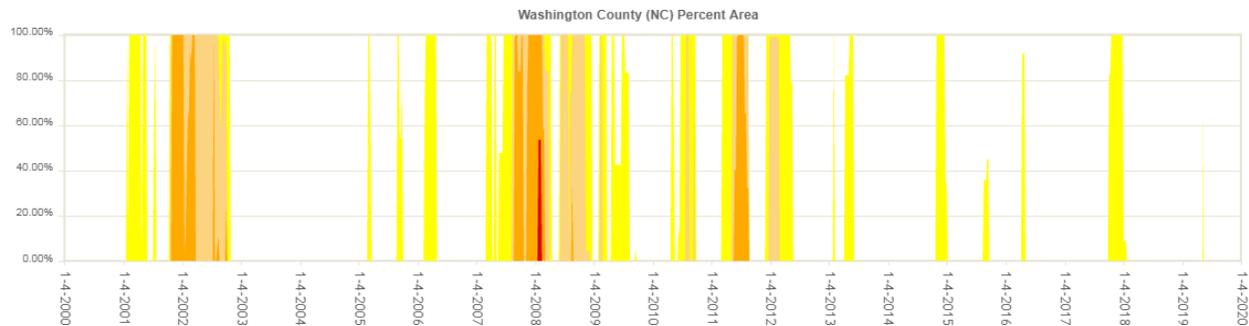
Source: U.S. Drought Monitor

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### Washington County

Between 2000 and 2018, Washington County was in some level of drought 31.3% of the time. The County recorded 64 weeks of in “severe” drought or worse during this timeframe.

**Figure 4.18 – US Drought Monitor Historical Trends – Washington 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 6 were reported to affect the counties in the Northeastern NC Region. Table 4.20 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 4.20 – Drought Impacts Reported in the Northeastern NC Region, January 2009 - December 2018**

Category	Bertie	Hyde	Martin	Tyrrell	Washington	Years Reported
	Impacts					
Agriculture	2	2	2	1	1	2010, 2012
Fire	-	1	-	-	-	2011
Relief, Response & Restrictions	2	2	2	1	1	2010, 2012
Society & Public Health	-	1	-	-	-	2011

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

#### Probability of Future Occurrence

Over the 991 weeks with data from 2000 through 2018, the Region spent an average of 336 weeks in some level of drought condition, ranging from abnormally dry to exceptional drought. This equates to a 33.9% chance of drought in any given week. Table 4.21 summarizes historical data by county. The probability of severe drought is lower, with the region averaging 7.2% of the time in severe drought conditions or worse.

**Table 4.21 – Historical Weeks in Drought by County, 2000-2018**

County	Any Drought Conditions		Severe Drought Conditions	
	Total Weeks	Percent of Time	Total Weeks	Percent of Time
Bertie	372	37.5%	97	9.8%
Hyde	310	31.3%	51	5.1%
Martin	370	37.3%	88	8.9%
Tyrrell	299	30.2%	57	5.8%
Washington	331	31.3%	64	6.5%

Source: US Drought Monitor

*Probability: 2 – Possible*

**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 Region is determined 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.

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 also 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 Northeastern NC Region was \$45,837,911, or an average of \$4,167,082 in losses every year. Losses were greatest in Bertie County, both in terms of acres affected and losses claimed. Table 4.22 summarizes the regional crop losses due to drought in reported in the RMA system.

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**Table 4.22 – Crop Losses Resulting from Drought in Northeastern NC Region, 2007-2017**

Year	Determined Acres	Indemnity Amount
2007	32,933.49	\$3,636,669
2008	56,846.81	\$8,301,875
2009	7,562.58	\$714,906
2010	51,478.61	\$7,116,298
2011	87,842.73	\$17,618,400
2012	3,932.39	\$416,010
2013	330.01	\$31,775
2014	939.06	\$117,891
2015	22,530.21	\$5,939,106
2016	4,896.52	\$1,926,548
2017	883.80	\$18,433
<b>Total</b>	<b>270,176.20</b>	<b>\$45,837,911</b>

Source: USDA Risk Management Agency

Table 4.23 summarizes county-specific data on indemnity amounts, as well as average payout amounts per year. Bertie County suffered the greatest impacts agriculturally from drought, with over \$14 million in payouts over the 11-year timespan.

**Table 4.23 – County-Specific Total Crop Losses Resulting from Drought, 2007-2017**

County	Determined Acres	Indemnity Amount	Average Annual Indemnity
Bertie	84,076.79	\$14,012,524	\$1,273,866
Hyde	37,364.96	\$6,102,051	\$554,731
Martin	60,365.56	\$12,762,921	\$1,160,265
Tyrrell	21,226.96	\$2,022,493	\$183,863
Washington	67,141.94	\$10,937,923	\$994,357
<b>Total</b>	<b>270,176.20</b>	<b>\$45,837,911</b>	<b>\$4,167,082</b>

Source: USDA Risk Management Agency

### Environment

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

Drought conditions can also provide a substantial increase in wildfire risk. As plants and trees die from a lack of precipitation, increased insect infestations, and diseases—all of which are associated with drought—they become fuel for wildfire. Long periods of drought can result in more intense wildfires, which bring additional consequences for the economy, the environment, and society. Drought may also increase likelihood of wind and water erosion of soils.

### Consequence Analysis

Table 4.24 summarizes the potential negative consequences of drought.

**Table 4.24 – 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.

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Category	Consequences
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.

### Hazard Summary by Jurisdiction

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

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	2	2	4	1	4	2.5	H
Town of Askewville	2	1	4	1	4	2.2	M
Town of Aulander	2	1	4	1	4	2.2	M
Town of Colerain	2	1	4	1	4	2.2	M
Town of Kelford	2	1	4	1	4	2.2	M
Town of Lewiston-Woodville	2	1	4	1	4	2.2	M
Town of Powellsville	2	1	4	1	4	2.2	M
Town of Roxobel	2	1	4	1	4	2.2	M
Town of Windsor	2	1	4	1	4	2.2	M
Hyde County	2	2	4	1	4	2.5	H
Martin County	2	2	4	1	4	2.5	H
Town of Bear Grass	2	1	4	1	4	2.2	M
Town of Everetts	2	1	4	1	4	2.2	M
Town of Hamilton	2	1	4	1	4	2.2	M
Town of Hassell	2	1	4	1	4	2.2	M
Town of Jamesville	2	1	4	1	4	2.2	M
Town of Oak City	2	1	4	1	4	2.2	M
Town of Parmele	2	1	4	1	4	2.2	M
Town of Robersonville	2	1	4	1	4	2.2	M
Town of Williamston	2	1	4	1	4	2.2	M
Tyrrell County	2	2	4	1	4	2.5	H

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Town of Columbia	2	1	4	1	4	2.2	M
Washington County	2	2	4	1	4	2.5	H
Town of Creswell	2	1	4	1	4	2.2	M
Town of Plymouth	2	1	4	1	4	2.2	M
Town of Roper	2	1	4	1	4	2.2	M

### 4.5.4 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.

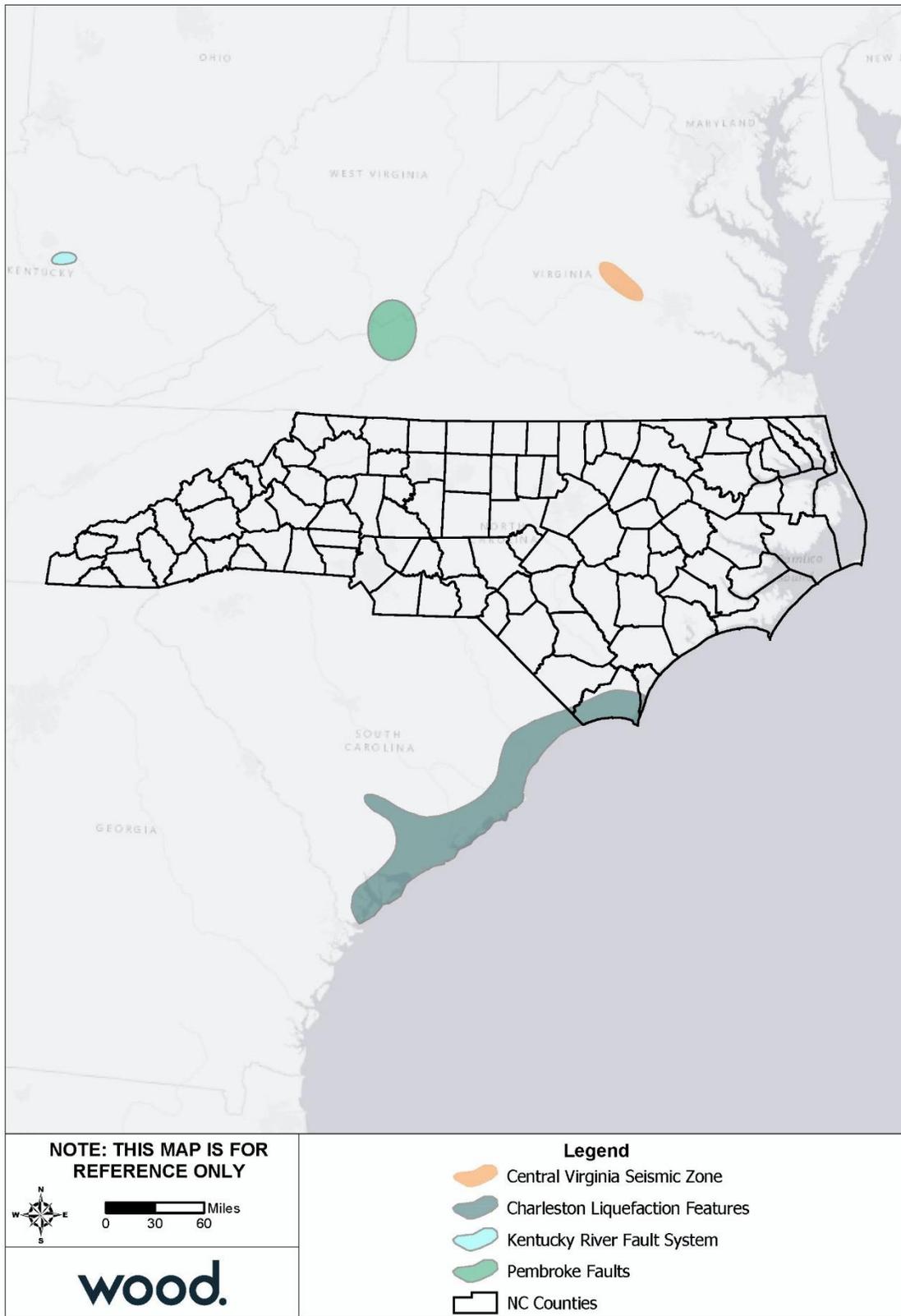
*Warning Time: 4 – Less than six hours*

*Duration: 1 – Less than six hours*

#### Location

Figure 4.19 reflects the Quaternary faults that present an earthquake hazard for the Northeastern NC Region based on data from the USGS Earthquake Hazards Program.

Figure 4.19 – US Quaternary Faults



Source: USGS Earthquake Hazards Program

## SECTION 4: RISK ASSESSMENT

All of North Carolina is subject to earthquakes to varying degrees, 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 4.25. 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 4.26 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 4.25 – 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 4.26 – 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.

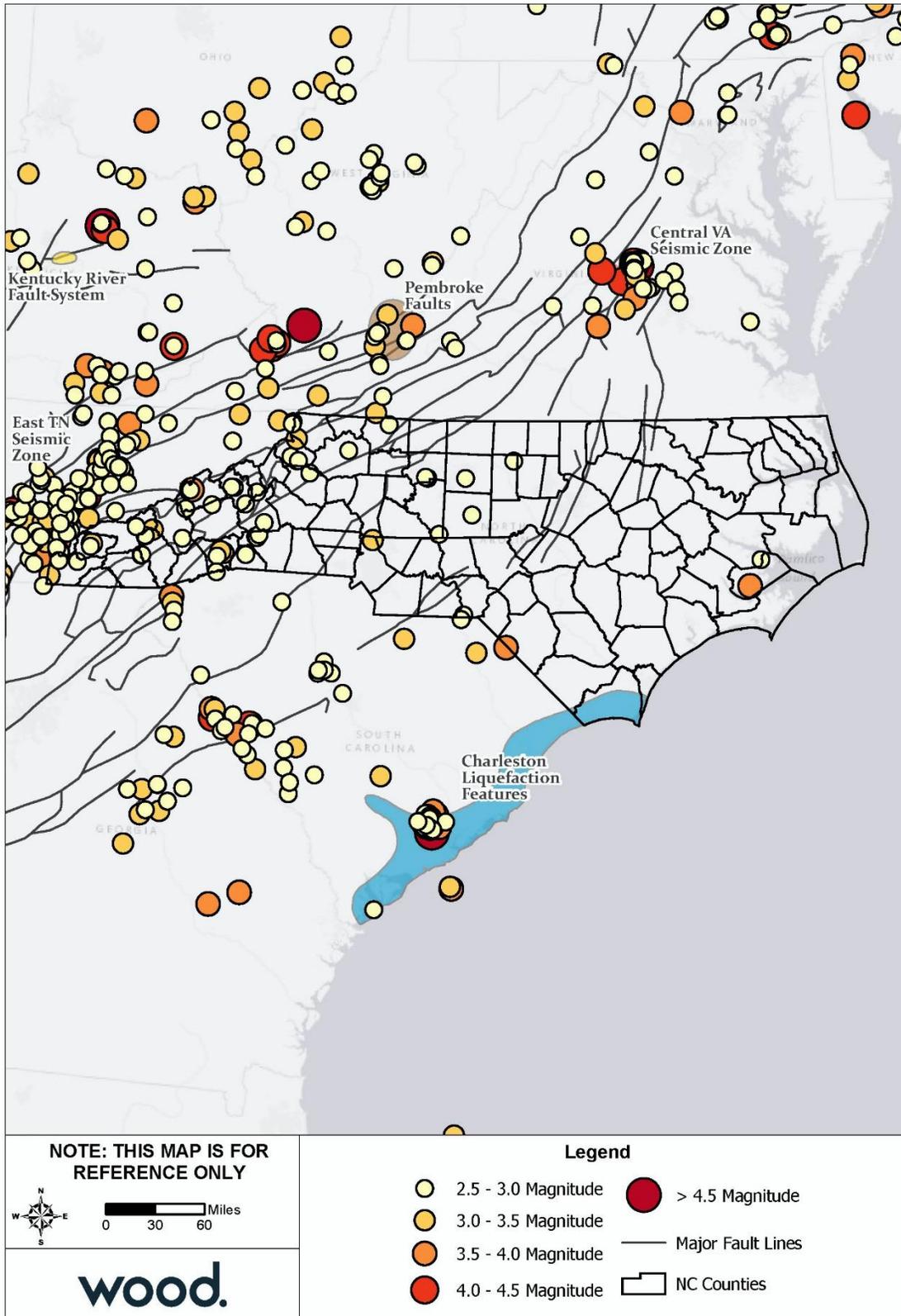
*Impact: 1 – Minor*

*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. Figure 4.20 shows historical earthquakes by magnitude in relation to North Carolina and the Quaternary Faults identified by USGS. This includes events from 1973 to 2019. Based on USGS records, there have not been any earthquakes with epicenters in the Northeastern NC Region during this period.

Figure 4.20 – Historical Earthquakes by Magnitude, 1973-2019



Source: USGS Earthquakes Hazard Program

## SECTION 4: RISK ASSESSMENT

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The above map 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.

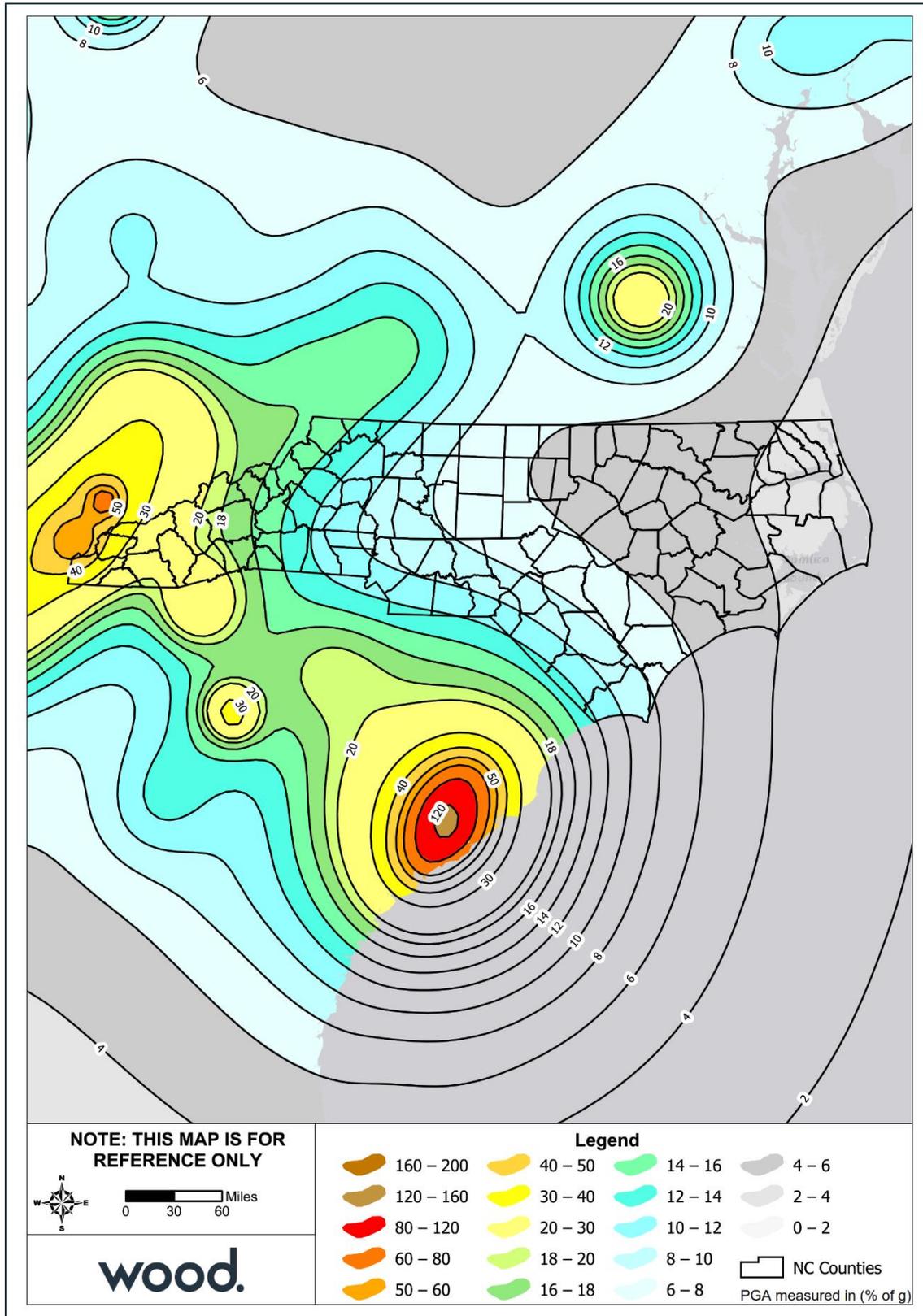
### Probability of Future Occurrence

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

Therefore, for the given probability of exceedance, two percent, the locations shaken more frequently will have larger ground motions. The Northeastern NC Region is located within the dark and light gray zones, representing a low peak acceleration of 0.02 to 0.06% g. Bertie and Martin Counties have slightly higher shake potential, while Hyde, Tyrrell, and Washington Counties have relatively lower risk.

Figure 4.21 – Seismic Hazard Information for North Carolina



Source: USGS Earthquake Hazards Program

## SECTION 4: RISK ASSESSMENT

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 earthquake impacts was estimated using data from the NCEM IRISK database, which was compiled in NCEM’s Risk Management Tool.

#### People

Earthquake events in the Northeastern NC 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.

Only a small portion of Martin County equating to 0.1 percent of the Region is estimated to face impacts from a 250-year earthquake. Table 4.27 details the population estimated to be at risk from a 500-year earthquake according to the NCEM IRISK database.

**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
<b>Bertie</b>									
Unincorporated Bertie County	13,731	13,731	100%	2,359	2,359	100%	759	759	100%
Town of Askewville	551	551	100%	95	95	100%	30	30	100%
Town of Aulander	1,055	1,055	100%	181	181	100%	58	58	100%
Town of Colerain	394	394	100%	68	68	100%	22	22	100%
Town of Kelford	248	248	100%	43	43	100%	14	14	100%
Town of Lewiston-Woodville	931	931	100%	160	160	100%	51	51	100%
Town of Powellsville	257	257	100%	44	44	100%	14	14	100%
Town of Roxobel	240	240	100%	41	41	100%	13	13	100%
Town of Windsor	3,877	3,877	100%	666	666	100%	214	214	100%
<b>Subtotal Bertie</b>	<b>21,284</b>	<b>21,284</b>	<b>100%</b>	<b>3657</b>	<b>3657</b>	<b>100%</b>	<b>1175</b>	<b>1175</b>	<b>100%</b>
<b>Hyde</b>									
Unincorporated Hyde County	5,809	1,337	23%	875	201	23%	293	67	22.9%

## SECTION 4: RISK ASSESSMENT

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
<b>Martin</b>									
Unincorporated Martin County	13,965	13,965	100%	2,450	2,450	100%	798	798	100%
Town of Bear Grass	55	55	100%	10	10	100%	3	3	100%
Town of Everetts	164	164	100%	29	29	100%	9	9	100%
Town of Hamilton	390	390	100%	68	68	100%	22	22	100%
Town of Hassell	83	83	100%	15	15	100%	5	5	100%
Town of Jamesville	481	481	100%	84	84	100%	27	27	100%
Town of Oak City	327	327	100%	57	57	100%	19	19	100%
Town of Parmele	229	229	100%	40	40	100%	13	13	100%
Town of Robersonville	1,410	1,410	100%	247	247	100%	81	81	100%
Town of Williamston	7,393	7,393	100%	1,297	1,297	100%	423	423	100%
<b>Subtotal Martin</b>	<b>24,497</b>	<b>24,497</b>	<b>100%</b>	<b>4297</b>	<b>4297</b>	<b>100%</b>	<b>1400</b>	<b>1400</b>	<b>100%</b>
<b>Tyrrell</b>									
Unincorporated Tyrrell County	3,621	1,571	43.4%	610	265	43.4%	191	83	43.5%
Town of Columbia	786	292	37.2%	132	49	37.1%	42	16	38.1%
<b>Subtotal Tyrrell</b>	<b>4,407</b>	<b>1,863</b>	<b>42.3%</b>	<b>742</b>	<b>314</b>	<b>42.3%</b>	<b>233</b>	<b>99</b>	<b>42.5%</b>
<b>Washington</b>									
Unincorporated Washington County	7,168	4,028	56.2%	1,309	735	56.1%	465	261	56.1%
Town of Creswell	461	172	37.3%	84	31	36.9%	30	11	36.7%
Town of Plymouth	4,682	4,682	100%	855	855	100%	303	303	100%
Town of Roper	912	192	21.1%	167	35	21%	59	12	20.3%
<b>Subtotal Washington</b>	<b>13,223</b>	<b>9,074</b>	<b>68.6%</b>	<b>2415</b>	<b>1656</b>	<b>68.6%</b>	<b>857</b>	<b>587</b>	<b>68.5%</b>
<b>Region Total</b>	<b>69,220</b>	<b>58,055</b>	<b>83.9%</b>	<b>11986</b>	<b>10125</b>	<b>84.5%</b>	<b>3958</b>	<b>3328</b>	<b>84.1%</b>

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.

The Northeastern NC Region has not been impacted by an earthquake with more than a moderate intensity, so damage to the built environment is unlikely.

Table 4.28 and Table 4.29 detail the estimated buildings impacted from 500-year and 750-year earthquake events.

**SECTION 4: RISK ASSESSMENT**

**Table 4.28 – 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.8%	\$40,677	1,861	20.6%	\$46,527	144	1.6%	\$12,212	9,040	99.9%	\$99,417
Town of Askeville	425	327	76.9%	\$2,153	87	20.5%	\$1,717	11	2.6%	\$1,228	425	100%	\$5,098
Town of Aulander	675	577	85.5%	\$5,450	84	12.4%	\$8,259	14	2.1%	\$2,094	675	100%	\$15,802
Town of Colerain	377	295	78.2%	\$1,429	69	18.3%	\$2,361	13	3.4%	\$975	377	100%	\$4,765
Town of Kelford	159	141	88.7%	\$1,030	14	8.8%	\$369	4	2.5%	\$286	159	100%	\$1,686
Town of Lewiston-Woodville	685	558	81.5%	\$5,137	111	16.2%	\$13,374	16	2.3%	\$1,008	685	100%	\$19,519
Town of Powellsville	163	143	87.7%	\$902	13	8%	\$526	7	4.3%	\$344	163	100%	\$1,773
Town of Roxobel	205	151	73.7%	\$1,557	50	24.4%	\$3,229	4	2%	\$241	205	100%	\$5,027
Town of Windsor	1,584	1,247	78.7%	\$8,805	278	17.6%	\$23,076	59	3.7%	\$5,134	1,584	100%	\$37,015
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.6%</b>	<b>\$67,140</b>	<b>2,567</b>	<b>19.3%</b>	<b>\$99,438</b>	<b>272</b>	<b>2%</b>	<b>\$23,522</b>	<b>13,313</b>	<b>99.9%</b>	<b>\$190,102</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	985	18.9%	\$2,733	729	14%	\$8,142	85	1.6%	\$12,865	1,799	34.4%	\$23,739
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.1%	\$73,964	3,226	31.2%	\$158,823	168	1.6%	\$33,611	10,320	99.9%	\$266,397
Town of Bear Grass	69	51	73.9%	\$516	6	8.7%	\$518	12	17.4%	\$2,558	69	100%	\$3,592
Town of Everetts	145	138	95.2%	\$1,335	7	4.8%	\$987	0	0%	\$0	145	100%	\$2,322
Town of Hamilton	273	215	78.8%	\$2,202	26	9.5%	\$2,247	31	11.4%	\$3,158	272	99.6%	\$7,607
Town of Hassell	65	54	83.1%	\$553	11	16.9%	\$749	0	0%	\$0	65	100%	\$1,302
Town of Jamesville	276	210	76.1%	\$1,572	41	14.9%	\$6,642	21	7.6%	\$2,451	272	98.6%	\$10,665
Town of Oak City	287	276	96.2%	\$3,315	10	3.5%	\$777	1	0.3%	\$501	287	100%	\$4,594
Town of Parmele	137	120	87.6%	\$1,417	16	11.7%	\$1,731	1	0.7%	\$36	137	100%	\$3,183
Town of Robersonville	851	737	86.6%	\$13,048	104	12.2%	\$21,650	10	1.2%	\$1,989	851	100%	\$36,687
Town of Williamston	3,900	2,843	72.9%	\$28,643	817	20.9%	\$151,219	232	5.9%	\$54,953	3,892	99.8%	\$234,815
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.8%</b>	<b>\$126,565</b>	<b>4,264</b>	<b>26.1%</b>	<b>\$345,343</b>	<b>476</b>	<b>2.9%</b>	<b>\$99,257</b>	<b>16,310</b>	<b>99.9%</b>	<b>\$571,164</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	899	34.2%	\$4,117	506	19.2%	\$4,746	38	1.4%	\$4,146	1,443	54.8%	\$13,009
Town of Columbia	512	151	29.5%	\$642	61	11.9%	\$2,108	27	5.3%	\$1,745	239	46.7%	\$4,496
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>1,050</b>	<b>33.4%</b>	<b>\$4,759</b>	<b>567</b>	<b>18%</b>	<b>\$6,854</b>	<b>65</b>	<b>2.1%</b>	<b>\$5,891</b>	<b>1,682</b>	<b>53.5%</b>	<b>\$17,505</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	2,142	40.6%	\$6,584	1,372	26%	\$11,168	69	1.3%	\$3,218	3,583	68%	\$20,970
Town of Creswell	365	102	27.9%	\$417	66	18.1%	\$1,057	19	5.2%	\$1,666	187	51.2%	\$3,141
Town of Plymouth	2,657	2,235	84.1%	\$5,544	321	12.1%	\$15,377	100	3.8%	\$5,778	2,656	100%	\$26,699
Town of Roper	578	100	17.3%	\$570	78	13.5%	\$1,482	18	3.1%	\$1,229	196	33.9%	\$3,281
<b>Subtotal Washington</b>	<b>8,871</b>	<b>4,579</b>	<b>51.6%</b>	<b>\$13,115</b>	<b>1,837</b>	<b>20.7%</b>	<b>\$29,084</b>	<b>206</b>	<b>2.3%</b>	<b>\$11,891</b>	<b>6,622</b>	<b>74.6%</b>	<b>\$54,091</b>
<b>Region Total</b>	<b>46,891</b>	<b>28,658</b>	<b>61.1%</b>	<b>\$214,312</b>	<b>9,964</b>	<b>21.2%</b>	<b>\$488,861</b>	<b>1,104</b>	<b>2.4%</b>	<b>\$153,426</b>	<b>39,726</b>	<b>84.7%</b>	<b>\$856,601</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.29 – Estimated Buildings Impacted by 750-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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.8%	\$149,173	1,861	20.6%	\$137,293	144	1.6%	\$38,562	9,040	99.9%	\$325,028
Town of Askeville	425	327	76.9%	\$7,219	87	20.5%	\$4,770	11	2.6%	\$3,717	425	100%	\$15,705
Town of Aulander	675	577	85.5%	\$16,249	84	12.4%	\$21,119	14	2.1%	\$4,657	675	100%	\$42,025
Town of Colerain	377	295	78.2%	\$6,621	69	18.3%	\$6,339	13	3.4%	\$3,119	377	100%	\$16,079
Town of Kelford	159	141	88.7%	\$3,086	14	8.8%	\$1,000	4	2.5%	\$861	159	100%	\$4,947
Town of Lewiston-Woodville	685	558	81.5%	\$15,562	111	16.2%	\$34,760	16	2.3%	\$3,031	685	100%	\$53,354
Town of Powellsville	163	143	87.7%	\$3,233	13	8%	\$1,459	7	4.3%	\$1,334	163	100%	\$6,026
Town of Roxobel	205	151	73.7%	\$4,582	50	24.4%	\$8,197	4	2%	\$687	205	100%	\$13,466
Town of Windsor	1,584	1,247	78.7%	\$30,005	278	17.6%	\$63,198	59	3.7%	\$15,332	1,584	100%	\$108,536
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.6%</b>	<b>\$235,730</b>	<b>2,567</b>	<b>19.3%</b>	<b>\$278,135</b>	<b>272</b>	<b>2%</b>	<b>\$71,300</b>	<b>13,313</b>	<b>99.9%</b>	<b>\$585,166</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,318	82.6%	\$48,078	774	14.8%	\$38,839	123	2.4%	\$38,463	5,215	99.8%	\$125,380
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.1%	\$243,167	3,227	31.2%	\$460,973	168	1.6%	\$100,017	10,321	99.9%	\$804,156
Town of Bear Grass	69	51	73.9%	\$1,583	6	8.7%	\$1,502	12	17.4%	\$6,806	69	100%	\$9,891
Town of Everetts	145	138	95.2%	\$4,265	7	4.8%	\$2,455	0	0%	\$0	145	100%	\$6,720
Town of Hamilton	273	215	78.8%	\$6,356	26	9.5%	\$6,545	31	11.4%	\$10,325	272	99.6%	\$23,227
Town of Hassell	65	54	83.1%	\$1,542	11	16.9%	\$2,134	0	0%	\$0	65	100%	\$3,676
Town of Jamesville	276	210	76.1%	\$6,151	41	14.9%	\$18,691	21	7.6%	\$6,670	272	98.6%	\$31,512
Town of Oak City	287	276	96.2%	\$9,206	10	3.5%	\$2,083	1	0.3%	\$1,598	287	100%	\$12,887
Town of Parmele	137	120	87.6%	\$3,949	16	11.7%	\$4,846	1	0.7%	\$200	137	100%	\$8,994
Town of Robersonville	851	737	86.6%	\$38,776	104	12.2%	\$60,823	10	1.2%	\$5,825	851	100%	\$105,424
Town of Williamston	3,900	2,843	72.9%	\$97,935	818	21%	\$409,225	232	5.9%	\$155,508	3,893	99.8%	\$662,667
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.8%</b>	<b>\$412,930</b>	<b>4,266</b>	<b>26.1%</b>	<b>\$969,277</b>	<b>476</b>	<b>2.9%</b>	<b>\$286,949</b>	<b>16,312</b>	<b>99.9%</b>	<b>\$1,669,154</b>

## SECTION 4: RISK ASSESSMENT

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,073	78.8%	\$34,189	510	19.4%	\$20,101	49	1.9%	\$18,377	2,632	100%	\$72,667
Town of Columbia	512	408	79.7%	\$6,326	66	12.9%	\$8,274	38	7.4%	\$7,733	512	100%	\$22,332
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,481</b>	<b>78.9%</b>	<b>\$40,515</b>	<b>576</b>	<b>18.3%</b>	<b>\$28,375</b>	<b>87</b>	<b>2.8%</b>	<b>\$26,110</b>	<b>3,144</b>	<b>100%</b>	<b>\$94,999</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,813	72.3%	\$56,768	1,373	26%	\$43,982	77	1.5%	\$11,362	5,263	99.8%	\$112,112
Town of Creswell	365	274	75.1%	\$3,629	68	18.6%	\$4,320	22	6%	\$5,319	364	99.7%	\$13,268
Town of Plymouth	2,657	2,235	84.1%	\$37,289	321	12.1%	\$48,747	100	3.8%	\$18,564	2,656	100%	\$104,600
Town of Roper	578	473	81.8%	\$6,162	79	13.7%	\$5,091	21	3.6%	\$4,322	573	99.1%	\$15,575
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,795</b>	<b>76.6%</b>	<b>\$103,848</b>	<b>1,841</b>	<b>20.8%</b>	<b>\$102,140</b>	<b>220</b>	<b>2.5%</b>	<b>\$39,567</b>	<b>8,856</b>	<b>99.8%</b>	<b>\$245,555</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,638</b>	<b>76%</b>	<b>\$841,101</b>	<b>10,024</b>	<b>21.4%</b>	<b>\$1,416,766</b>	<b>1,178</b>	<b>2.5%</b>	<b>\$462,389</b>	<b>46,840</b>	<b>99.9%</b>	<b>\$2,720,254</b>

Source: NCEM Risk Management Tool

## SECTION 4: RISK ASSESSMENT

### Environment

An earthquake is unlikely to cause substantial impacts to the natural environment in the Northeastern NC 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.

### Hazard Summary by Jurisdiction

The following table summarizes earthquake hazard risk by jurisdiction. Earthquake risk is uniform across the planning area.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	1	1	4	4	1	1.9	L
Town of Askeville	1	1	4	4	1	1.9	L
Town of Aulander	1	1	4	4	1	1.9	L
Town of Colerain	1	1	4	4	1	1.9	L
Town of Kelford	1	1	4	4	1	1.9	L
Town of Lewiston-Woodville	1	1	4	4	1	1.9	L
Town of Powellsville	1	1	4	4	1	1.9	L
Town of Roxobel	1	1	4	4	1	1.9	L
Town of Windsor	1	1	4	4	1	1.9	L
Hyde County	1	1	4	4	1	1.9	L
Martin County	1	1	4	4	1	1.9	L
Town of Bear Grass	1	1	4	4	1	1.9	L
Town of Everetts	1	1	4	4	1	1.9	L
Town of Hamilton	1	1	4	4	1	1.9	L
Town of Hassell	1	1	4	4	1	1.9	L
Town of Jamesville	1	1	4	4	1	1.9	L
Town of Oak City	1	1	4	4	1	1.9	L

## SECTION 4: RISK ASSESSMENT

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Town of Parmele	1	1	4	4	1	1.9	L
Town of Robersonville	1	1	4	4	1	1.9	L
Town of Williamston	1	1	4	4	1	1.9	L
Tyrrell County	1	1	4	4	1	1.9	L
Town of Columbia	1	1	4	4	1	1.9	L
Washington County	1	1	4	4	1	1.9	L
Town of Creswell	1	1	4	4	1	1.9	L
Town of Plymouth	1	1	4	4	1	1.9	L
Town of Roper	1	1	4	4	1	1.9	L

### 4.5.5 Extreme Heat

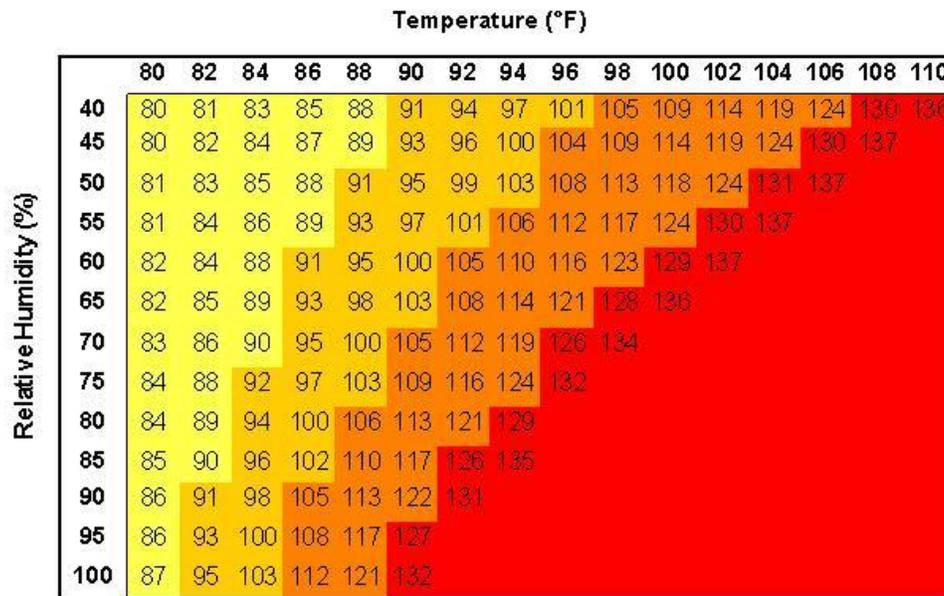
#### Hazard Background

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



**Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity**

- Caution
- Extreme Caution
- Danger
- Extreme Danger

Source: National Weather Service (NWS) [http://www.nws.noaa.gov/os/heat/heat\\_index.shtml](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 or asthma, 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

## SECTION 4: RISK ASSESSMENT

individuals are susceptible if they participate in strenuous physical activities during hot weather or are not acclimated to hot weather. Table 4.31 lists typical symptoms and health impacts of exposure to extreme heat.

**Table 4.31 – 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](http://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

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

### Extent

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

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

*Impact: 3 – Critical*

*Spatial Extent: 4 – Large*

### Historical Occurrences

According to NOAA, 2017 was North Carolina’s hottest year on record; that record stretches back 123 years to 1895.

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The following two heat-related incidents were reported by NCEI both in Bertie County; these incidents caused no injuries, fatalities, property damage, or crop damage:

**July 21, 2011:** An extended period of excessive heat and humidity occurred across most of northeast North Carolina from July 21st to July 23rd. High temperatures ranged from 96 to 103 degrees during the afternoons, with heat index values ranging from 110 to 119. Overnight lows only fell into the lower 70s to lower 80s.

**July 5, 2012:** High Pressure centered just to the west of the Middle Atlantic Region produced hot and humid weather over northeast North Carolina from July 5th through July 8th. High temperatures ranged from the mid-90s to lower 100s, and low temperatures ranged from the mid-70s to lower 80s across the area.

Heat index records maintained by the North Carolina Climate Office were unavailable for the Northeast NC Region. Records from the Northeast Regional Climate Center from climate stations in Williamston, Lewiston, and Plymouth indicate that the region averaged approximately 9.8 days per year with a maximum temperature at or above 95-degrees Fahrenheit between 1999-2018. This source does not record heat indexes, but it can be assumed that many of these days' heat indexes exceeded the threshold for a heat advisory given the prevailing humidity levels of the region.

**Table 4.32 – Daily Max Temperature, Northeast NC Region, 1999-2018**

Year	Williamston		Lewiston		Plymouth	
	95°F +	100°F+	95°F +	100°F+	95°F +	100°F+
1999	15	1	18	1	23	1
2000	1	0	5	0	6	0
2001	3	0	4	0	5	0
2002	19	1	44	7	18	1
2003	5	0	4	0	0	0
2004	0	0	4	0	0	0
2005	6	1	8	0	5	0
2006	4	0	9	0	3	0
2007	11	2	30	5	8	2
2008	13	1	17	3	12	1
2009	1	0	7	0	2	0
2010	17	1	42	9	26	4
2011	16	1	30	6	22	3
2012	11	3	16	6	11	3
2013	1	0	3	0	2	0
2014	1	0	2	0	3	0
2015	10	0	17	1	11	0
2016	8	0	7	0	9	0
2017	2	0	3	0	0	0
2018	1	0	3	0	3	0
<b>Sum</b>	<b>145</b>	<b>11</b>	<b>273</b>	<b>38</b>	<b>169</b>	<b>15</b>
<b>Average</b>	<b>7.25</b>	<b>0.55</b>	<b>13.65</b>	<b>1.9</b>	<b>8.45</b>	<b>0.75</b>

Source: Northeast Regional Climate Center, CLIMOD 2 Tool

According to this data, the Region averages between 7.25 and 13.65 days per year with maximum temperatures exceeding 95°F.

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### Probability of Future Occurrence

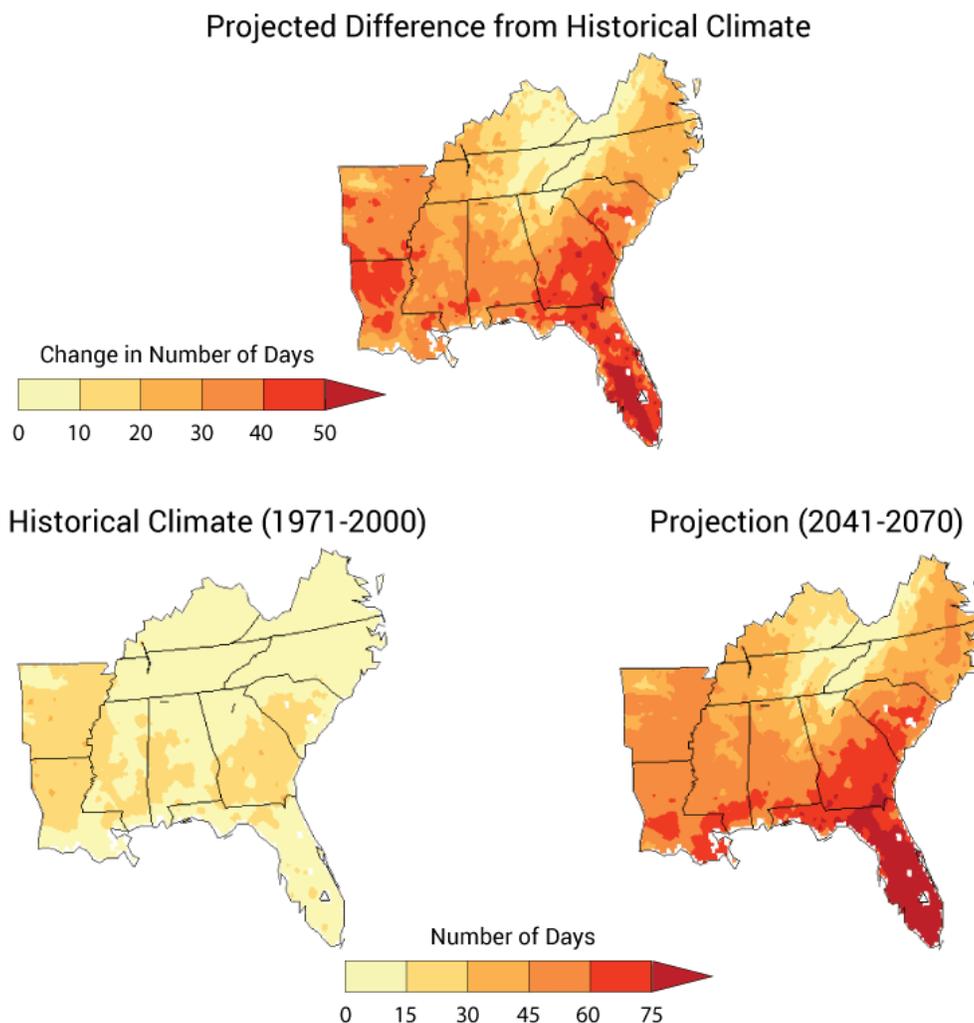
Data was gathered from the Northeast Regional Climate Center’s CLIMOD Tool from weather stations in Williamston, Lewiston, and Plymouth. Based on 20 years of data, these weather stations averaged 9.8 days per year with max temperatures of 95°F or greater. There were at least four days each year where temperatures reached this threshold. Additionally, on average, the region saw 1.1 days per year where maximum temperatures reached 100°F or greater.

*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 Northeastern 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 10 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

## SECTION 4: RISK 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, people who work outdoors and/or do strenuous labor, people with chronic health problems such as heart disease or asthma, people who are obese, and people who are on certain medications, such as tranquilizers, antidepressants, sleeping pills, or drugs for Parkinson's disease are also more vulnerable to extreme heat.

#### Property

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

Extreme heat can also cause significant agricultural losses. Between 2007-2017, the sum of claims paid for crop damage due to heat in the Northeastern NC Region was \$2,748,682.25, or an average of \$249,880.20 in losses every year. Losses were greatest in 2010. Table 4.33 through Table 4.37 summarize the crop losses due to drought in reported in the RMA system.

**Table 4.33 – Crop Losses Resulting from Heat, Bertie County, 2007-2017**

Year	Determined Acres	Indemnity Amount
2008	20.92	\$5,350.00
2010	839.82	\$143,829.00
2011	141.27	\$32,249.00
2012	1,890.29	\$172,999.00
2015	602.47	\$110,972.50
2016	637.03	\$236,866.90
2017	95.92	\$37,449.45
<b>Total</b>	<b>4,227.72</b>	<b>\$739,715.85</b>

Source: USDA Risk Management Agency

**Table 4.34 – Crop Losses Resulting from Heat, Hyde County, 2007-2017**

Year	Determined Acres	Indemnity Amount
2008	167.50	\$58,609.00
2010	1,432.91	\$194,170.00
2011	34.10	\$18,140.00
2015	270.08	\$54,862.20
<b>Total</b>	<b>1,904.59</b>	<b>\$325,781.20</b>

Source: USDA Risk Management Agency

**Table 4.35 – Crop Losses Resulting from Heat, Martin County, 2007-2017**

Year	Determined Acres	Indemnity Amount
2008	64.45	\$21,811.00
2010	896.80	\$222,938.00

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Year	Determined Acres	Indemnity Amount
2011	45.11	\$14,468.00
2012	239.81	\$32,644.00
2015	70.15	\$12,445.50
2016	114.08	\$15,460.00
2017	79.80	\$13,475.50
<b>Total</b>	<b>1,510.19</b>	<b>\$333,242.00</b>

Source: USDA Risk Management Agency

**Table 4.36 – Crop Losses Resulting from Heat, Tyrrell County, 2007-2017**

Year	Determined Acres	Indemnity Amount
2007	128.00	\$28,530.00
2010	131.68	\$28,040.00
2011	815.23	\$88,662.00
2012	127.00	\$140,633.00
2014	101.12	\$45,336.90
2015	298.00	\$80,127.00
<b>Total</b>	<b>1,601.03</b>	<b>\$411,328.90</b>

Source: USDA Risk Management Agency

**Table 4.37 – Crop Losses Resulting from Heat, Washington County, 2007-2017**

Year	Determined Acres	Indemnity Amount
2007	139.98	\$18,276.00
2010	3,084.99	\$594,227.00
2011	316.16	\$77,293.00
2012	265.90	\$99,698.00
2014	137.20	\$137,505.00
2015	44.50	\$1,290.50
2016	33.75	\$10,324.80
<b>Total</b>	<b>4,022.48</b>	<b>\$938,614.30</b>

Source: USDA Risk Management Agency

### Environment

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

### Consequence Analysis

Table 4.38 summarizes the potential negative consequences of extreme heat.

**Table 4.38 – 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.

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Category	Consequences
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.

### Hazard Summary by Jurisdiction

The following table summarizes extreme heat hazard risk by jurisdiction. Extreme heat risk does not vary significantly by jurisdiction; however, potential impact is greater in Bertie and Washington County where agricultural vulnerability is greater.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	4	3	4	1	3	3.3	H
Town of Askeville	4	2	4	1	3	3.0	H
Town of Aulander	4	2	4	1	3	3.0	H
Town of Colerain	4	2	4	1	3	3.0	H
Town of Kelford	4	2	4	1	3	3.0	H
Town of Lewiston-Woodville	4	2	4	1	3	3.0	H
Town of Powellsville	4	2	4	1	3	3.0	H
Town of Roxobel	4	2	4	1	3	3.0	H
Town of Windsor	4	2	4	1	3	3.0	H
Hyde County	4	2	4	1	3	3.0	H
Martin County	4	2	4	1	3	3.0	H
Town of Bear Grass	4	2	4	1	3	3.0	H
Town of Everetts	4	2	4	1	3	3.0	H
Town of Hamilton	4	2	4	1	3	3.0	H
Town of Hassell	4	2	4	1	3	3.0	H
Town of Jamesville	4	2	4	1	3	3.0	H
Town of Oak City	4	2	4	1	3	3.0	H
Town of Parmele	4	2	4	1	3	3.0	H
Town of Robersonville	4	2	4	1	3	3.0	H
Town of Williamston	4	2	4	1	3	3.0	H
Tyrrell County	4	2	4	1	3	3.0	H
Town of Columbia	4	2	4	1	3	3.0	H
Washington County	4	3	4	1	3	3.3	H
Town of Creswell	4	2	4	1	3	3.0	H
Town of Plymouth	4	2	4	1	3	3.0	H
Town of Roper	4	2	4	1	3	3.0	H

### 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.

Flooding is the most frequent and costly of all natural hazards in the United States, and has caused more than 10,000 death(s) since 1900. Approximately 90 percent of presidentially declared disasters result from flood-related natural hazard events. Taken as a whole, more frequent, localized flooding problems that do not meet federal disaster declaration thresholds ultimately cause the majority of damages across the United States.

#### Sources and Types of Flooding

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

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

- ▶ **Bertie County:** Cashie River and its tributaries, Cashie Swamp, Chiska Creek, Cricket Swamp, Eastmost Swamp and its tributaries, Jacks Branch, and Salmon Creek and its tributaries.
- ▶ **Hyde County:** Pungo River Canal
- ▶ **Martin County:** Roanoke River and tributaries, Conoho Creek and tributaries, Ross Swamp, Huskanaw Swamp, Hardison Mill Creek and tributaries, Smithwick Creek, Sweetwater Creek, and other small streams
- ▶ **Tyrrell County:** coastal flood sources only
- ▶ **Washington County:** Welch Creek, Conaby Creek and its tributary, Kendrick Creek, Beaver Dam Branch and its tributary, and Welch Creek Tributary.

The above-listed 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.

Although only coastal flood sources are evaluated for Tyrrell County's Flood Insurance Study, the county is also vulnerable to flooding as a result of heavy rainfall over land. Riverine flooding can affect all of the Northeastern NC Region. For example, riverine flooding was present in all counties in the Region, save Tyrrell county, following Hurricane Matthew, per each county's unique Resilient Redevelopment Plan. In Martin county, for example, the Roanoke River reached an elevation of 11.61 feet at Williamston. Hurricane Matthew brought with it a significant amount of rainfall, which caused or contributed to flood levels in the Region.

**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.

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

- ▶ **Bertie County:** Surge propagates into the Albemarle Sound, which further propagates into the Batchelor Bay, Black Walnut Swamp, the Chowan River, Salmon Creek, and the Roanoke River.
- ▶ **Hyde County:** Surge propagates into the Pamlico Sound and further propagates into the Pamlico River, Lake Mattamuskeet, and a multitude of small watercourses where high winds associated with tropical storms can produce high waves.
- ▶ **Tyrrell County:** Surge propagates into the Albemarle Sound and propagates further into the coastal waterways.
- ▶ **Washington County:** Surge propagates into Pamlico Sound and Albemarle Sound, which further propagates into Maw Creek, Roanoke River, Scuppernong River, and Welch Creek.

**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.

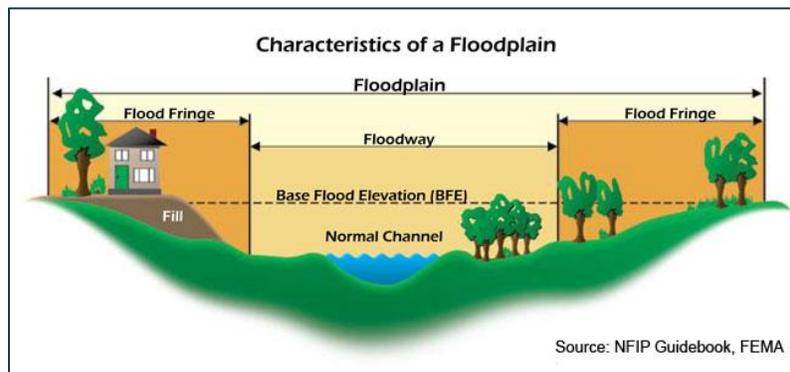
Localized flooding may be caused by the following issues:

- ▶ **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 1%-annual-chance 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.

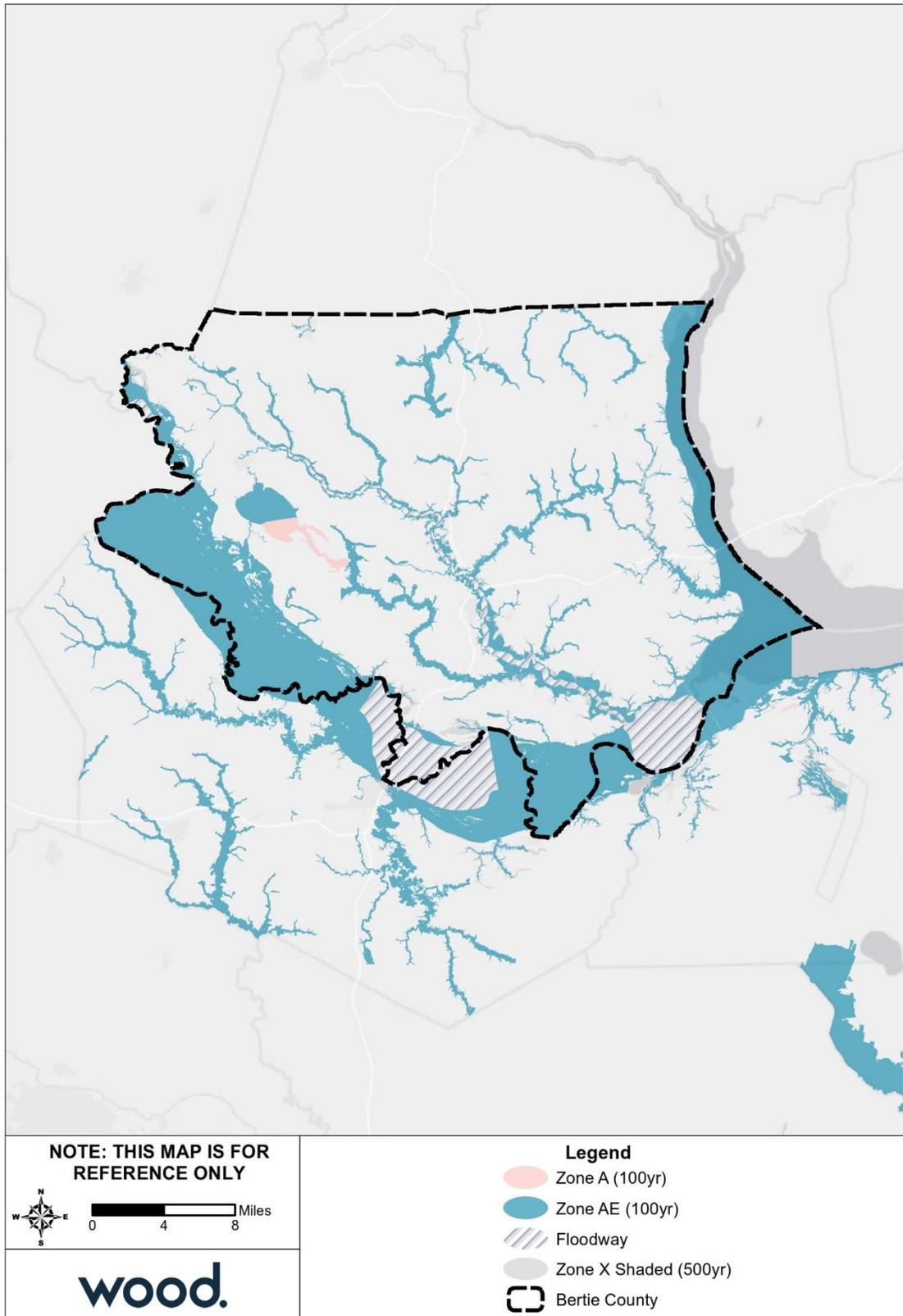
*Warning Time: 3 – 6 to 12 hours*

*Duration: 3 – Less than one week*

#### Location

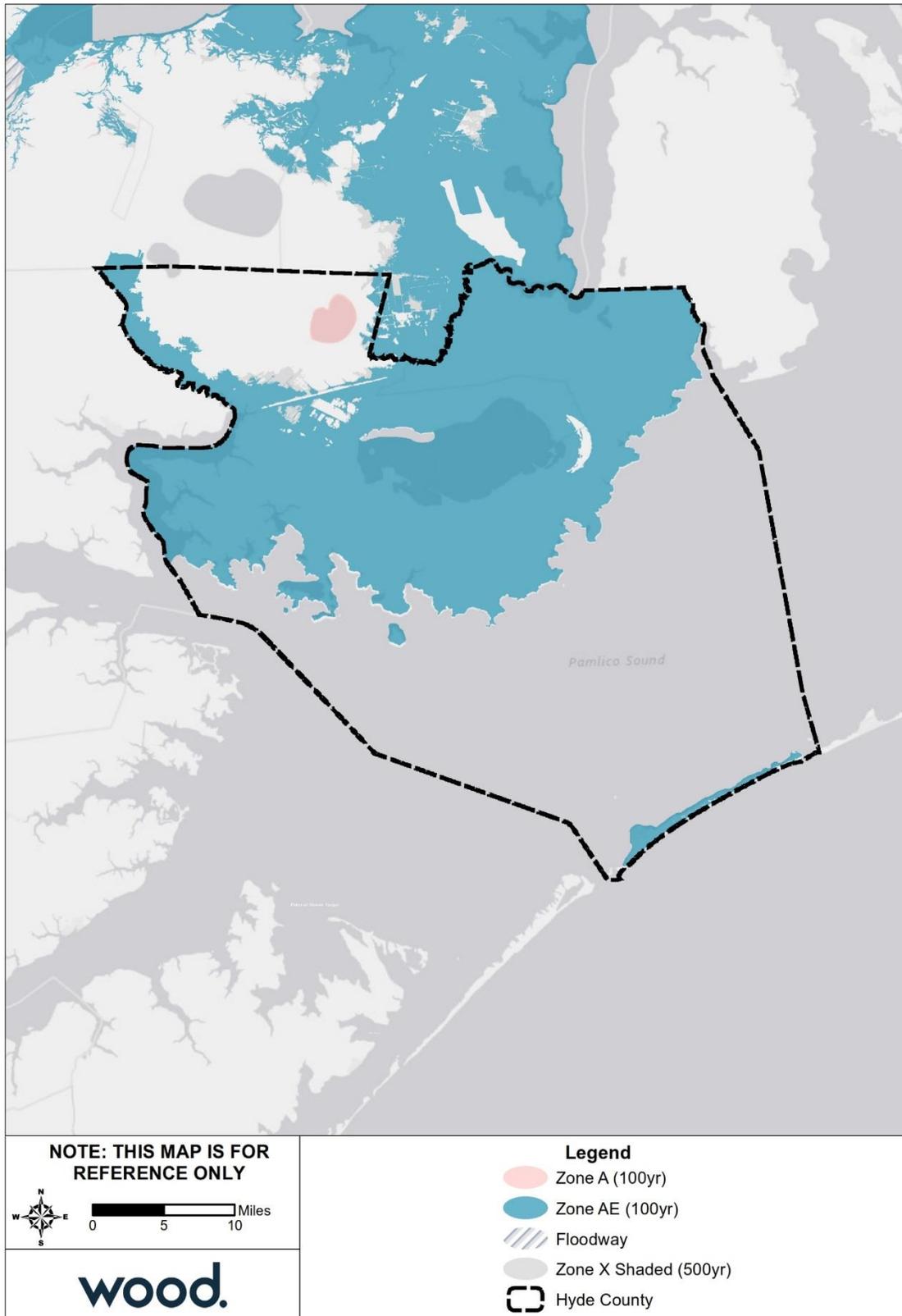
Figure 4.25 to Figure 4.29 reflect the effective mapped flood insurance zones by county for the Northeastern NC Region.

Figure 4.25 – FEMA Flood Hazard Areas in Bertie County



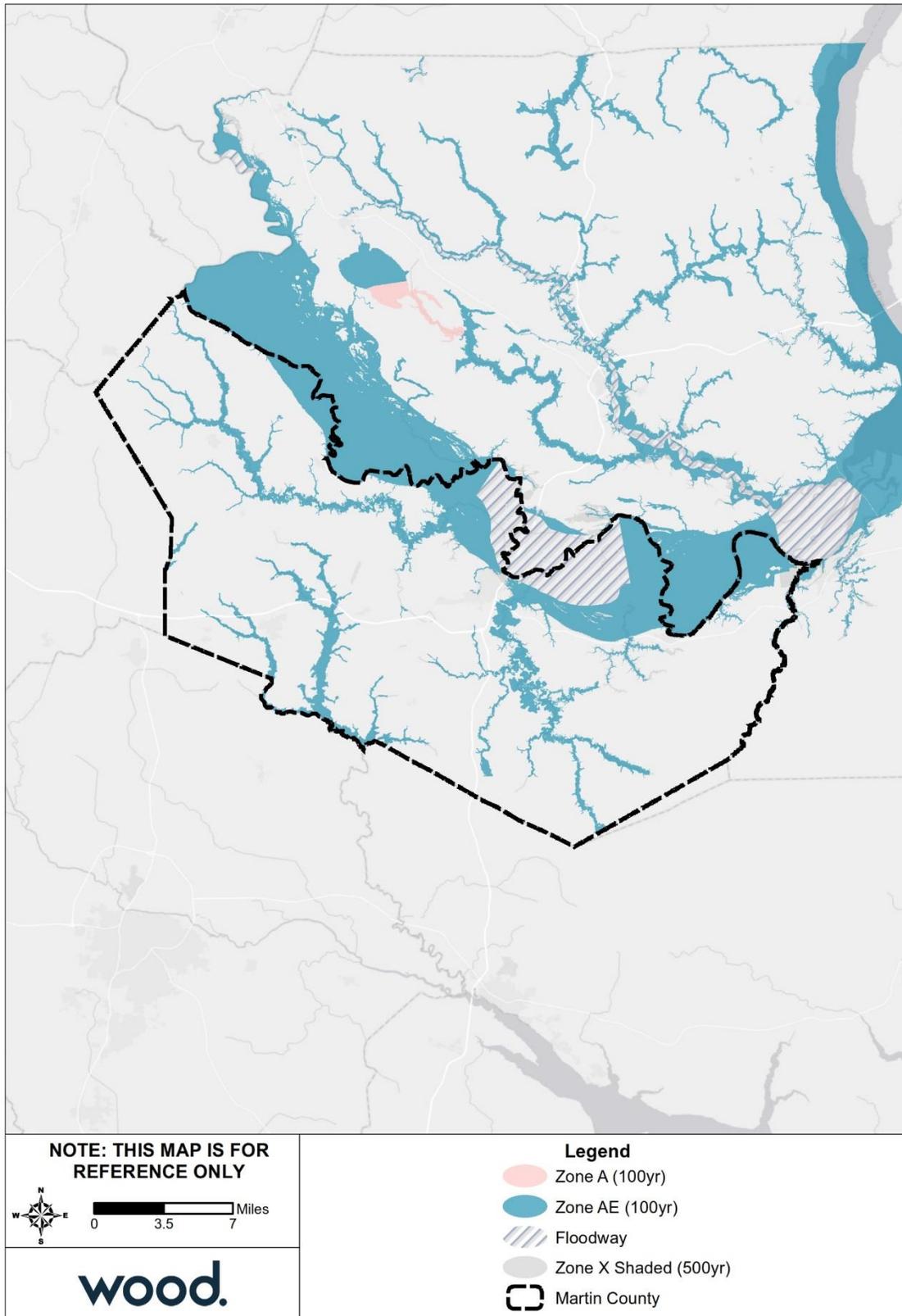
Source: FEMA 2009 Effective DFIRM

Figure 4.26 – FEMA Flood Hazard Areas in Hyde County



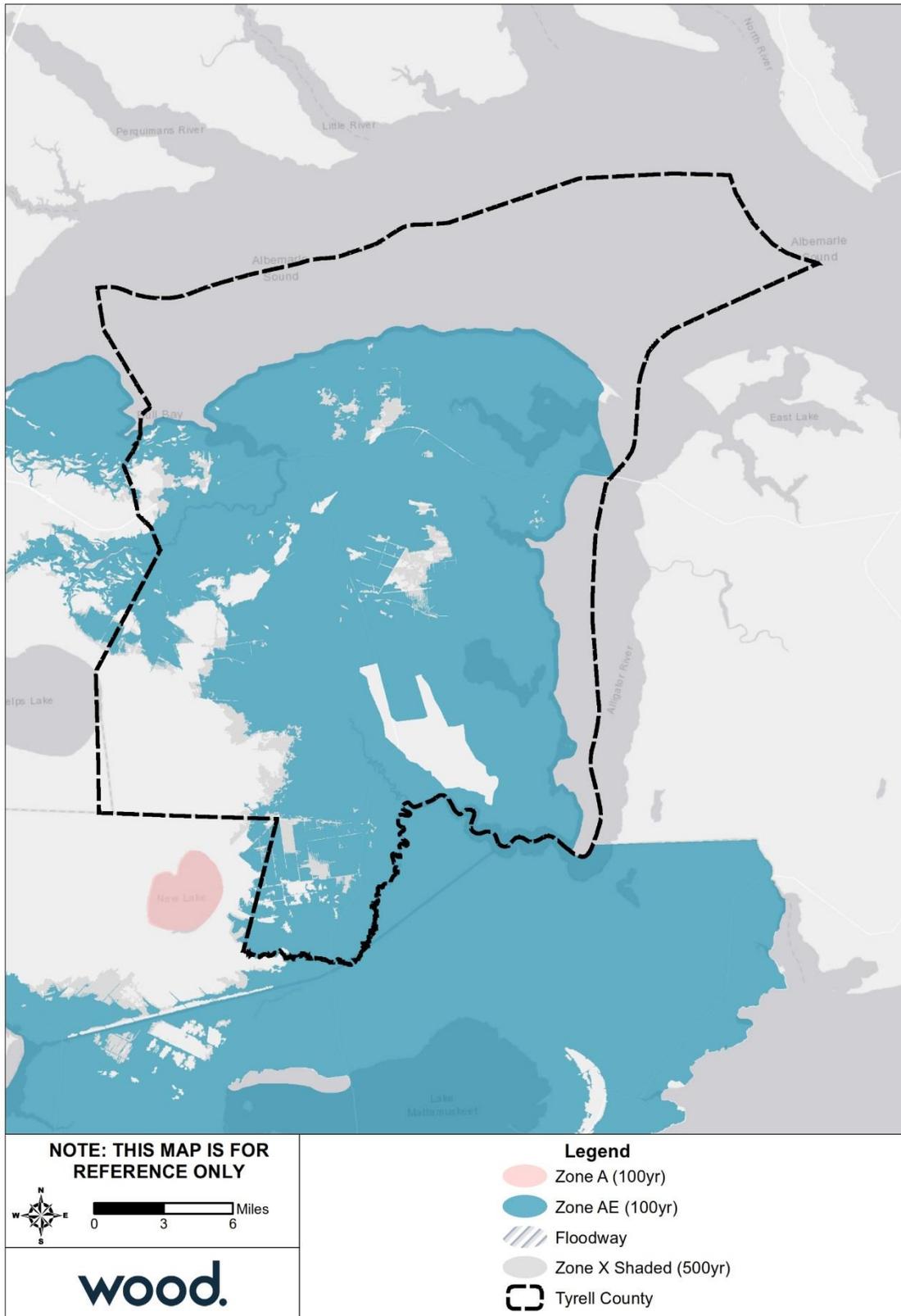
Source: FEMA 2009 Effective DFIRM

Figure 4.27 – FEMA Flood Hazard Areas in Martin County



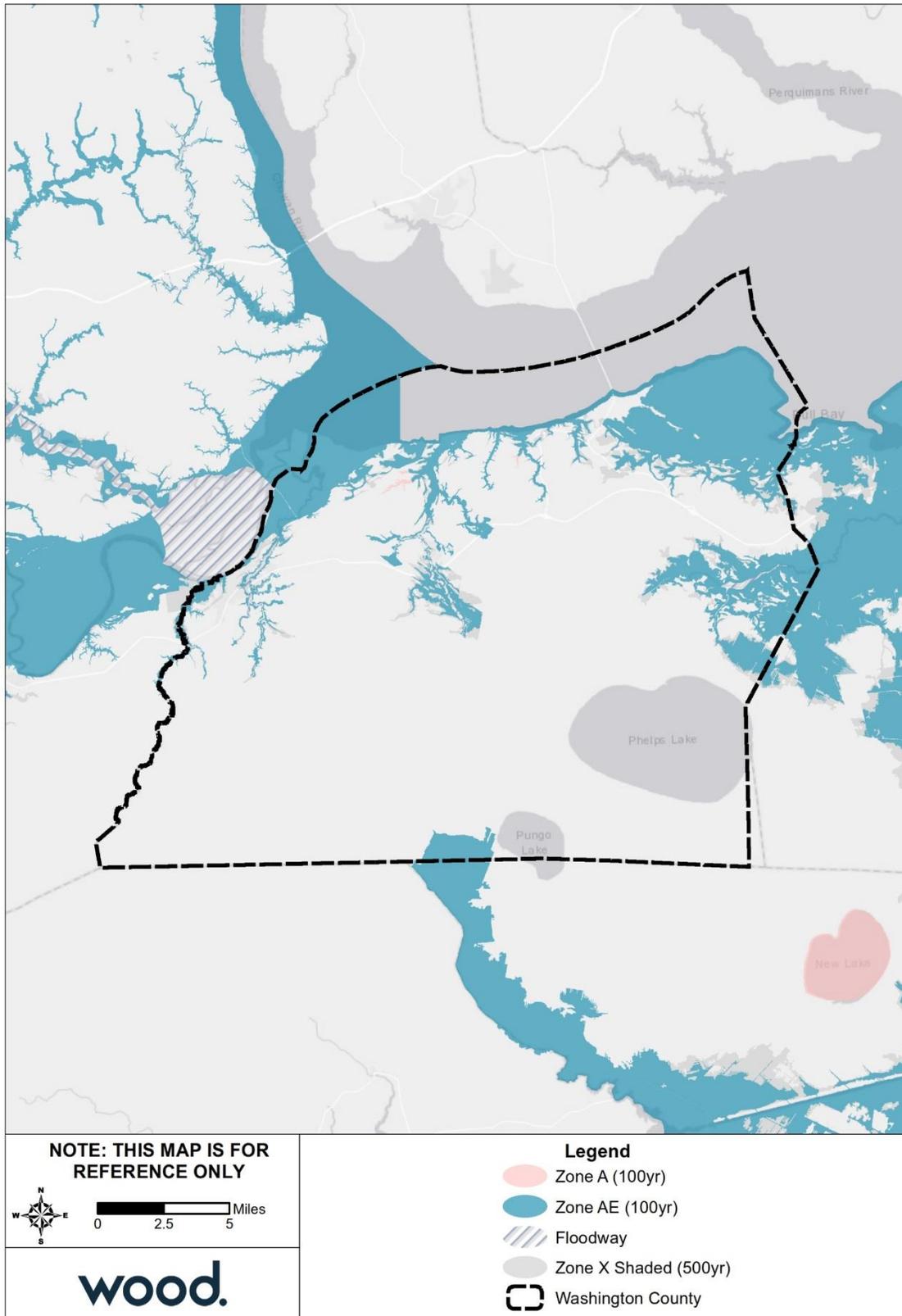
Source: FEMA 2009 Effective DFIRM

Figure 4.28 – FEMA Flood Hazard Areas in Tyrrell County



Source: FEMA 2009 Effective DFIRM

Figure 4.29 – FEMA Flood Hazard Areas in Washington County



Source: FEMA 2009 Effective DFIRM

## SECTION 4: RISK ASSESSMENT

### 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 Northeastern NC Region using the Effective FIRMs, dated May 2, 2006. Table 4.39 summarizes the flood insurance zones identified by the Digital FIRM (DFIRM).

**Table 4.39 – Mapped Flood Insurance Zones within Northeastern NC Region**

Zone	Description
<b>A</b>	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.
<b>AE</b>	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.
<b>VE</b>	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
<b>0.2% Annual Chance (Shaded Zone X)</b>	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.)
<b>Zone X (Unshaded)</b>	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.

Approximately 36.4% of the Northeastern NC Region within the SFHA. Table 4.40 below summarizes acreage of the each county's total area by flood zone on the effective DFIRM. Figure 4.30 through Figure 4.34 shows the depth of flooding predicted from a 1% annual chance flood.

**Table 4.40 – Flood Zone Acreage in Northeastern NC Region County**

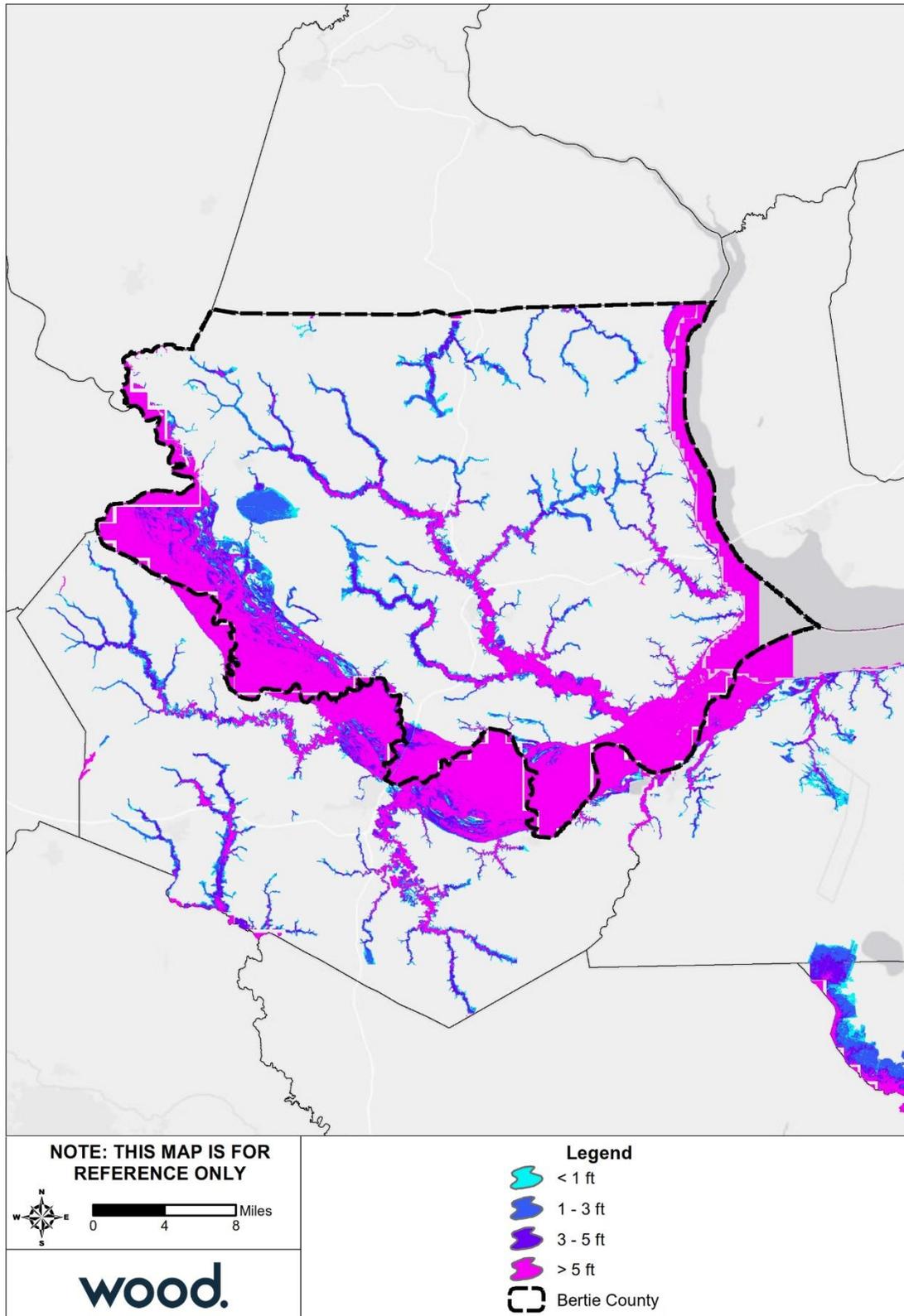
Flood Zone	Acreage	Percent of Total (%)
<b>Bertie County</b>		
Zone A	2,146.47	0.45
Zone AE	139,417.01	29.39

**SECTION 4: RISK ASSESSMENT**

<b>Flood Zone</b>	<b>Acreage</b>	<b>Percent of Total (%)</b>
Zone X (500-year)	4,869.20	1.03
Zone X Unshaded	327,967.68	69.13
<b>Subtotal</b>	<b>474,400.36</b>	<b>--</b>
<b>Hyde County</b>		
Zone A	5,360.92	0.60
Zone AE	374,945.77	41.94
Zone VE	30,496.22	3.41
Zone X (500-year)	5,317.39	0.59
Zone X Unshaded	71,216.76	7.97
Open Water	406,570.44	45.48
<b>Subtotal</b>	<b>893,907.49</b>	<b>--</b>
<b>Martin County</b>		
Zone AE	63,485.36	21.72
Zone X (500-year)	1,837.26	0.63
Zone X Unshaded	226,929.68	77.65
<b>Subtotal</b>	<b>292,252.30</b>	<b>--</b>
<b>Tyrrell County</b>		
Zone AE	214,173.90	55.58
Zone X (500-year)	12,107.74	3.14
Zone X Unshaded	42,171.34	10.94
Open Water	116,914.69	30.34
<b>Subtotal</b>	<b>385,367.68</b>	<b>--</b>
<b>Washington County</b>		
Zone A	140.26	0.05
Zone AE	43,226.44	16.04
Zone X (500-year)	6,645.31	2.47
Zone X Unshaded	199,240.79	73.95
Open Water	20,171.22	7.49
<b>Subtotal</b>	<b>269,424.02</b>	<b>--</b>
<b>Northeastern NC Region</b>		
Zone A	7,647.65	0.33
Zone AE	835,248.48	36.07
Zone VE	30,496.22	1.32
Zone X (500-year)	30,776.90	1.33
Zone X Unshaded	867,526.25	37.47
Open Water	543,656.35	23.48
<b>Total</b>	<b>2,315,351.85</b>	<b>--</b>

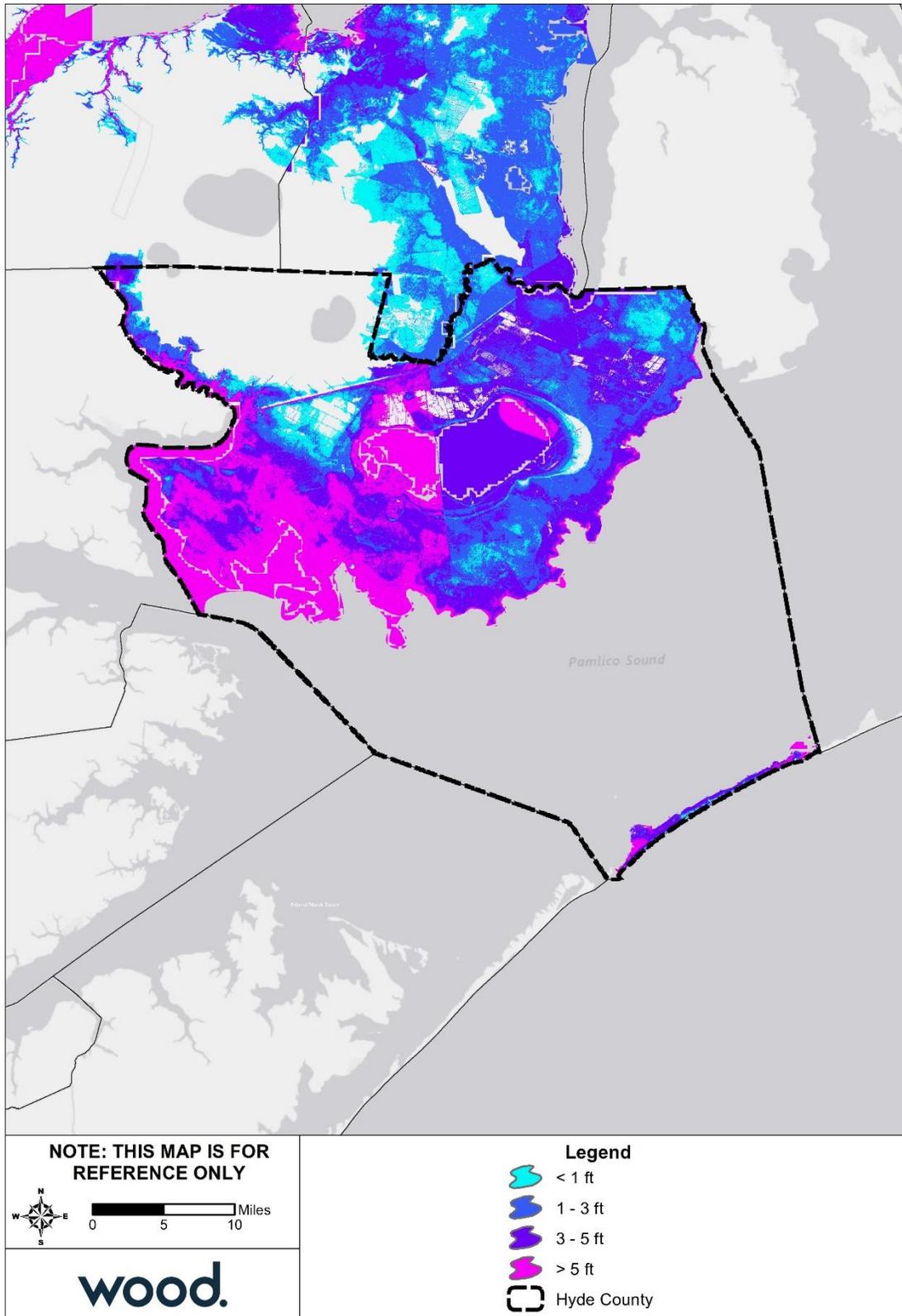
Source: FEMA Effective DFIRM

Figure 4.30 – Flood Depth, 100-Year Floodplain, Bertie County



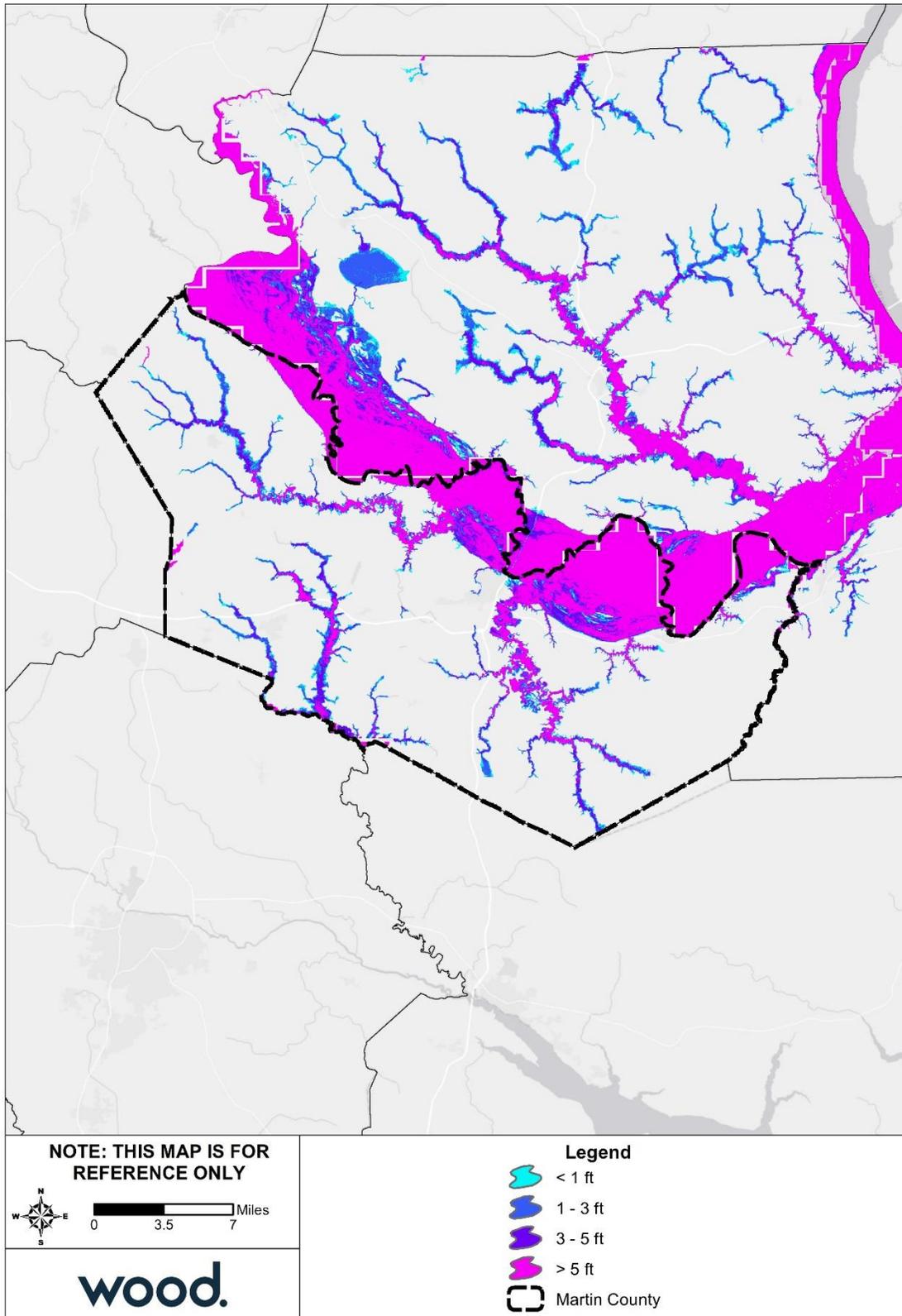
Source: FEMA Effective DFIRM

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



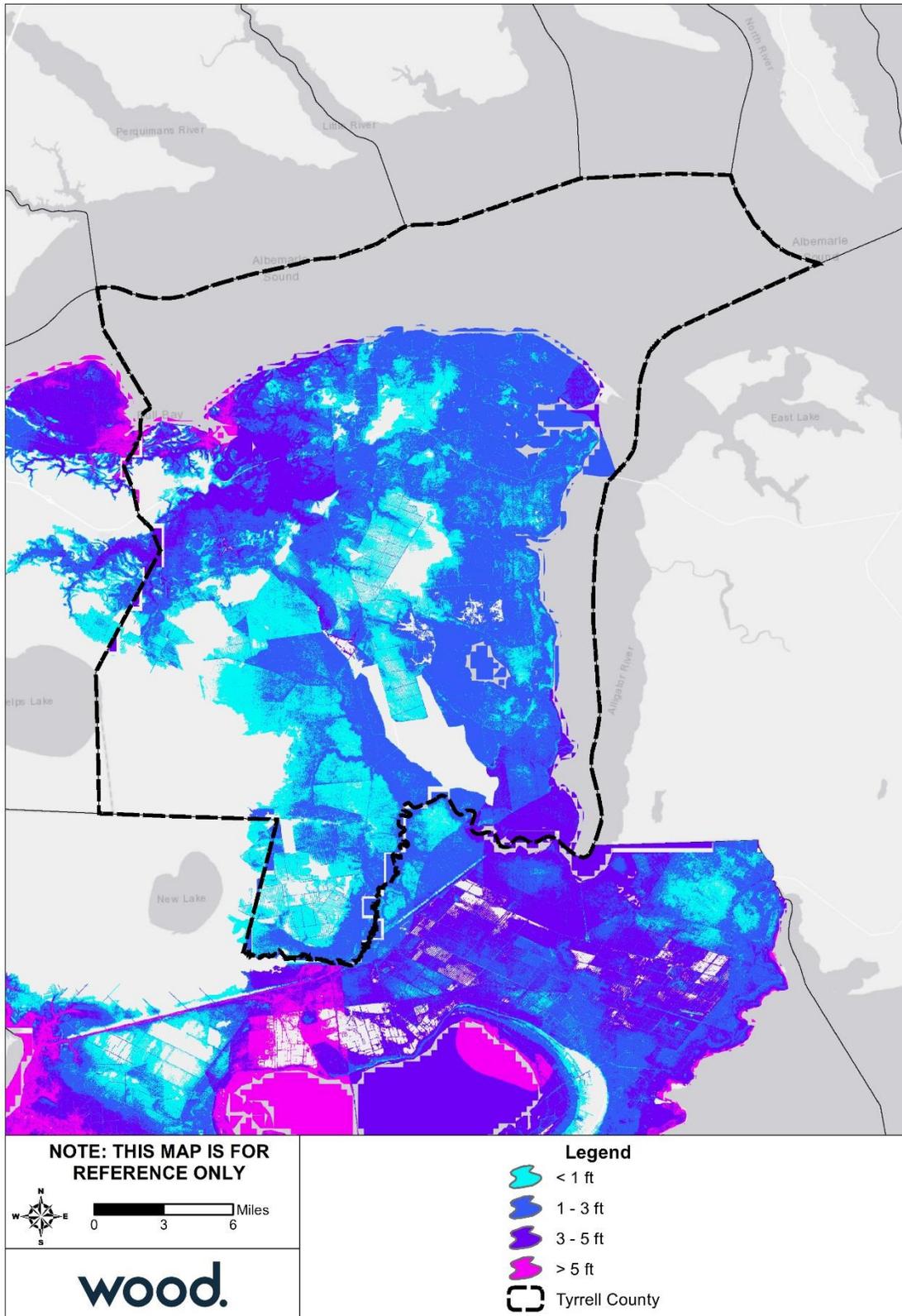
Source: FEMA Effective DFIRM

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



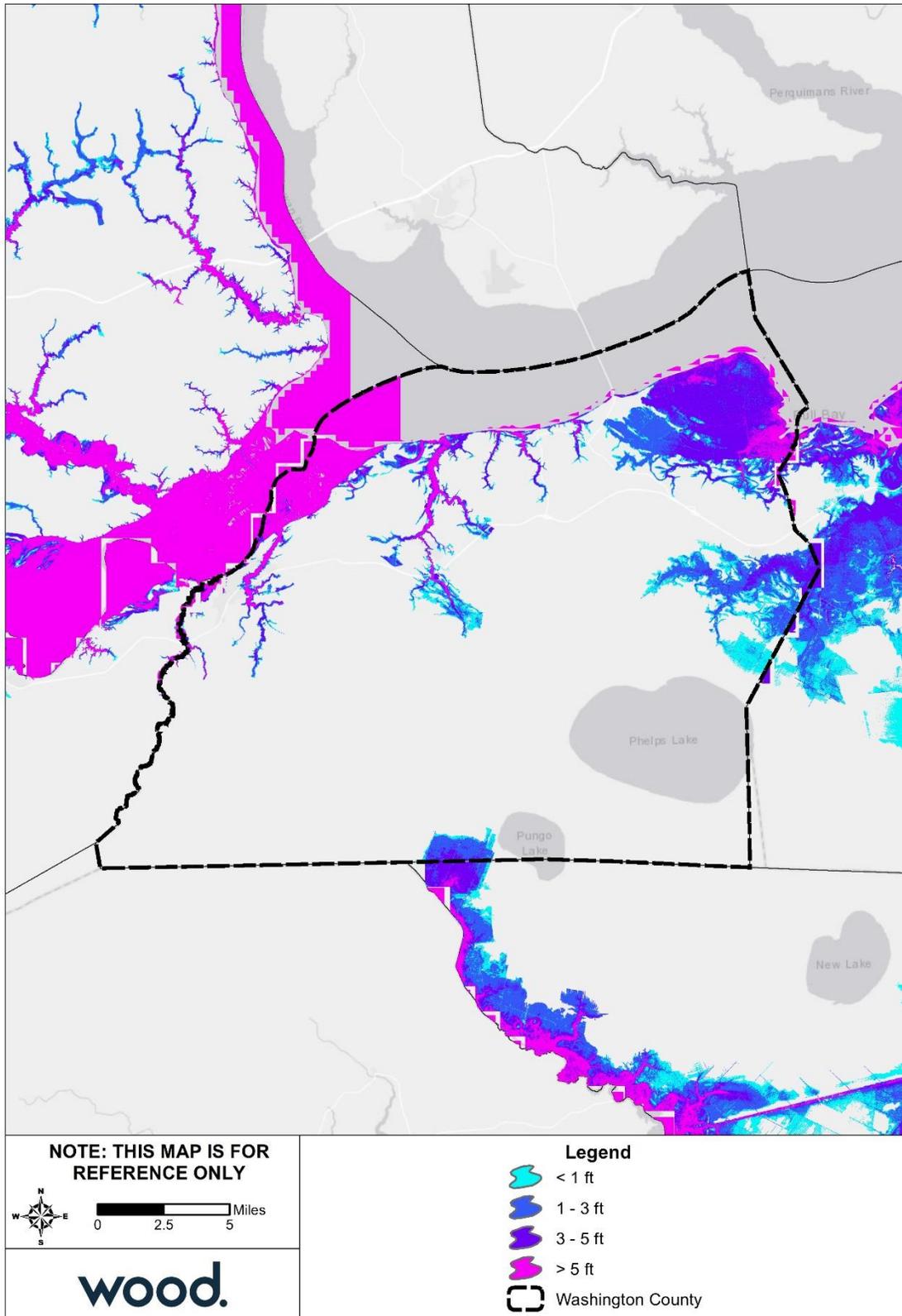
Source: FEMA Effective DFIRM

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



Source: FEMA Effective DFIRM

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



Source: FEMA Effective DFIRM

## SECTION 4: RISK ASSESSMENT

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 expected to be equaled or exceeded once on average during any 100-year period (recurrence intervals). Considered another way, properties within a 100-year flood zone have a one percent probability of being flooded during any given year. Mortgage lenders require that owners of properties with federally-backed mortgages located within SFHAs purchase and maintain flood insurance policies on their properties. Consequently, newer and recently purchased properties in the community are typically insured against flooding.

*Impact: 3 – Critical*

*Spatial Extent: 3 – Moderate*

### Historical Occurrences

According to NCEI, 80 recorded flood events affected the planning area from 1999 to 2018 causing an estimated \$10,225,000 in property damage, \$2,000,000 in crop damage, and 6 deaths. Table 4.41 summarizes these historical occurrences of flooding by county and event type identified from 1999 through 2018 by 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. Further, only reported damages are shown here and further damages may have occurred but gone unreported. Incidents of storm surge are reported under the Hurricane and Tropical Storm profile in Section 4.5.7.

**Table 4.41 – NCEI Records of Flooding, 1999-2018**

Type	Event Count	Deaths/ Injuries	Reported Property Damage	Reported Crop Damage
<b>Bertie</b>				
Flash Flood	17	1/0	\$5,000	\$0
Flood	7	0/0	\$10,000,000	\$1,000,000
Heavy Rain	14	0/0	\$0	\$0
<b>Hyde</b>				
Coastal Flood	5	0/0	\$0	\$0
Flash Flood	2	0/0	\$0	\$0
Flood	2	0/0	\$0	\$0
Heavy Rain	2	0/0	\$0	\$0
<b>Martin</b>				
Flash Flood	17	0/0	\$210,000	\$0
Flood	2	0/0	\$0	\$0
Heavy Rain	1	0/0	\$0	\$0
<b>Tyrrell</b>				
Coastal Flood	1	0/0	\$0	\$0
Flash Flood	2	0/0	\$0	\$0
<b>Washington</b>				
Flash Flood	6	0/0	\$0	\$0
Flood	2	5/0	\$10,000	\$1,000,000
<b>Region Total</b>				
Coastal Flood	6	0/0	\$0	\$0
Flash Flood	44	1/0	\$215,000	\$0
Flood	13	5/0	\$10,010,000	\$2,000,000
Heavy Rain	17	0/0	\$0	\$0
<b>Total</b>	<b>80</b>	<b>6/0</b>	<b>\$10,225,000</b>	<b>\$2,000,000</b>

Source: NCEI

## SECTION 4: RISK ASSESSMENT

Table 4.42 provides a summary of this historical information by location. Many of the events attributed to the region are countywide or cover large portions of a given county. Similarly, though some events have associated starting locations identified, the event may have covered a larger area including multiple jurisdictions. Still, this list provides an indication of areas that may be particularly flood prone.

**Table 4.42 – Summary of Historical Flood Occurrences by Location, 1999-2018**

Location	Event Count	Deaths/Injuries	Property Damage	Crop Damage
<b>Bertie</b>				
Askewville	3	0/0	\$0	\$0
Aulander	2	0/0	\$0	\$0
Bertie	1	0/0	\$5,000	\$0
Burden	2	0/0	\$0	\$0
Colerain	1	0/0	\$0	\$0
Countywide	3	1/0	\$0	\$0
Drew	1	0/0	\$4,000,000	\$1,000,000
Ellis Store	1	0/0	\$0	\$0
Kelford	1	0/0	\$0	\$0
Lewiston	3	0/0	\$0	\$0
Merry Hill	1	0/0	\$0	\$0
Perrytown	1	0/0	\$0	\$0
Powellsville	1	0/0	\$0	\$0
Quitsna	1	0/0	\$1,000,000	\$0
Windsor	15	0/0	\$5,000,000	\$0
Woodard	1	0/0	\$0	\$0
<b>Subtotal Bertie</b>	<b>38</b>	<b>1/0</b>	<b>\$10,005,000</b>	<b>\$1,000,000</b>
<b>Hyde</b>				
Hyde (Zone)	5	0/0	\$0	\$0
Ocracoke	1	0/0	\$0	\$0
Ocracoke Is Arpt	2	0/0	\$0	\$0
Sladesville	2	0/0	\$0	\$0
Swanquarter	1	0/0	\$0	\$0
<b>Subtotal Hyde</b>	<b>11</b>	<b>0/0</b>	<b>\$0</b>	<b>\$0</b>
<b>Martin</b>				
Martin (Zone)	1	0/0	\$51,000	\$0
Bear Grass	1	0/0	\$0	\$0
Countywide	8	0/0	\$200,000	\$0
Jamesville	2	0/0	\$0	\$0
Robersonville	1	0/0	\$0	\$0
Williamston	5	0/0	\$10,000	\$0
Williamston Arpt	1	0/0	\$0	\$0
Williamston Hrrs Arp	1	0/0	\$0	\$0
<b>Subtotal Martin</b>	<b>20</b>	<b>0/0</b>	<b>\$210,000</b>	<b>\$0</b>
<b>Tyrrell</b>				
Tyrrell (Zone)	1	0/0	\$0	\$0
Columbia	1	0/0	\$0	\$0
Kilkenny	1	0/0	\$0	\$0
<b>Subtotal Tyrrell</b>	<b>3</b>	<b>0/0</b>	<b>\$0</b>	<b>\$0</b>

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Location	Event Count	Deaths/Injuries	Property Damage	Crop Damage
<b>Washington</b>				
Countywide	3	0/0	\$0	\$0
Creswell	1	0/0	\$0	\$0
Plymouth	1	0/0	\$0	\$0
Roper	1	0/0	\$0	\$0
Scuppernong	1	5/0	\$10,000	\$1,000,000
Wenona	1	0/0	\$0	\$0
<b>Subtotal Washington</b>	<b>8</b>	<b>5/0</b>	<b>\$10,000</b>	<b>\$1,000,000</b>
<b>Region Total</b>	<b>80</b>	<b>6/0</b>	<b>\$10,225,000</b>	<b>\$2,000,000</b>

Source: NCEI

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

**September 14-16, 1999** – Rainfall associated with Hurricane Floyd caused flash flooding as it fell on soils already saturated by 3 weeks of rain across the region. Rivers, creeks, and streams were still swollen and near flood stage from Tropical Storm Dennis which impacted the region less than two weeks prior. In Martin County, rainfall totals ranged from 6 inches to nearly 11 inches. Southwest Bertie County saw as much as 18 inches of rain. The additional runoff from Floyd produced some of the worst flooding the state had seen. Many rivers rose to over 15 feet above flood stage. Many roads were flooded or washed out. A number of high-water rescues had to be conducted. One person perished due to flash flooding in Bertie County. There was also enormous structural, housing, and crop losses due to the flooding, although none was reported in NCEI in the Northeastern NC Region.

**June 15, 2011** – The remnants of Tropical Storm Allison dropped 12 to 16 inches of rain across Martin County causing widespread, dangerous flooding. Nearly all primary and secondary roads were closed and flooding reached up to 25 homes causing \$200,000 in damage. The worst of the flooding occurred during the early evening hours. Askewville in Bertie County reported 8.5 inches of water. Many roads across the Region were closed and several homes were evacuated due to high water.

**September 29-30, 2010** – The combination of a deep flow of tropical moisture spreading northward along the east coast, and a near stationary frontal boundary over the region resulted in heavy rain across much of northeast North Carolina from Wednesday morning, September 29th, into Thursday night September 30th. Rainfall amounts ranged from four to thirteen inches over the area. The rain fell on already saturated ground leaving to flash flooding across the region especially in low lying areas. Several roads were flooded and impassable with minor damage to a few homes. In Washington County, many acres of crops were damaged. High water did minor damage to a few homes along Highway 64 from near Plymouth to Scuppernong. Five deaths were directly attributed to the flooding in Washington County when a vehicle hydroplaned on the highway, went off the right side of the road, ran down a small hill, hit an embankment and flipped over into a flooded canal where the occupants drowned. Total damages from flooding across the region were reported in NCEI at \$20,000 with agricultural losses of \$1 million.

**September 19-21, 2016** – The combination of a stalled frontal boundary and the remnant low pressure area that was Tropical Storm Julia produced heavy rain across much of northeast North Carolina from Monday, September 19th into Thursday, September 22nd. Rainfall totals generally ranged from 6 to 17 inches across the county. Windsor reported 17 inches of rain and widespread flooding. The Cashie River exceeded major flood stage. Numerous homes and businesses were flooded and damaged and numerous roads were flooded and closed. The event caused \$4,000,000 in property damages and \$1,000,000 in crop damages in Bertie County.

## SECTION 4: RISK ASSESSMENT

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**October 8, 2016** – The combination of a cold front moving through the Mid-Atlantic and Hurricane Matthew tracking northeast just off the North Carolina and Virginia coasts, produced heavy rain across northeast North Carolina from Saturday, October 8th into Sunday, October 9th. Rainfall totals generally ranged from 6 to 12 inches. This rain led to significant flash flooding over much of the Northeastern NC Region. Many roads were washed out and impassable for days from the serious flash flooding. The Cashie River exceeded major flood stage, and flooding continued through October 13<sup>th</sup>. In the Northeastern NC Region, this event caused \$6 million in damage, as reported by NCEI.

### 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.

The Region is also at risk to other magnitudes of flooding and other types of flooding, such as stormwater floods, storm surge, and other tidal flooding, which have varying probabilities. According to past records, annual probability of flooding varies across the participating counties from 15% to 100% likelihood of flooding in any given year. For the Region as a whole, future flooding is considered likely. However, exposure to flood hazards varies across jurisdictions, and probability of flooding is lower in those jurisdictions without any land in the SFHA, which includes Colerain, Powellsville, Bear Grass, Everetts, Hassell, Oak City, Parmele, and Robersonville.

*Probability: 3 – Likely*

### Climate Change

Per the Fourth National Climate Assessment, frequency and intensity of heavy precipitation events is expected to increase across the country. Additionally, increases in precipitation totals are expected in the Southeast. Therefore, with more rainfall falling in more intense incidents, the region may experience more frequent flash flooding. Increased flooding may also result from more intense tropical cyclone; researchers have noted the occurrence of more intense storms bringing greater rainfall totals, a trend that is expected to continue as ocean and air temperatures rise.

### Vulnerability Assessment

The following section provides an assessment of vulnerability to flooding by jurisdiction and flood return period.

### 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 4.43 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.

## SECTION 4: RISK ASSESSMENT

Table 4.43 – NFIP Initial FIRM Dates

NFIP Initial FIRM Date	Jurisdiction
07/18/1977	Town of Roxobel, Town of Windsor
08/05/1985	Town of Columbia, Town of Roper
08/19/1985	Tyrrell County (Unincorporated Area), Town of Plymouth, Washington County (Unincorporated Area)
12/04/1985	Bertie County (Unincorporated Area)
01/01/1987	Town of Hamilton
02/04/1987	Hyde County (Unincorporated Area), Town of Creswell
07/01/1987	Town of Robersonville
08/19/1987	Town of Williamston
07/16/1991	Martin County (Unincorporated Area)
09/19/2007	Town of Bear Grass, Town of Everetts, Town of Hassell, Town of Jamesville, Town of Oak City, Town of Parmele
02/04/2009	Town of Askewville, Town of Aulander, Town of Colerain, Town of Kelford, Town of Lewiston-Woodville, Town of Powellsville

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

Note: These dates reflect the initial Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map (FHBM) for each community; these dates do not indicate participation in the NFIP. The Towns of Askewville, Lewiston Woodville, Powellsville, Everetts, and Parmele do not participate in the NFIP. Askewville and Lewiston Woodville have less than 5% of their land in high risk flood zones. Powellsville, Everetts, and Parmele are located entirely in the low-risk unshaded Zone X flood zone.

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 to be 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 for the 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

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of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e.coli and other disease causing agents.

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

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If the City 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 have been 6 deaths in the Northeastern NC Region caused by flood events between 1999 - 2018.

Table 4.44 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 4.44 – 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
<b>Bertie</b>									
Unincorporated Bertie County	13,731	479	3.50%	2,359	82	3.50%	759	26	3.40%
Town of Askewville	551	7	1.30%	95	1	1.10%	30	0	0%
Town of Aulander	1,055	104	9.90%	181	18	9.90%	58	6	10.30%
Town of Colerain	394	1	0.30%	68	0	0%	22	0	0%
Town of Kelford	248	7	2.80%	43	1	2.30%	14	0	0%
Town of Lewiston-Woodville	931	0	0%	160	0	0%	51	0	0%
Town of Powellsville	257	0	0%	44	0	0%	14	0	0%
Town of Roxobel	240	2	0.80%	41	0	0%	13	0	0%
Town of Windsor	3,877	265	6.80%	666	45	6.80%	214	15	7%
<b>Subtotal Bertie</b>	<b>21,284</b>	<b>865</b>	<b>4.10%</b>	<b>3,657</b>	<b>147</b>	<b>4%</b>	<b>1,175</b>	<b>47</b>	<b>4%</b>
<b>Hyde</b>									
Unincorporated Hyde County	5,809	4,949	85.20%	875	745	85.10%	293	250	85.30%
<b>Martin</b>									
Unincorporated Martin County	13,965	221	1.6%	2,450	39	1.6%	798	13	1.6%

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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
Town of Bear Grass	55	0	0%	10	0	0%	3	0	0%
Town of Everetts	164	0	0%	29	0	0%	9	0	0%
Town of Hamilton	390	0	0%	68	0	0%	22	0	0%
Town of Hassell	83	0	0%	15	0	0%	5	0	0%
Town of Jamesville	481	2	0.4%	84	0	0%	27	0	0%
Town of Oak City	327	0	0%	57	0	0%	19	0	0%
Town of Parmele	229	0	0%	40	0	0%	13	0	0%
Town of Robersonville	1,410	0	0%	247	0	0%	81	0	0%
Town of Williamston	7,393	172	2.3%	1,297	30	2.3%	423	10	2.4%
<b>Subtotal Martin</b>	<b>24,497</b>	<b>395</b>	<b>1.6%</b>	<b>4297</b>	<b>69</b>	<b>1.6%</b>	<b>1400</b>	<b>23</b>	<b>1.6%</b>
<b>Tyrrell</b>									
Unincorporated Tyrrell County	3,621	2,584	71.40%	610	435	71.30%	191	136	71.20%
Town of Columbia	786	778	99%	132	131	99.20%	42	42	100%
<b>Subtotal Tyrrell</b>	<b>4,407</b>	<b>3,362</b>	<b>76.30%</b>	<b>742</b>	<b>566</b>	<b>76.30%</b>	<b>233</b>	<b>178</b>	<b>76.40%</b>
<b>Washington</b>									
Unincorporated Washington County	461	141	30.60%	84	26	31%	30	9	30%
Town of Creswell	4,682	301	6.40%	855	55	6.40%	303	19	6.30%
Town of Plymouth	912	56	6.10%	167	10	6%	59	4	6.80%
Town of Roper	7,168	917	12.80%	1,309	167	12.80%	465	59	12.70%
<b>Subtotal Washington</b>	<b>13,223</b>	<b>1,415</b>	<b>10.70%</b>	<b>2,415</b>	<b>258</b>	<b>10.70%</b>	<b>857</b>	<b>91</b>	<b>10.60%</b>
<b>Region Total</b>	<b>69,220</b>	<b>10,591</b>	<b>15.30%</b>	<b>11,986</b>	<b>1,716</b>	<b>14.30%</b>	<b>3,958</b>	<b>566</b>	<b>14.30%</b>

Source: NCEM Risk Management Tool

### 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 4.45 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 the amount of development that has occurred since the original analysis for the IRISK dataset was performed.

Table 4.46 provides a summary of 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.

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**Table 4.45 – Buildings Impacted by the 100-Year Flood Event**

Jurisdiction	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
<b>Bertie</b>															
Unincorporated Bertie County	9,047	9	0.10%	246	2.70%	\$1,722,443	9	0.10%	\$11,855	0	0%	\$0	255	2.80%	\$1,734,298
Town of Askewville	425	4	0.90%	4	0.90%	\$4,587	0	0%	\$0	0	0%	\$0	4	0.90%	\$4,587
Town of Aulander	675	57	8.40%	57	8.40%	\$92,450	0	0%	\$0	0	0%	\$0	57	8.40%	\$92,450
Town of Colerain	377	3	0.80%	1	0.30%	\$674	2	0.50%	\$1,253	0	0%	\$0	3	0.80%	\$1,926
Town of Kelford	159	4	2.50%	4	2.50%	\$4,446	0	0%	\$0	0	0%	\$0	4	2.50%	\$4,446
Town of Lewiston-Woodville	685	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Powellsville	163	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Roxobel	205	0	0%	1	0.50%	\$2,922	0	0%	\$0	0	0%	\$0	1	0.50%	\$2,922
Town of Windsor	1,584	23	1.50%	86	5.40%	\$217,670	14	0.90%	\$91,795	1	0.10%	\$5,654	101	6.40%	\$315,119
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>100</b>	<b>0.80%</b>	<b>399</b>	<b>3%</b>	<b>\$2,045,192</b>	<b>25</b>	<b>0.20%</b>	<b>\$104,903</b>	<b>1</b>	<b>0%</b>	<b>\$5,654</b>	<b>425</b>	<b>3.20%</b>	<b>\$2,155,748</b>
<b>Hyde</b>															
Hyde County (Unincorporated Area)	5,225	2,795	53.5%	3,670	70.2%	\$59,812,567	454	8.7%	\$6,203,188	70	1.3%	\$2,058,715	4,194	80.3%	\$68,074,471
<b>Martin</b>															
Martin County (Unincorporated Area)	10,328	125	1.2%	110	1.1%	\$495,615	15	0.1%	\$110,100	0	0%	\$0	125	1.2%	\$605,715
Town of Bear Grass	69	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Everetts	145	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Hamilton	273	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Hassell	65	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Jamesville	276	3	1.1%	1	0.4%	\$25,811	2	0.7%	\$44,017	0	0%	\$0	3	1.1%	\$69,828
Town of Oak City	287	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Parmele	137	0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0

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Jurisdiction	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
Town of Robersonville	851		0	0%	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Williamston	3,900		71	1.8%	67	1.7%	\$384,805	4	0.1%	\$26,684	0	0%	\$0	71	1.8%	\$411,489
<b>Subtotal Martin</b>	<b>16,331</b>		<b>199</b>	<b>1.2%</b>	<b>178</b>	<b>1.1%</b>	<b>\$906,231</b>	<b>21</b>	<b>0.1%</b>	<b>\$180,801</b>	<b>0</b>	<b>0%</b>	<b>\$0</b>	<b>199</b>	<b>1.2%</b>	<b>\$1,087,032</b>
<b>Tyrrell</b>																
Tyrrell County (Unincorporated Area)	2,632		1,004	38.10%	1,479	56.20%	\$6,086,713	42	1.60%	\$214,726	2	0.10%	\$21,327	1,523	57.90%	\$6,322,767
Town of Columbia	512		375	73.20%	405	79.10%	\$3,123,105	22	4.30%	\$294,953	8	1.60%	\$172,846	435	85%	\$3,590,904
<b>Subtotal Tyrrell</b>	<b>3,144</b>		<b>1,379</b>	<b>43.90%</b>	<b>1,884</b>	<b>59.90%</b>	<b>\$9,209,818</b>	<b>64</b>	<b>2%</b>	<b>\$509,679</b>	<b>10</b>	<b>0.30%</b>	<b>\$194,173</b>	<b>1,958</b>	<b>62.30%</b>	<b>\$9,913,671</b>
<b>Washington</b>																
Washington County (Unincorporated Area)	5,271		289	5.50%	488	9.30%	\$850,356	13	0.20%	\$36,574	0	0%	\$0	501	9.50%	\$886,930
Town of Creswell	365		61	16.70%	84	23%	\$114,846	0	0%	\$0	0	0%	\$0	84	23%	\$114,846
Town of Plymouth	2,657		113	4.30%	144	5.40%	\$644,745	2	0.10%	\$446	0	0%	\$0	146	5.50%	\$645,191
Town of Roper	578		25	4.30%	29	5%	\$31,915	0	0%	\$0	0	0%	\$0	29	5%	\$31,915
<b>Subtotal Washington</b>	<b>8,871</b>		<b>488</b>	<b>5.50%</b>	<b>745</b>	<b>8.40%</b>	<b>\$1,641,862</b>	<b>15</b>	<b>0.20%</b>	<b>\$37,020</b>	<b>0</b>	<b>0%</b>	<b>\$0</b>	<b>760</b>	<b>8.60%</b>	<b>\$1,678,882</b>
<b>Region Total</b>	<b>46,891</b>		<b>4,961</b>	<b>10.6%</b>	<b>6,876</b>	<b>14.7%</b>	<b>\$73,615,670</b>	<b>579</b>	<b>1.2%</b>	<b>\$7,035,591</b>	<b>81</b>	<b>0.2%</b>	<b>\$2,258,542</b>	<b>7,536</b>	<b>16.1%</b>	<b>\$82,909,804</b>

Source: NCEM Risk Management Tool

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**Table 4.46 – Critical Infrastructure and Key Resources Buildings at Risk to Flood Events by Sector**

Sector	Event	Number of Buildings at Risk	Estimated Damages
Banking and Finance	100 Year	3	\$44,443
Commercial Facilities	100 Year	263	\$4,768,729
Critical Manufacturing	100 Year	40	\$584,602
Emergency Services	100 Year	6	\$113,662
Energy	100 Year	6	\$36,168
Food and Agriculture	100 Year	296	\$2,178,366
	Floodway	1	\$2,948
Government Facilities	100 Year	27	\$612,639
Healthcare and Public Health	100 Year	7	\$358,416
Transportation Systems	100 Year	29	\$888,818
<b>All Categories</b>	<b>100 Year</b>	<b>677</b>	<b>\$9,585,843</b>
	<b>Floodway</b>	<b>1</b>	<b>\$2,948</b>

Source: NCEM Risk Management Tool

### 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. Table 4.47 summarizes repetitive loss properties by jurisdiction as identified by FEMA through the NFIP.

According to 2019 NFIP records, there are a total of 351 repetitive loss properties within the Northeastern NC Region, of which 67 percent are insured. There are 31 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. Data was not available on property type, however, it can be reasonably concluded based on current policy statistics, which are detailed in the county annexes, that the majority of these repetitive loss properties are residential.

**Table 4.47 – Repetitive Loss Properties by Jurisdiction**

Jurisdiction	Total Number of Properties	Total Number of Insured Properties	Total Number of Losses	Total Amount of Claims Payments	Severe Repetitive Loss Properties
Bertie County	17	8	41	\$1,315,789.23	0
Town of Aulander	2	2	5	\$29,654.21	0
Town of Windsor	77	47	206	\$8,675,623.62	5
Hyde County	136	90	401	\$6,886,390.79	21
Martin County	5	3	10	\$177,176.15	0
Town of Williamston	1	0	2	\$62,681.83	0
Tyrrell County	60	43	141	\$2,118,203.48	1
Town of Columbia	32	27	78	\$1,655,435.16	3
Washington County	14	10	31	\$439,815.55	0
Town of Creswell	1	1	3	\$20,249.55	0
Town of Plymouth	6	5	15	\$520,502.32	1
<b>Total</b>	<b>351</b>	<b>236</b>	<b>933</b>	<b>\$21,901,521.89</b>	<b>31</b>

Source: FEMA/ISO

Note: Communities in the planning area are not listed here if they do not have any repetitive losses.

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### Environment

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

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

### Consequence Analysis

Table 4.48 summarizes the potential detrimental consequences of wildfire.

**Table 4.48 – 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	Buildings and infrastructure, including transportation and utility infrastructure, may be damaged or destroyed. Impacts are expected to be localized to the area of the incident. Severe damage is possible.
Environment	Chemicals and other hazardous substances may contaminate local water bodies. Wildlife and livestock deaths possible. 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. Flood may also adversely affect water quality by increasing nutrient and sediment loads in waterbodies.
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.

### Hazard Summary by Jurisdiction

The following table summarizes flood hazard risk by jurisdiction. Flood hazards associated with riverine flooding, coastal flooding and storm surge, high tide flooding, flash flooding, and stormwater flooding can impact the region. Spatial extent was assigned based on the percent of each jurisdiction's land area in the SFHA and thus exposed to a high risk of flooding, with additional consideration given to potential area at risk to other sources and magnitudes of flooding. Most communities were assigned a probability of likely; communities without any land area in the SFHA were assigned a probability of possible.

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	3	3	3	3	3	3.0	H
Town of Askeville	3	3	2	3	3	2.8	H
Town of Aulander	3	3	3	3	3	3.0	H
Town of Colerain	2	3	1	3	3	2.3	M
Town of Kelford	3	3	3	3	3	3.0	H
Town of Lewiston-Woodville	3	3	2	3	3	2.8	H
Town of Powellsville	2	3	1	3	3	2.3	M
Town of Roxobel	3	3	2	3	3	2.8	H
Town of Windsor	3	3	3	3	3	3.0	H
Hyde County	3	3	3	3	3	3.0	H
Martin County	3	3	3	3	3	3.0	H
Town of Bear Grass	2	3	1	3	3	2.3	M
Town of Everetts	2	3	1	3	3	2.3	M
Town of Hamilton	3	3	2	3	3	2.8	H
Town of Hassell	2	3	1	3	3	2.3	M
Town of Jamesville	3	3	3	3	3	3.0	H
Town of Oak City	2	3	1	3	3	2.3	M
Town of Parmele	2	3	1	3	3	2.3	M
Town of Robersonville	2	3	1	3	3	2.3	M
Town of Williamston	3	3	2	3	3	2.8	H
Tyrrell County	3	3	4	3	3	3.2	H
Town of Columbia	3	3	4	3	3	3.2	H
Washington County	3	3	3	3	3	3.0	H
Town of Creswell	3	3	3	3	3	3.0	H
Town of Plymouth	3	3	3	3	3	3.0	H
Town of Roper	3	3	3	3	3	3.0	H

### 4.5.7 Hurricane and Tropical Storm

#### Hazard Background

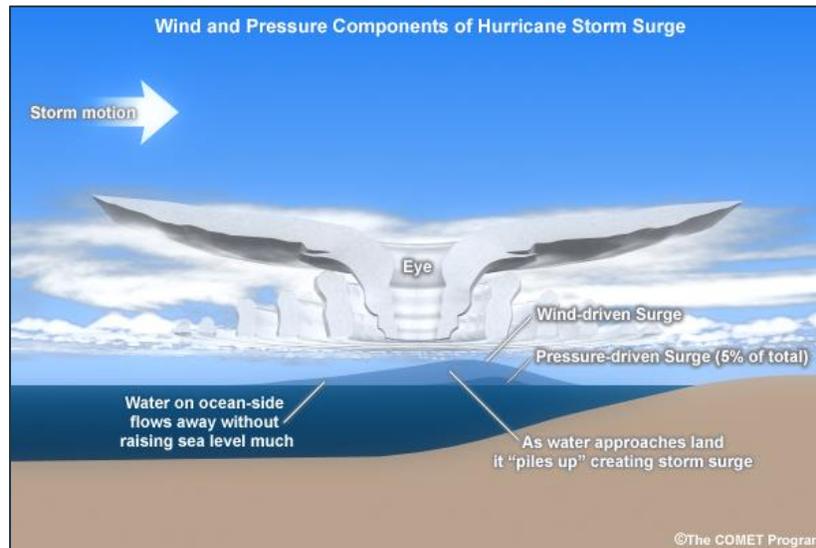
Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A 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.

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 4.35. 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 4.35 – 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, a band of warm water that lies off the Atlantic coast. 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 one week*

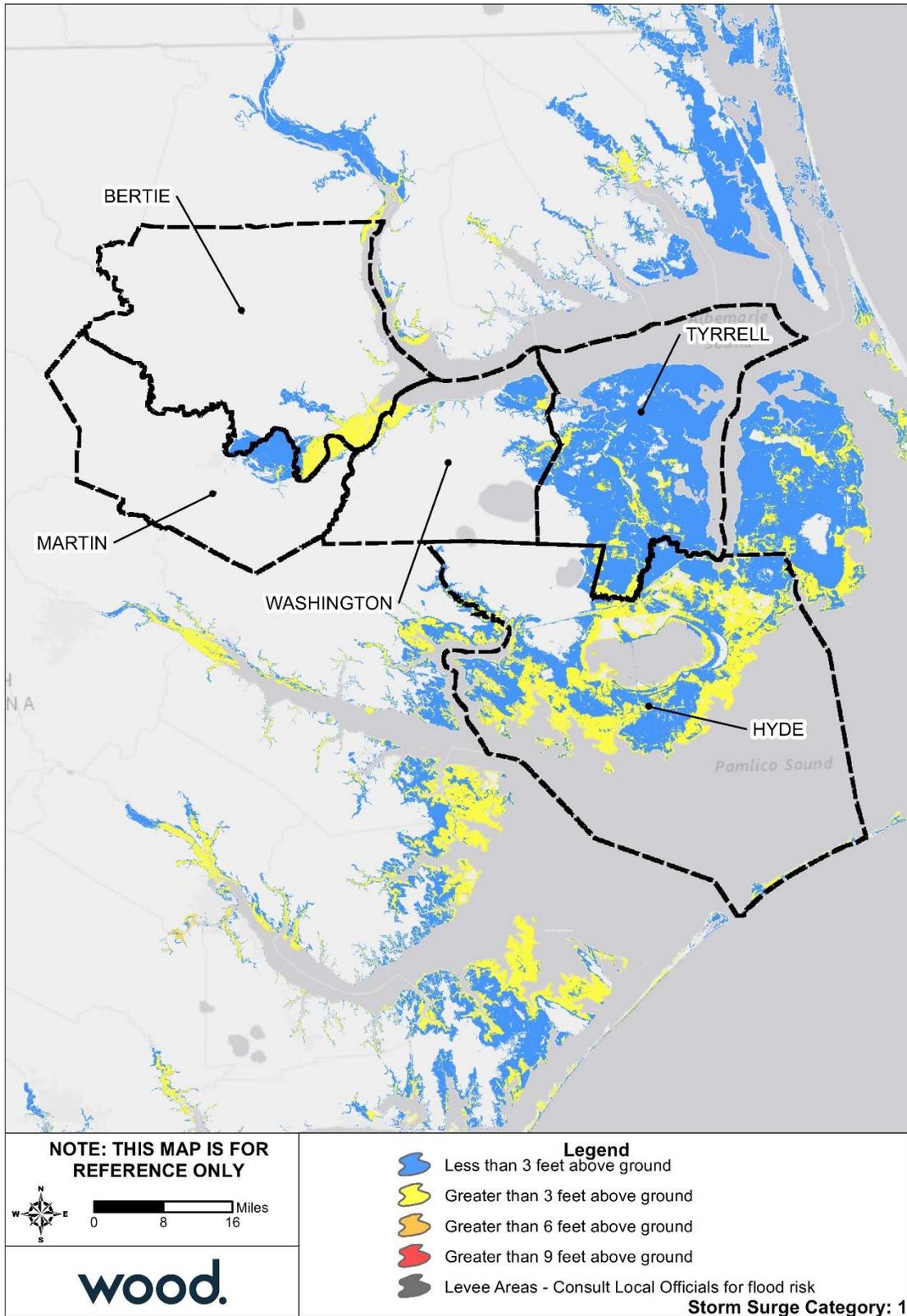
#### Location

Hurricanes and tropical storms can impact the entire Northeastern NC Region. Wind impacts can affect the region uniformly, while 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 4.36 through Figure 4.40 show the estimated extent of surge by storm category according to NOAA SLOSH data.

#### Northeastern NC

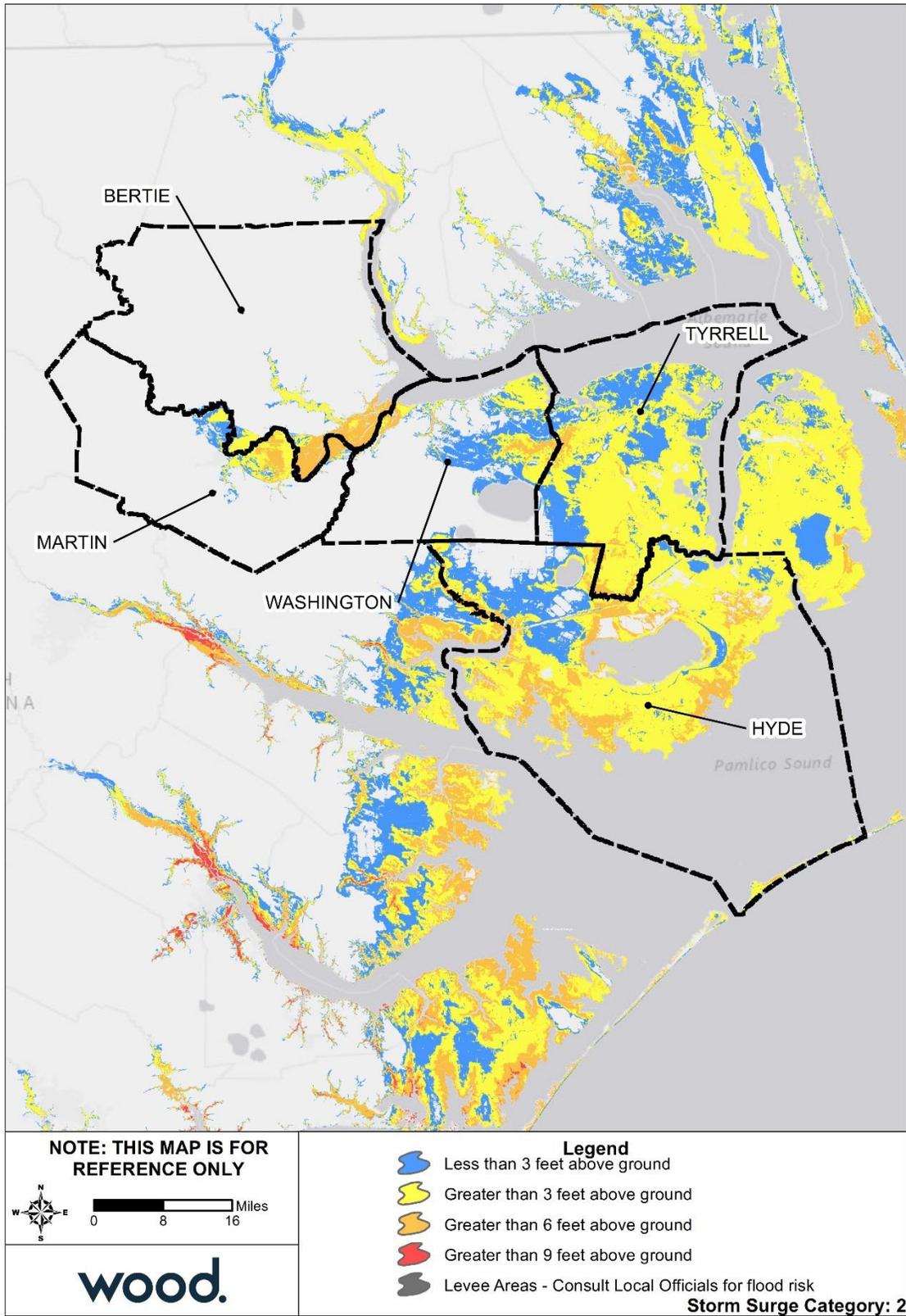
Regional Hazard Mitigation Plan  
2020

Figure 4.36 – Category 1 Storm Surge Inundation



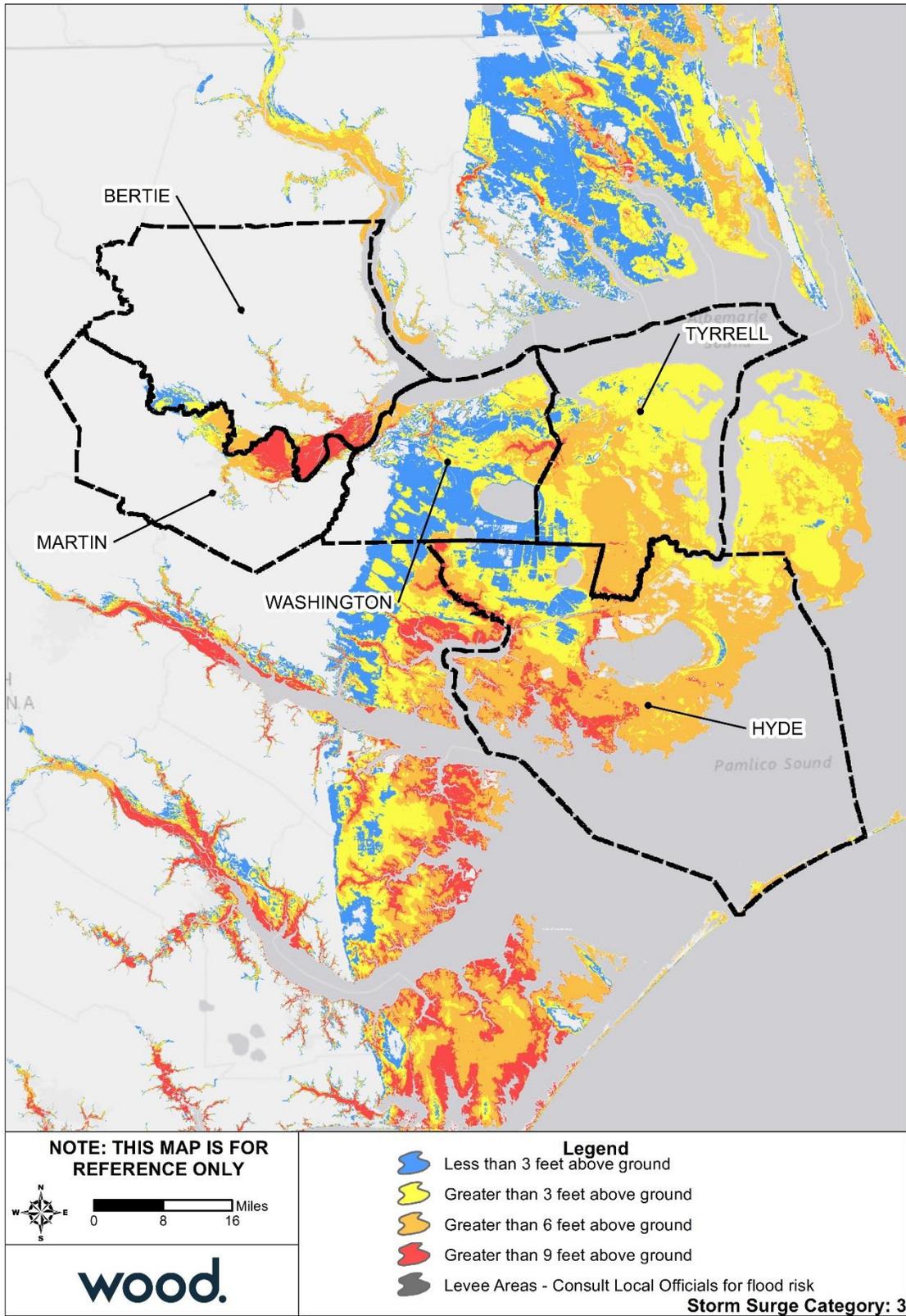
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.37 – Category 2 Storm Surge Inundation



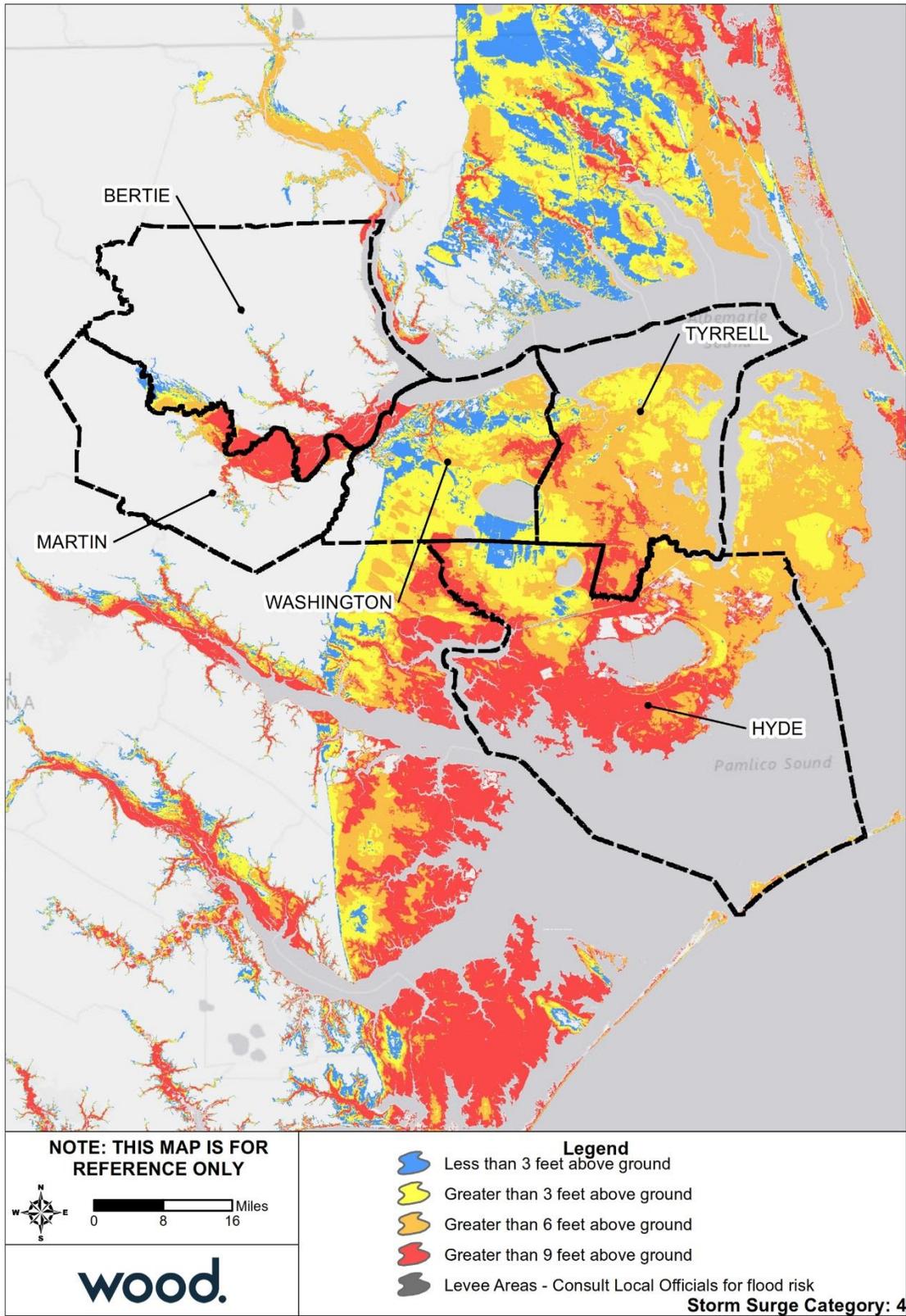
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.38 – Category 3 Storm Surge Inundation



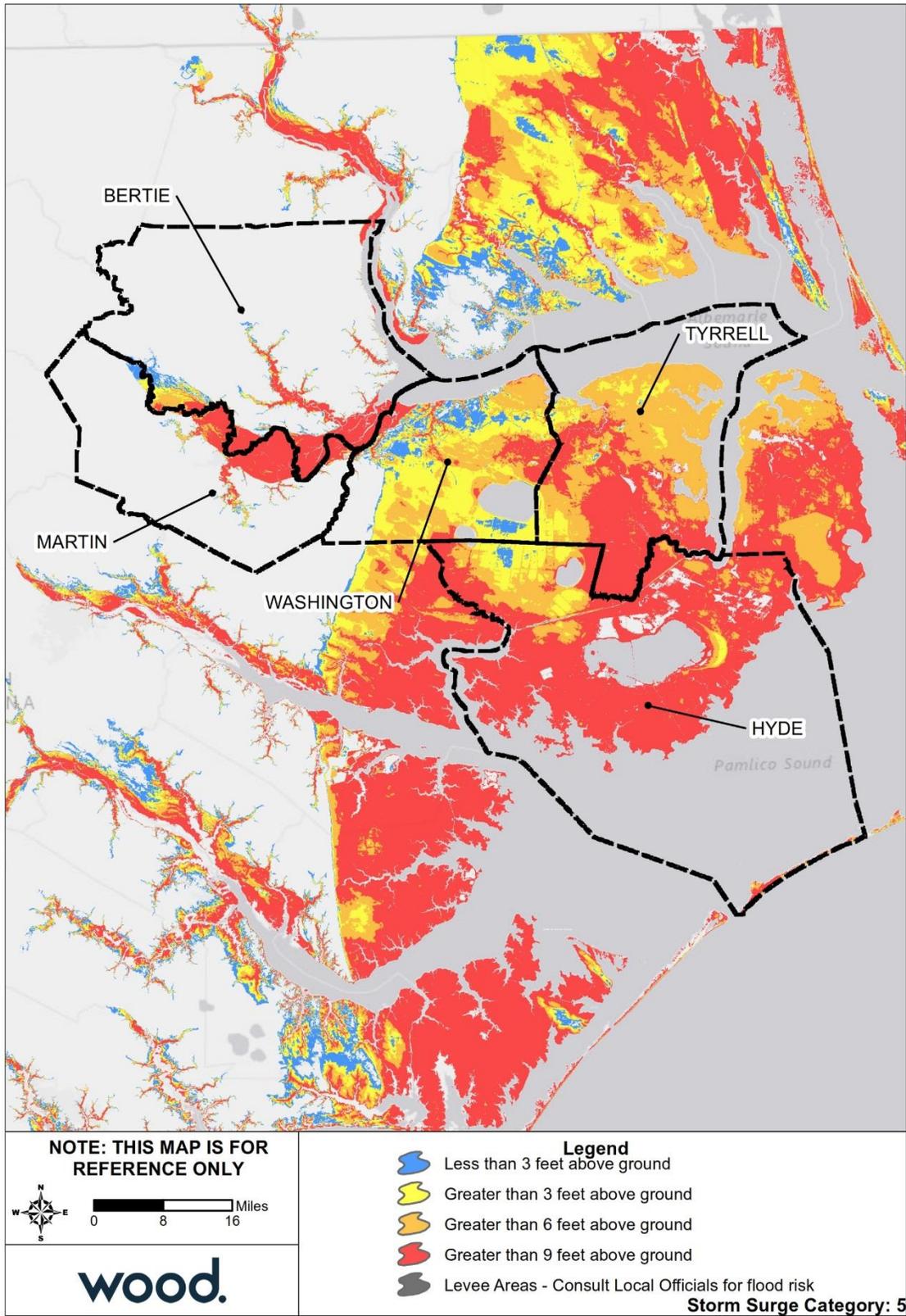
Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.39 – Category 4 Storm Surge Inundation



Source: NOAA National Storm Surge Hazard Maps – Version 2

Figure 4.40 – Category 5 Storm Surge Inundation



Source: NOAA National Storm Surge Hazard Maps – Version 2

## SECTION 4: RISK ASSESSMENT

### 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 force winds can extend outward by about 35 miles from the eye of a small hurricane to more than 150 miles from the center of a large hurricane. Tropical storm force winds may extend even further, up to approximately 300 miles from the eye of a large hurricane. In general, the front right quadrant of a storm, relative to its direction of movement, is the most dangerous part of the storm. Wind speeds are highest in this area due to the additive impact of the atmospheric steering winds and the storm winds.

Hurricane intensity is further classified by the Saffir-Simpson Scale, detailed in Table 4.49, which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

**Table 4.49 – 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 4.50 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.

**SECTION 4: RISK ASSESSMENT**

**Table 4.50 – 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

Located on the coast and along estuarine areas, the Northeastern NC Region is susceptible to every category of hurricane.

*Impact: 4 – Catastrophic*

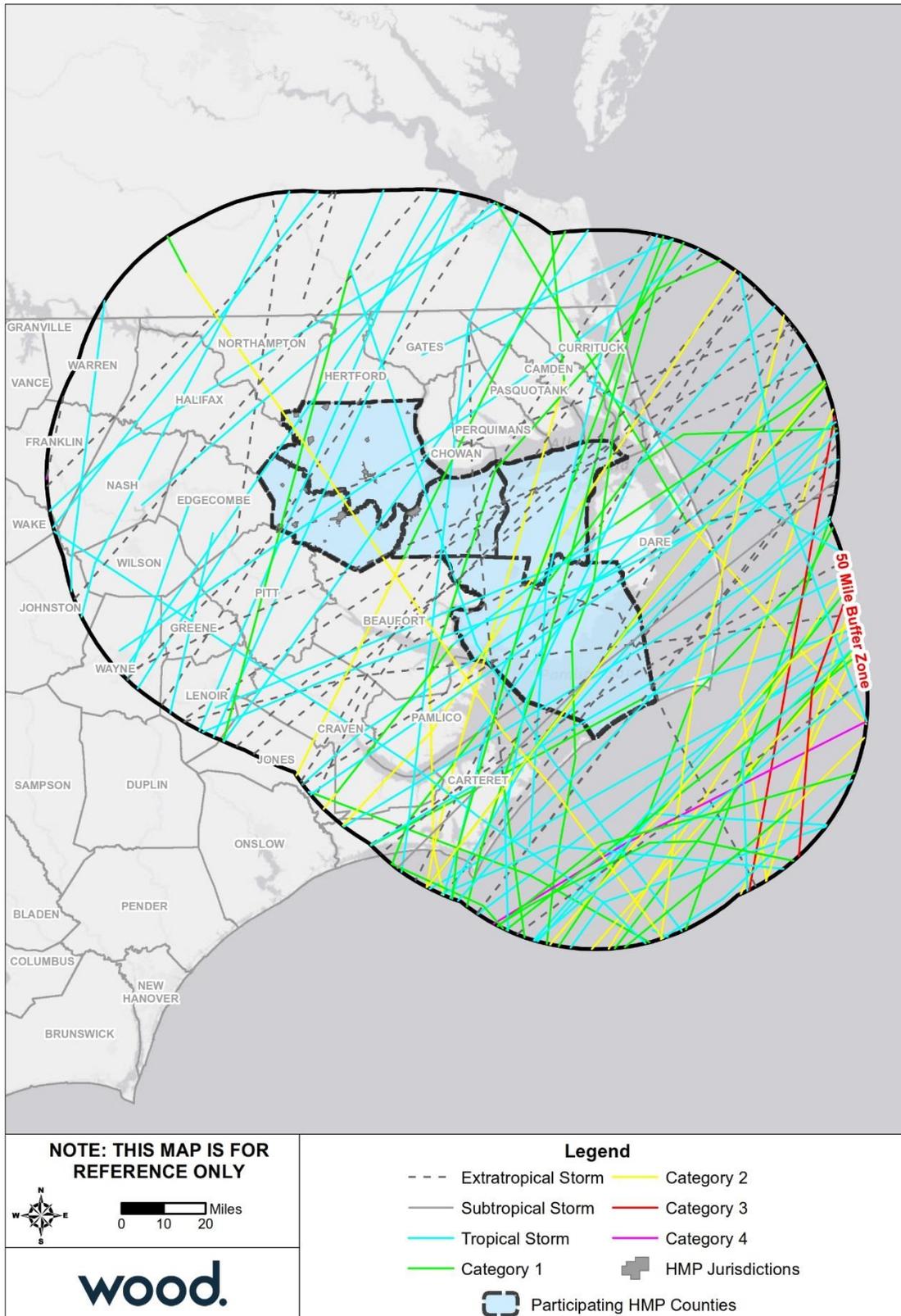
*Spatial Extent: 4 – Large*

**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, 101 hurricanes and tropical storms have passed within 50 miles of the Northeastern NC Region since 1900. These storm tracks are shown in Figure 4.41. The date, storm name, storm category, and maximum wind speed of each event are detailed in Table 4.51.

**SECTION 4: RISK ASSESSMENT**

**Figure 4.41 – Hurricane/Tropical Storm Tracks within 50 miles of Northeastern NC Region, 1900-2016**



Source: NOAA Office of Coastal Management

**SECTION 4: RISK ASSESSMENT**

**Table 4.51 – Hurricane/Tropical Storm Tracks within 50 Miles of Northeastern NC Region, 1900-2016**

Date	Storm Name	Max Storm Category*	Max Wind Speed (mph)*
10/13/1900	Unnamed	Extratropical Storm	40
7/11/1901	Unnamed	Category 1	81
9/18/1901	Unnamed	Tropical Storm	40
9/14/1904	Unnamed	Tropical Storm	69
6/29/1907	Unnamed	Extratropical Storm	58
5/29/1908	Unnamed	Category 1	75
7/31/1908	Unnamed	Category 1	81
9/1/1908	Unnamed	Tropical Storm	52
8/28/1910	Unnamed	Extratropical Storm	46
10/20/1910	Unnamed	Tropical Storm	63
6/15/1912	Unnamed	Extratropical Storm	46
9/3/1913	Unnamed	Category 1	86
5/16/1916	Unnamed	Tropical Storm	40
9/6/1916	Unnamed	Tropical Storm	40
8/24/1918	Unnamed	Category 1	75
8/26/1924	Unnamed	Category 2	104
9/17/1924	Unnamed	Extratropical Storm	52
9/30/1924	Unnamed	Extratropical Storm	69
12/2/1925	Unnamed	Extratropical Storm	75
9/19/1928	Unnamed	Extratropical Storm	81
9/12/1930	Unnamed	Category 1	92
9/16/1932	Unnamed	Extratropical Storm	58
8/23/1933	Unnamed	Category 2	104
9/16/1933	Unnamed	Category 2	109
9/3/1934	Unnamed	Tropical Storm	46
9/8/1934	Unnamed	Category 1	92
9/6/1935	Unnamed	Tropical Storm	58
7/31/1937	Unnamed	Tropical Storm	63
10/11/1942	Unnamed	Extratropical Storm	52
8/2/1944	Unnamed	Tropical Storm	69
9/14/1944	Unnamed	Category 3	121
10/20/1944	Unnamed	Extratropical Storm	52
6/25/1945	Unnamed	Category 1	75
7/6/1946	Unnamed	Tropical Storm	52
7/7/1946	Unnamed	Tropical Storm	52
10/10/1946	Unnamed	Extratropical Storm	40
9/25/1947	Unnamed	Extratropical Storm	40
8/24/1949	Unnamed	Category 2	104
8/14/1953	Barbara	Category 1	92
5/29/1954	Unnamed	Tropical Storm	46
8/31/1954	Carol	Category 2	109
10/15/1954	Hazel	Category 4	132
8/12/1955	Connie	Category 2	98
9/19/1955	Ione	Category 2	109
9/27/1956	Flossy	Extratropical Storm	58
10/17/1956	Unnamed	Extratropical Storm	58
9/27/1958	Helene	Category 4	138
7/10/1959	Cindy	Tropical Storm	46

## SECTION 4: RISK ASSESSMENT

Date	Storm Name	Max Storm Category*	Max Wind Speed (mph)*
8/2/1959	Unnamed	Tropical Storm	46
7/30/1960	Brenda	Tropical Storm	63
9/12/1960	Donna	Category 2	104
9/14/1961	Unnamed	Tropical Storm	40
8/28/1962	Alma	Category 1	75
9/1/1964	Cleo	Tropical Storm	46
9/14/1964	Dora	Tropical Storm	58
10/16/1964	Isbell	Category 1	75
9/16/1967	Doria	Tropical Storm	63
10/20/1968	Gladys	Category 1	81
8/28/1971	Doria	Tropical Storm	63
9/30/1971	Ginger	Category 1	86
6/22/1972	Agnes	Tropical Storm	52
6/29/1975	Amy	Tropical Storm	40
10/27/1975	Hallie	Tropical Storm	52
8/20/1981	Dennis	Tropical Storm	69
6/19/1982	Subtrop: Unnamed	Subtropical Storm	69
9/14/1984	Diana	Tropical Storm	58
9/27/1985	Gloria	Category 2	104
11/22/1985	Kate	Tropical Storm	52
8/18/1986	Charley	Category 1	81
8/19/1991	Bob	Category 2	109
9/25/1992	Danielle	Tropical Storm	63
8/31/1993	Emily	Category 3	115
6/6/1995	Allison	Extratropical Storm	46
6/19/1996	Arthur	Tropical Storm	46
7/13/1996	Bertha	Category 1	75
10/8/1996	Josephine	Extratropical Storm	52
7/24/1997	Danny	Tropical Storm	46
8/27/1998	Bonnie	Category 2	98
9/4/1998	Earl	Extratropical Storm	58
9/4/1999	Dennis	Tropical Storm	69
9/16/1999	Floyd	Category 2	104
10/18/1999	Irene	Category 2	109
9/24/2000	Helene	Tropical Storm	46
9/10/2002	Gustav	Tropical Storm	63
10/12/2002	Kyle	Tropical Storm	46
9/18/2003	Isabel	Category 2	104
8/3/2004	Alex	Category 2	98
8/14/2004	Charley	Tropical Storm	69
9/15/2005	Ophelia	Category 1	86
6/14/2006	Alberto	Extratropical Storm	40
9/1/2006	Ernesto	Tropical Storm	58
6/3/2007	Barry	Extratropical Storm	46
9/9/2007	Gabrielle	Tropical Storm	58
7/20/2008	Cristobal	Tropical Storm	52
9/6/2008	Hanna	Tropical Storm	69
8/27/2011	Irene	Category 1	86
6/7/2013	Andrea	Extratropical Storm	46

## SECTION 4: RISK ASSESSMENT

Date	Storm Name	Max Storm Category*	Max Wind Speed (mph)*
7/4/2014	Arthur	Category 2	98
6/7/2016	Colin	Extratropical Storm	52
9/3/2016	Hermine	Extratropical Storm	69
10/9/2016	Matthew	Category 1	81

\*Reports the most intense category and wind speed that occurred within 50 miles of the Northeastern NC Region, not for the storm event overall. Source: Office of Coastal Management, 2019. <https://marinecadastre.gov/data/>

The above list of storms is not an exhaustive list of hurricanes that have affected the Northeastern NC Region. Several storms, including Hurricane Earl and Hurricane Sandy, have passed further than 50 miles away from the Northeastern NC Region yet had strong enough wind or rain impacts to affect the region. NCEI records hurricane and tropical storm events across the region by county and zone; therefore, one event that impacts all four counties in the region is recorded for each county. During the 20-year period from 1999 through 2018, NCEI records 94 hurricane and tropical storm reports across 27 separate days. These events are summarized in Table 4.52 by storm. All death, injury, and damage records were combined from all counties/zones. Where property damage estimates were broken out by type, NCEI reports only the value of wind-related damages. Event narratives following this table provide a fuller scope of the impacts from selected events.

**Table 4.52 – Recorded Hurricane/Tropical Storm Winds in Northeastern NC Counties, 1999-2018**

Date	Storm	Deaths/ Injuries	Property Damage	Crop Damage
8/30 - 9/1/1999	Hurricane Dennis	0/0	\$5,000	\$19,000,000
9/14 - 9/15/1999	Hurricane Floyd	0/0	\$8,824,000	\$55,200,000
10/16 - 10/17/1999	Hurricane Irene	0/0	\$3,000	\$0
9/10/2002	Tropical Storm Gustav	0/0	\$55,000	\$0
9/17 - 9/18/2003	Hurricane Isabel	0/0	\$14,500,000	\$0
8/3/2004	Hurricane Alex	0/0	\$5,000,000	\$0
8/14/2004	Tropical Storm Charley	0/0	\$175,000	\$450,000
9/13/2005	Hurricane Ophelia	0/0	\$50,000	\$0
8/31/2006	Tropical Storm Ernesto	0/0	\$65,000	\$0
7/20/2008	Tropical Storm Cristobal	0/0	\$0	\$0
9/5/2008	Tropical Storm Hannah	0/0	\$30,000	\$0
9/2/2010	Hurricane Earl	0/0	\$24,200	\$2,000,000
8/26 - 8/27/2011	Hurricane Irene	0/0	\$89,300,000	\$60,000,000
10/28/2012	Hurricane Sandy	0/0	\$100,000	\$0
6/6/2013	Tropical Storm Andrea	0/0	\$0	\$0
7/3 - 7/4/2014	Hurricane Arthur	0/0	\$0	\$0
9/2/2016	Hurricane Hermine	0/0	\$0	\$0
10/8/2016	Hurricane Matthew	0/0	\$0	\$0
9/13/2018	Hurricane Florence	0/0	\$14,984,000	\$0
10/11/2018	Hurricane Michael	0/0	\$0	\$0
<b>Total</b>		<b>0/0</b>	<b>\$133,115,200</b>	<b>\$136,650,000</b>

Source: NCEI

**September 14-15, 1999** – Hurricane Floyd caused massive record flooding across inland sections of eastern North Carolina. At its peak on the morning of September 13th, the winds were 155 mph and the central pressure bottomed-out at 921 mb. September 14th the first outer rainbands began affecting eastern North Carolina and in turn, reports of flooding began filtering into the National Weather Service office in Morehead City/Newport (MHX). At least 40 official shelters were open across the county warning

## SECTION 4: RISK ASSESSMENT

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area. Severe weather and rainfall preceded landfall. Estimates were near 6 to 10 inches with isolated areas of 12 to 15 inches. Hurricane Floyd made landfall on the morning of September 16th near North Topsail Beach as a category 2 hurricane. The eye moved northeast over Jacksonville, New Bern, Washington, and Plymouth and continued over the eastern shores of Virginia. As the hurricane moved over the eastern coast of North Carolina, it accelerated and weakened. It lost its tropical characteristics early on the 17th.

Similar to rainfall, the strongest ocean storm surges occurred west and northwest of the eye. Ocean storm surges were about 4 to 6 feet above normal, generally affecting Onslow, Carteret, and Hyde Counties. This caused extensive beach erosion on the south facing beaches. Ocracoke Island officials reported at least 10 new dune breaks along Highway 12. Along the Albemarle Sound, storm tides were about 5 to 6 feet above normal. The Pamlico River storm tides were around 6 to 8 feet above normal. Water levels were especially high in Hyde County. Extreme flooding was experienced across most counties. Inland flooding exceeded Hurricane Bertha, Fran, Bonnie, and Dennis combined. Most counties reported their worst flooding ever. The Roanoke River in Williamston rose to nearly 3 feet above its flood stage. Unbelievable numbers of homes were covered with water and over half a million customers throughout the county warning area were without power. In the Northeastern NC region, as reported by NCEI, wind associated with Floyd caused \$8,824,000 in property damages and over \$55 million in crop damages, however there were no reported fatalities or injuries.

**September 17-18, 2003** – Hurricane Isabel made landfall early in the afternoon on September 18th as a category two hurricane across Core Banks in extreme eastern Carteret county. Isabel moved north northwest near 20 mph across eastern North Carolina during the afternoon. Areas mainly near and east of the storm center experienced significant wind and storm surge effects. Major ocean overwash and beach erosion occurred along the North Carolina Outer Banks where waves up to 20 feet accompanied a 6 to 8 foot storm surge. Eastern Carteret, eastern Pamlico, southern Craven, Beaufort, and Hyde counties experienced significant storm surge damage with hundreds of homes flooded in most of these counties. Storm surges from 2 to 6 feet occurred across Hyde county with the highest water levels recorded in Swan Quarter in the southwest part of the county where hundreds of homes and businesses flooded. Wind damage was more significant across Hyde, Washington, Tyrell, Martin, and the Outer Banks counties where wind gusts of around 100 mph occurred. Hurricane force winds resulted in structural damage to homes. Numerous trees and power lines were downed across these areas resulting in a loss of electricity for several weeks in some locations. 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. Winds associated with Hurricane Isabel caused \$14.5 million in damages in the Northeastern NC Region.

**August 26-27, 2011** – Hurricane Irene made landfall near Cape Lookout as a large category 1 storm. Due to the large size of the hurricane, strong damaging winds, major storm surge, and flooding rains were experienced across much of eastern North Carolina. Across the Northeastern NC Region, winds gusted to 50 to 60 miles per hour, resulting in downed trees and power lines with power outages. A 3 to 5-foot surge occurring along the Albemarle Sound including Plymouth. Winds also resulted in total water level rises including wave action of 11 to 14 feet causing several dune breaches across highway 12 in Ocracoke. Sound-side surge was minimal, only up to 2-feet however on mainland Hyde County surge was 5 to 6-feet. Rainfall ranged from 7 to 8 inches in Hyde county up to 13 inches in Bertie County and 14 inches in Martin County. Low-lying roads experienced flooding and significant damage occurred to structures and crops across the region. Much of the region experienced extensive power outages. Additionally, two hurricanes – an EF1 near Creswell, and an EF2 near Columbia, touched down, adding to the damage, particularly to manufactured homes.

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**September 13, 2018** – Hurricane Florence was a long-lived Cape Verde hurricane and the wettest tropical cyclone on record in the Carolinas. By the evening of September 13, Florence had been downgraded to a Category 1 hurricane. Hurricane Florence made landfall near Wrightsville Beach early on Saturday September 15 and weakened further as it slowly moved inland. Thousands of downed trees caused widespread power outages to nearly all of eastern North Carolina. The historic legacy of Hurricane Florence will be record breaking storm surge of 9 to 13 feet and widespread devastating rainfall of 20 to 30 inches, locally up to 36 inches, which produced catastrophic and life-threatening flooding. In the Northeastern NC Region, rainfall was generally 3 to 8 inches, with a storm total of 7.53 inches in Williamston. Winds gusted up to 62 miles per hour. The gusty winds combined with saturated ground led to some downed trees with and power outages. Property damages totaled almost \$15 million across the region.

In addition to wind impacts, the Northeastern NC Region has experienced storm surge from hurricane and tropical storm events, affecting Hyde, Tyrrell, and Washington Counties. Table 4.53 summarizes all recorded storm surge events from NCEI between 1999 and 2018. These events caused over \$61 million in property damage. Narrative records on storm surge impacts are provided below.

**Table 4.53 – Recorded Storm Surge Events in Northeastern NC Counties, 1999-2018**

Date	Location	Deaths/ Injuries	Property Damage	Crop Damage
5/6/2005	EASTERN HYDE (ZONE)	0/0	\$0	\$0
7/20/2008	EASTERN HYDE (ZONE)	0/0	\$0	\$0
8/26/2011	WESTERN HYDE (ZONE)	0/0	\$40,000,000	\$0
8/26/2011	TYRRELL (ZONE)	0/0	\$20,000,000	\$0
8/26/2011	WASHINGTON (ZONE)	0/0	\$1,000,000	\$0
8/26/2011	EASTERN HYDE (ZONE)	0/0	\$0	\$0
10/28/2012	EASTERN HYDE (ZONE)	0/0	\$100,000	\$0
<b>Total</b>		<b>0/0</b>	<b>\$61,100,000</b>	<b>\$0</b>

Source: NCEI

**May 6, 2005** – An unseasonable and strong Nor'easter buffeted the North Carolina coast on the 6th with damaging wind gusts, torrential rain, high surf, and coastal flooding. Winds were sustained as high as 45 to 55 mph with wind gusts to 80 mph across coastal counties of Eastern North Carolina. Water levels rose four to six feet above normal along Pamlico Sound, and the lower reaches of the Neuse River.

**August 26, 2011 (Hurricane Irene)** – Hurricane Irene made landfall during the morning of the 27th, near Cape Lookout, as a large category 1 hurricane on the Saffir/Simpson Hurricane Wind Scale. Due to the large size of the hurricane, strong damaging winds, major storm surge, and flooding rains were experienced across much of eastern North Carolina. Millions of dollars in damages were reported across the area. Storm surge damages were estimated at 240 million dollars. The highest storm surges of 8-11 feet occurred along the Pamlico Sound, and the lower reaches of the Neuse and Pamlico Rivers on the 27th. In western Hyde County, winds gusting above hurricane force resulted in sound-side storm surge of 5 to 6 feet with minor to moderate structural damage. In eastern Hyde, winds gusting above hurricane force resulted in total water level rises including wave action of 11 to 14 feet causing several dune breaches across highway 12 in Ocracoke. Sound-side surge was minimal up to 2 feet. Winds gusted up to hurricane force resulting in a 3 to 5 foot surge along the Albemarle Sound including the Columbia area in Tyrrell County and Plymouth in Washington County.

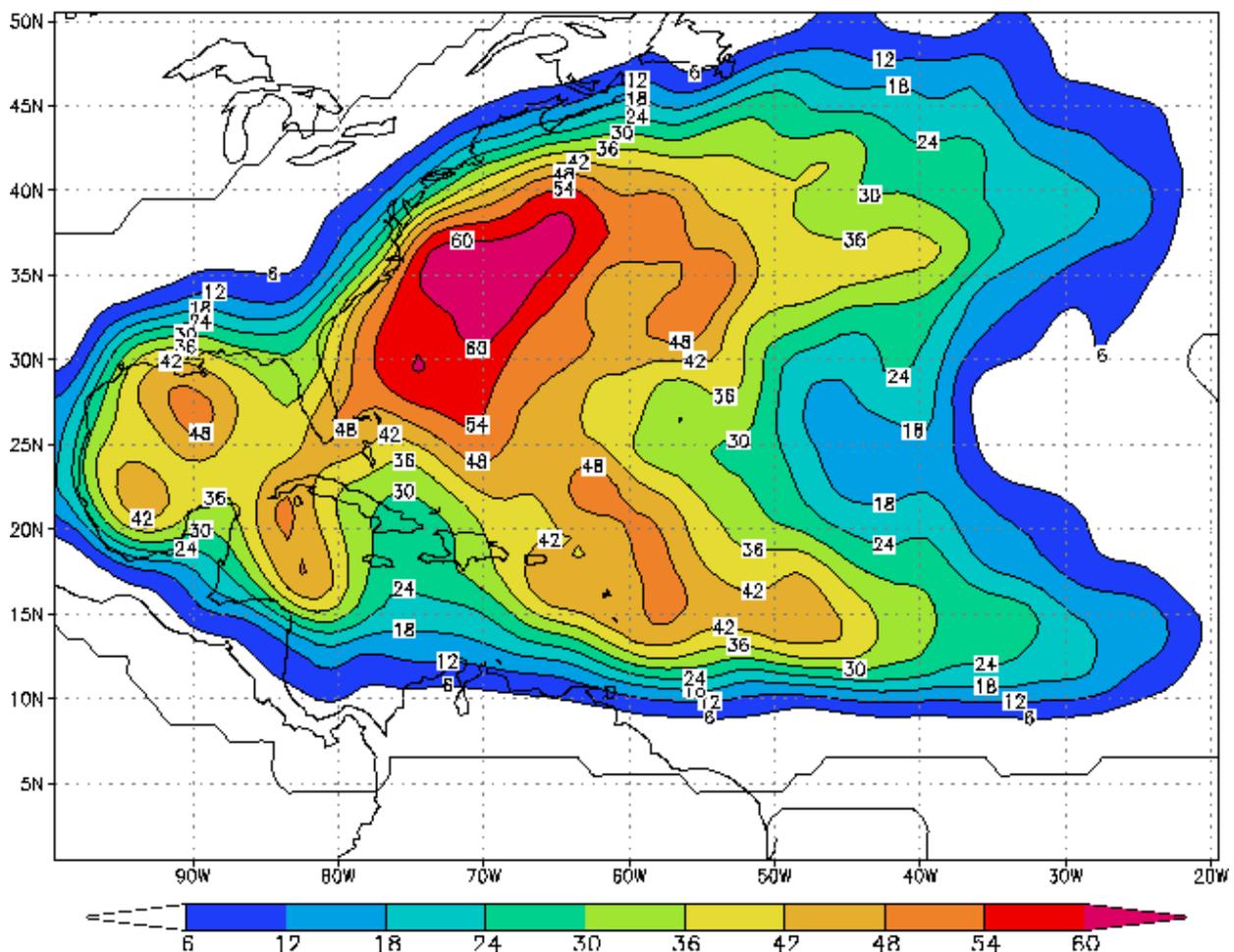
## SECTION 4: RISK ASSESSMENT

**October 28, 2012 (Hurricane Sandy)** – Maximum wind gusts were estimated from 50 mph in mainland Hyde County to 60 mph in Outer Banks Hyde County. Storm surge ranged from 1 foot across mainland Hyde County in Engelhard to 3 feet sound-side in Ocracoke. Minor to moderate beach erosion occurred due to large breaking waves. Several homes were flooded due to sound-side surge. Damages were estimated at one hundred thousand dollars due to storm surge.

### Probability of Future Occurrence

Figure 4.42 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 NOAA's Hurricane Research Division, using data from 1944 to 1999 and shows the number of times a storm or hurricane was located within approximately 100 miles of a given spot in the Atlantic basin. Per this data, there is approximately a 36-48% chance of a hurricane impacting the Northeastern NC Region in any given year.

**Figure 4.42 – 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.

## SECTION 4: RISK ASSESSMENT

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Per NCEI records, the Northeastern NC Region has been impacted by hurricane winds 20 times over the 20-year period from 1999 through 2018, equating to a 100 percent annual probability of occurrence.

*Probability: 4 – Highly Likely*

### Climate Change

One of the primary factors contributing to the origin and growth of tropical storm and hurricanes systems is water temperature. Per the Fourth National Climate Assessment, “There is growing evidence that the tropics have expanded poleward by about 70 to 200 miles in each hemisphere since satellite measurements began in 1979, with an accompanying shift of the subtropical dry zones, midlatitude jets, and both midlatitude and tropical cyclone tracks.” It is unclear as of yet whether these changes can be attributed to climate change, but current climate science suggests cyclones would become more frequent and intense as water temperatures warm. In addition to occurring with greater frequency, intense hurricanes are also expected to produce greater amounts of rainfall. The 2017 hurricane season is considered an indicator of these potential changes.

### Vulnerability Assessment

#### Methodologies and Assumptions

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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

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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

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General damages to property are both direct (what the winds associated with hurricanes physically destroy) and indirect, which focuses on additional costs, damages and losses attributed to secondary hazards spawned by the hurricane, or due to the damages caused by the storm. Depending on the size and strength of the hurricane, associated winds are capable of damaging and eventually destroying almost anything. Construction practices and building codes can help maximize the resistance of structures to damage.

Secondary impacts of damage due to hurricane winds 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 impacts of a hurricane put tremendous strain on a community. In the immediate aftermath of a hurricane, the focus is on emergency services.

Hurricanes and tropical storm winds can also cause agricultural damages. For the Northeastern NC Region, USDA RMA reports losses of \$33,889,622 from 2008-2017 due to hurricanes and tropical storms, which

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equates to an average annual loss of \$3,080,874.80. Table 4.54 through Table 4.58 summarize the crop losses due to hurricanes and tropical storms reported in the RMA system by county.

**Table 4.54 – Crop Losses Resulting from Hurricanes and Tropical Storms, 2007-2017, Bertie County**

Year	Determined Acres	Indemnity Amount
2011	8,180.76	\$6,869,770.00
2014	138.24	\$92,306.00
2016	1,087.61	\$275,952.04
2017	1,042.40	\$264,073.00
<b>Total</b>	<b>10,449.01</b>	<b>\$7,502,101.04</b>

Source: USDA Risk Management Agency

**Table 4.55 – Crop Losses Resulting from Hurricanes and Tropical Storms, 2007-2017, Hyde County**

Year	Determined Acres	Indemnity Amount
2010	67.61	\$8,245.00
2011	14,026.99	\$2,688,139.00
2012	4,353.48	\$371,342.00
2014	17,370.34	\$2,733,202.35
2016	3,225.12	\$929,758.54
2017	658.10	\$94,150.00
<b>Total</b>	<b>39,701.64</b>	<b>\$6,824,836.89</b>

Source: USDA Risk Management Agency

**Table 4.56 – Crop Losses Resulting from Hurricanes and Tropical Storms, 2007-2017, Martin County**

Year	Determined Acres	Indemnity Amount
2010	12.52	\$1,036.00
2011	19,129.26	\$10,723,635.00
2012	203.03	\$22,501.00
2014	182.85	\$443,721.67
2015	2.78	\$456.15
2016	7,223.34	\$1,898,592.47
2017	313.28	\$110,787.00
<b>Total</b>	<b>27,067.06</b>	<b>\$13,200,729.29</b>

Source: USDA Risk Management Agency

**Table 4.57 – Crop Losses Resulting from Hurricanes and Tropical Storms, 2007-2017, Tyrrell County**

Year	Determined Acres	Indemnity Amount
2011	5,617.13	\$752,728.00
2012	575.10	\$100,765.00
2014	4,614.39	\$541,813.95
2015	248.30	\$41,183.00
2016	654.59	\$228,312.62
2017	459.90	\$27,632.00
<b>Total</b>	<b>12,169.41</b>	<b>\$1,692,434.57</b>

Source: USDA Risk Management Agency

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**Table 4.58 – Crop Losses Resulting from Hurricanes and Tropical Storms, 2007-2017, Washington County**

<b>Year</b>	<b>Determined Acres</b>	<b>Indemnity Amount</b>
2010	751.90	\$102,128.00
2011	13,999.44	\$3,260,288.00
2012	92.89	\$4,169.00
2014	525.79	\$73,282.55
2015	404.00	\$104,944.00
2016	4,261.65	\$1,124,709.45
<b>Total</b>	<b>20,035.67</b>	<b>\$4,669,521.00</b>

Source: USDA Risk Management Agency

Table 4.59 through Table 4.63 detail buildings at risk and provide damage estimates across all jurisdictions for the 25-, 50-, 100-, 300-, and 700-year hurricane wind events. All scenarios impacted approximately the same number of buildings but with varying severity of damage.

The damage estimates for the 100-year hurricane wind event total \$161,713,792, which equates to a loss ratio of 4 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. 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.

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**Table 4.59 – Buildings at Risk from 25-Year Hurricane 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,994	77.30%	\$1,363,832	1,861	20.60%	\$252,708	144	1.60%	\$69,810	8,999	99.50%	\$1,686,350
Town of Askeville	425	327	76.90%	\$61,126	87	20.50%	\$7,010	11	2.60%	\$5,557	425	100%	\$73,693
Town of Aulander	675	577	85.50%	\$118,742	84	12.40%	\$14,252	14	2.10%	\$1,509	675	100%	\$134,503
Town of Colerain	377	291	77.20%	\$95,622	69	18.30%	\$8,423	13	3.40%	\$2,026	373	98.90%	\$106,071
Town of Kelford	159	136	85.50%	\$8,821	14	8.80%	\$104	4	2.50%	\$123	154	96.90%	\$9,048
Town of Lewiston-Woodville	685	558	81.50%	\$110,534	111	16.20%	\$8,339	16	2.30%	\$1,306	685	100%	\$120,179
Town of Powellsville	163	143	87.70%	\$38,344	13	8%	\$697	7	4.30%	\$564	163	100%	\$39,605
Town of Roxobel	205	151	73.70%	\$14,816	50	24.40%	\$5,389	4	2%	\$116	205	100%	\$20,321
Town of Windsor	1,584	1,247	78.70%	\$275,779	278	17.60%	\$43,932	59	3.70%	\$7,049	1,584	100%	\$326,761
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,424</b>	<b>78.30%</b>	<b>\$2,087,616</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$340,854</b>	<b>272</b>	<b>2%</b>	<b>\$88,060</b>	<b>13,263</b>	<b>99.60%</b>	<b>\$2,516,531</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$6,480,618	774	14.80%	\$608,796	122	2.30%	\$254,149	5,124	98.10%	\$7,343,563
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$3,153,059	3,227	31.20%	\$759,241	168	1.60%	\$156,024	10,321	99.90%	\$4,068,323
Town of Bear Grass	69	51	73.90%	\$19,619	6	8.70%	\$1,063	12	17.40%	\$5,133	69	100%	\$25,816
Town of Everetts	145	138	95.20%	\$41,690	7	4.80%	\$658	0	0%	\$0	145	100%	\$42,347
Town of Hamilton	273	215	78.80%	\$81,166	26	9.50%	\$5,108	31	11.40%	\$15,775	272	99.60%	\$102,049
Town of Hassell	65	54	83.10%	\$23,018	11	16.90%	\$1,392	0	0%	\$0	65	100%	\$24,410
Town of Jamesville	276	210	76.10%	\$83,984	41	14.90%	\$23,692	21	7.60%	\$6,744	272	98.60%	\$114,420
Town of Oak City	287	276	96.20%	\$140,732	10	3.50%	\$923	1	0.30%	\$3,759	287	100%	\$145,413
Town of Parmele	137	120	87.60%	\$52,865	16	11.70%	\$6,905	1	0.70%	\$624	137	100%	\$60,394
Town of Robersonville	851	737	86.60%	\$415,345	104	12.20%	\$36,900	10	1.20%	\$3,829	851	100%	\$456,074
Town of Williamston	3,900	2,843	72.90%	\$1,227,091	818	21%	\$388,692	232	5.90%	\$294,030	3,893	99.80%	\$1,909,813
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$5,238,569</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$1,224,574</b>	<b>476</b>	<b>2.90%</b>	<b>\$485,918</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$6,949,059</b>

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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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$1,156,247	508	19.30%	\$112,745	48	1.80%	\$466,312	2,568	97.60%	\$1,735,304
Town of Columbia	512	408	79.70%	\$164,889	66	12.90%	\$853,042	38	7.40%	\$97,574	512	100%	\$1,115,505
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$1,321,136</b>	<b>574</b>	<b>18.30%</b>	<b>\$965,787</b>	<b>86</b>	<b>2.70%</b>	<b>\$563,886</b>	<b>3,080</b>	<b>98%</b>	<b>\$2,850,809</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$1,252,302	1,366	25.90%	\$132,227	77	1.50%	\$11,124	5,171	98.10%	\$1,395,653
Town of Creswell	365	274	75.10%	\$122,834	68	18.60%	\$16,177	22	6%	\$10,147	364	99.70%	\$149,158
Town of Plymouth	2,657	2,235	84.10%	\$409,561	321	12.10%	\$91,900	100	3.80%	\$15,892	2,656	100%	\$517,354
Town of Roper	578	473	81.80%	\$92,736	79	13.70%	\$3,944	21	3.60%	\$59,265	573	99.10%	\$155,945
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$1,877,433</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$244,248</b>	<b>220</b>	<b>2.50%</b>	<b>\$96,428</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$2,218,110</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,352</b>	<b>75.40%</b>	<b>\$17,005,372</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$3,384,259</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$1,488,441</b>	<b>46,543</b>	<b>99.30%</b>	<b>\$21,878,072</b>

Source: NCEM Risk Management Tool

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**Table 4.60 – Buildings at Risk from 50-Year Hurricane 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$3,616,117	1,861	20.60%	\$840,315	144	1.60%	\$225,679	9,000	99.50%	\$4,682,111
Town of Askeville	425	327	76.90%	\$151,209	87	20.50%	\$19,059	11	2.60%	\$19,982	425	100%	\$190,250
Town of Aulander	675	577	85.50%	\$330,934	84	12.40%	\$45,764	14	2.10%	\$5,163	675	100%	\$381,860
Town of Colerain	377	291	77.20%	\$229,674	69	18.30%	\$29,091	13	3.40%	\$8,184	373	98.90%	\$266,949
Town of Kelford	159	141	88.70%	\$81,874	14	8.80%	\$1,630	4	2.50%	\$1,742	159	100%	\$85,246
Town of Lewiston-Woodville	685	558	81.50%	\$284,501	111	16.20%	\$42,935	16	2.30%	\$5,234	685	100%	\$332,670
Town of Powellsville	163	143	87.70%	\$90,068	13	8%	\$2,753	7	4.30%	\$2,501	163	100%	\$95,322
Town of Roxobel	205	151	73.70%	\$57,888	50	24.40%	\$16,710	4	2%	\$393	205	100%	\$74,991
Town of Windsor	1,584	1,247	78.70%	\$708,413	278	17.60%	\$135,728	59	3.70%	\$22,373	1,584	100%	\$866,513
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$5,550,678</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$1,133,985</b>	<b>272</b>	<b>2%</b>	<b>\$291,251</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$6,975,912</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$19,388,311	774	14.80%	\$2,036,397	122	2.30%	\$1,086,148	5,124	98.10%	\$22,510,856
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$7,983,156	3,227	31.20%	\$2,848,302	168	1.60%	\$642,015	10,321	99.90%	\$11,473,473
Town of Bear Grass	69	51	73.90%	\$60,592	6	8.70%	\$5,028	12	17.40%	\$23,473	69	100%	\$89,093
Town of Everetts	145	138	95.20%	\$99,321	7	4.80%	\$3,103	0	0%	\$0	145	100%	\$102,425
Town of Hamilton	273	215	78.80%	\$195,016	26	9.50%	\$23,207	31	11.40%	\$69,421	272	99.60%	\$287,643
Town of Hassell	65	54	83.10%	\$70,023	11	16.90%	\$6,054	0	0%	\$0	65	100%	\$76,077
Town of Jamesville	276	210	76.10%	\$214,891	41	14.90%	\$96,964	21	7.60%	\$26,696	272	98.60%	\$338,551
Town of Oak City	287	276	96.20%	\$449,579	10	3.50%	\$4,137	1	0.30%	\$13,473	287	100%	\$467,189
Town of Parmele	137	120	87.60%	\$123,784	16	11.70%	\$26,104	1	0.70%	\$2,756	137	100%	\$152,644
Town of Robersonville	851	737	86.60%	\$1,060,340	104	12.20%	\$160,627	10	1.20%	\$15,779	851	100%	\$1,236,745
Town of Williamston	3,900	2,843	72.90%	\$2,992,889	818	21%	\$1,536,679	232	5.90%	\$1,142,842	3,893	99.80%	\$5,672,410
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$13,249,591</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$4,710,205</b>	<b>476</b>	<b>2.90%</b>	<b>\$1,936,455</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$19,896,250</b>

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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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$3,124,105	508	19.30%	\$376,755	48	1.80%	\$1,441,219	2,568	97.60%	\$4,942,080
Town of Columbia	512	408	79.70%	\$416,225	66	12.90%	\$1,416,129	38	7.40%	\$238,048	512	100%	\$2,070,402
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$3,540,330</b>	<b>574</b>	<b>18.30%</b>	<b>\$1,792,884</b>	<b>86</b>	<b>2.70%</b>	<b>\$1,679,267</b>	<b>3,080</b>	<b>98%</b>	<b>\$7,012,482</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$3,799,661	1,366	25.90%	\$556,840	77	1.50%	\$58,057	5,171	98.10%	\$4,414,559
Town of Creswell	365	274	75.10%	\$271,007	68	18.60%	\$54,036	22	6%	\$44,561	364	99.70%	\$369,603
Town of Plymouth	2,657	2,235	84.10%	\$1,029,758	321	12.10%	\$250,547	100	3.80%	\$59,312	2,656	100%	\$1,339,616
Town of Roper	578	473	81.80%	\$445,420	79	13.70%	\$39,903	21	3.60%	\$325,119	573	99.10%	\$810,442
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$5,545,846</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$901,326</b>	<b>220</b>	<b>2.50%</b>	<b>\$487,049</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$6,934,220</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$47,274,756</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$10,574,797</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$5,480,170</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$63,329,720</b>

Source: NCEM Risk Management Tool

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**Table 4.61 – Buildings at Risk from 100-Year Hurricane 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$8,312,171	1,861	20.60%	\$2,251,317	144	1.60%	\$623,999	9,000	99.50%	\$11,187,487
Town of Askeville	425	327	76.90%	\$337,956	87	20.50%	\$51,799	11	2.60%	\$50,965	425	100%	\$440,720
Town of Aulander	675	577	85.50%	\$359,460	84	12.40%	\$47,674	14	2.10%	\$7,115	675	100%	\$414,249
Town of Colerain	377	291	77.20%	\$578,389	69	18.30%	\$97,829	13	3.40%	\$35,773	373	98.90%	\$711,991
Town of Kelford	159	141	88.70%	\$81,874	14	8.80%	\$1,630	4	2.50%	\$1,742	159	100%	\$85,246
Town of Lewiston-Woodville	685	558	81.50%	\$735,166	111	16.20%	\$174,073	16	2.30%	\$20,955	685	100%	\$930,193
Town of Powellsville	163	143	87.70%	\$221,858	13	8%	\$10,704	7	4.30%	\$10,782	163	100%	\$243,343
Town of Roxobel	205	151	73.70%	\$133,469	50	24.40%	\$46,095	4	2%	\$2,134	205	100%	\$181,697
Town of Windsor	1,584	1,247	78.70%	\$1,545,562	278	17.60%	\$418,738	59	3.70%	\$79,320	1,584	100%	\$2,043,620
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$12,305,905</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$3,099,859</b>	<b>272</b>	<b>2%</b>	<b>\$832,785</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$16,238,546</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$44,594,153	774	14.80%	\$4,927,815	122	2.30%	\$3,202,671	5,124	98.10%	\$52,724,639
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$24,248,558	3,227	31.20%	\$7,679,473	168	1.60%	\$1,893,513	10,321	99.90%	\$33,821,545
Town of Bear Grass	69	51	73.90%	\$218,221	6	8.70%	\$20,800	12	17.40%	\$94,467	69	100%	\$333,488
Town of Everetts	145	138	95.20%	\$239,633	7	4.80%	\$15,218	0	0%	\$0	145	100%	\$254,851
Town of Hamilton	273	215	78.80%	\$596,937	26	9.50%	\$87,340	31	11.40%	\$230,210	272	99.60%	\$914,487
Town of Hassell	65	54	83.10%	\$262,845	11	16.90%	\$22,119	0	0%	\$0	65	100%	\$284,964
Town of Jamesville	276	210	76.10%	\$655,444	41	14.90%	\$326,182	21	7.60%	\$98,382	272	98.60%	\$1,080,009
Town of Oak City	287	276	96.20%	\$1,740,321	10	3.50%	\$16,984	1	0.30%	\$36,827	287	100%	\$1,794,132
Town of Parmele	137	120	87.60%	\$362,856	16	11.70%	\$74,437	1	0.70%	\$9,391	137	100%	\$446,684
Town of Robersonville	851	737	86.60%	\$3,445,127	104	12.20%	\$528,534	10	1.20%	\$54,770	851	100%	\$4,028,431
Town of Williamston	3,900	2,843	72.90%	\$8,499,179	818	21%	\$5,242,004	232	5.90%	\$3,272,468	3,893	99.80%	\$17,013,650
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$40,269,121</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$14,013,091</b>	<b>476</b>	<b>2.90%</b>	<b>\$5,690,028</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$59,972,241</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$8,863,183	508	19.30%	\$1,095,899	48	1.80%	\$3,633,078	2,568	97.60%	\$13,592,160
Town of Columbia	512	408	79.70%	\$1,324,564	66	12.90%	\$2,158,923	38	7.40%	\$650,172	512	100%	\$4,133,659
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$10,187,747</b>	<b>574</b>	<b>18.30%</b>	<b>\$3,254,822</b>	<b>86</b>	<b>2.70%</b>	<b>\$4,283,250</b>	<b>3,080</b>	<b>98%</b>	<b>\$17,725,819</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$8,428,932	1,366	25.90%	\$1,391,315	77	1.50%	\$199,446	5,171	98.10%	\$10,019,694
Town of Creswell	365	274	75.10%	\$719,992	68	18.60%	\$163,459	22	6%	\$183,434	364	99.70%	\$1,066,885
Town of Plymouth	2,657	2,235	84.10%	\$2,209,543	321	12.10%	\$636,168	100	3.80%	\$200,294	2,656	100%	\$3,046,005
Town of Roper	578	473	81.80%	\$515,237	79	13.70%	\$79,417	21	3.60%	\$325,309	573	99.10%	\$919,963
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$11,873,704</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$2,270,359</b>	<b>220</b>	<b>2.50%</b>	<b>\$908,483</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$15,052,547</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$119,230,630</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$27,565,946</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$14,917,217</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$161,713,792</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.62 – Buildings at Risk from 300-Year Hurricane 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$21,901,420	1,861	20.60%	\$5,775,934	144	1.60%	\$1,857,476	9,000	99.50%	\$29,534,830
Town of Askeville	425	327	76.90%	\$798,223	87	20.50%	\$142,008	11	2.60%	\$117,627	425	100%	\$1,057,858
Town of Aulander	675	577	85.50%	\$1,917,917	84	12.40%	\$443,663	14	2.10%	\$73,469	675	100%	\$2,435,048
Town of Colerain	377	291	77.20%	\$1,616,825	69	18.30%	\$304,719	13	3.40%	\$132,879	373	98.90%	\$2,054,422
Town of Kelford	159	141	88.70%	\$491,736	14	8.80%	\$25,739	4	2.50%	\$30,973	159	100%	\$548,448
Town of Lewiston-Woodville	685	558	81.50%	\$1,975,088	111	16.20%	\$568,409	16	2.30%	\$76,634	685	100%	\$2,620,131
Town of Powellsville	163	143	87.70%	\$611,204	13	8%	\$39,220	7	4.30%	\$40,813	163	100%	\$691,236
Town of Roxobel	205	151	73.70%	\$946,042	50	24.40%	\$324,577	4	2%	\$41,755	205	100%	\$1,312,374
Town of Windsor	1,584	1,247	78.70%	\$3,611,840	278	17.60%	\$1,303,228	59	3.70%	\$290,659	1,584	100%	\$5,205,727
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$33,870,295</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$8,927,497</b>	<b>272</b>	<b>2%</b>	<b>\$2,662,285</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$45,460,074</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$140,055,267	774	14.80%	\$16,107,284	122	2.30%	\$15,379,985	5,124	98.10%	\$171,542,537
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$120,841,945	3,227	31.20%	\$29,582,870	168	1.60%	\$7,906,895	10,321	99.90%	\$158,331,709
Town of Bear Grass	69	51	73.90%	\$1,078,031	6	8.70%	\$68,671	12	17.40%	\$330,961	69	100%	\$1,477,663
Town of Everetts	145	138	95.20%	\$713,473	7	4.80%	\$62,431	0	0%	\$0	145	100%	\$775,904
Town of Hamilton	273	215	78.80%	\$1,995,465	26	9.50%	\$275,374	31	11.40%	\$647,659	272	99.60%	\$2,918,498
Town of Hassell	65	54	83.10%	\$832,693	11	16.90%	\$72,293	0	0%	\$0	65	100%	\$904,986
Town of Jamesville	276	210	76.10%	\$4,966,470	41	14.90%	\$2,372,982	21	7.60%	\$761,159	272	98.60%	\$8,100,611
Town of Oak City	287	276	96.20%	\$5,632,105	10	3.50%	\$60,738	1	0.30%	\$99,062	287	100%	\$5,791,905
Town of Parmele	137	120	87.60%	\$1,164,401	16	11.70%	\$194,611	1	0.70%	\$27,487	137	100%	\$1,386,499
Town of Robersonville	851	737	86.60%	\$11,402,505	104	12.20%	\$1,491,388	10	1.20%	\$169,838	851	100%	\$13,063,731
Town of Williamston	3,900	2,843	72.90%	\$26,836,361	818	21%	\$15,926,516	232	5.90%	\$8,258,852	3,893	99.80%	\$51,021,729
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$175,463,449</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$50,107,874</b>	<b>476</b>	<b>2.90%</b>	<b>\$18,201,913</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$243,773,235</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$25,718,123	508	19.30%	\$2,922,962	48	1.80%	\$8,469,596	2,568	97.60%	\$37,110,681
Town of Columbia	512	408	79.70%	\$3,940,843	66	12.90%	\$3,416,572	38	7.40%	\$1,791,322	512	100%	\$9,148,737
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$29,658,966</b>	<b>574</b>	<b>18.30%</b>	<b>\$6,339,534</b>	<b>86</b>	<b>2.70%</b>	<b>\$10,260,918</b>	<b>3,080</b>	<b>98%</b>	<b>\$46,259,418</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$30,957,609	1,366	25.90%	\$4,231,044	77	1.50%	\$926,860	5,171	98.10%	\$36,115,512
Town of Creswell	365	274	75.10%	\$1,819,409	68	18.60%	\$428,484	22	6%	\$584,838	364	99.70%	\$2,832,732
Town of Plymouth	2,657	2,235	84.10%	\$12,263,270	321	12.10%	\$3,617,297	100	3.80%	\$1,761,922	2,656	100%	\$17,642,489
Town of Roper	578	473	81.80%	\$3,349,250	79	13.70%	\$699,578	21	3.60%	\$1,136,750	573	99.10%	\$5,185,577
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$48,389,538</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$8,976,403</b>	<b>220</b>	<b>2.50%</b>	<b>\$4,410,370</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$61,776,310</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$427,437,515</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$90,458,592</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$50,915,471</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$568,811,574</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.63 – Buildings at Risk from 700-Year Hurricane 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$48,899,851	1,861	20.60%	\$12,468,931	144	1.60%	\$4,823,257	9,000	99.50%	\$66,192,039
Town of Askeville	425	327	76.90%	\$1,840,533	87	20.50%	\$350,032	11	2.60%	\$267,120	425	100%	\$2,457,685
Town of Aulander	675	577	85.50%	\$4,647,518	84	12.40%	\$1,315,662	14	2.10%	\$214,125	675	100%	\$6,177,305
Town of Colerain	377	291	77.20%	\$3,965,507	69	18.30%	\$795,860	13	3.40%	\$364,523	373	98.90%	\$5,125,890
Town of Kelford	159	141	88.70%	\$1,143,608	14	8.80%	\$72,074	4	2.50%	\$88,244	159	100%	\$1,303,926
Town of Lewiston-Woodville	685	558	81.50%	\$4,738,801	111	16.20%	\$1,479,033	16	2.30%	\$226,509	685	100%	\$6,444,342
Town of Powellsville	163	143	87.70%	\$1,512,842	13	8%	\$117,194	7	4.30%	\$122,715	163	100%	\$1,752,751
Town of Roxobel	205	151	73.70%	\$2,195,826	50	24.40%	\$709,738	4	2%	\$111,526	205	100%	\$3,017,090
Town of Windsor	1,584	1,247	78.70%	\$8,619,154	278	17.60%	\$3,552,159	59	3.70%	\$900,169	1,584	100%	\$13,071,482
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$77,563,640</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$20,860,683</b>	<b>272</b>	<b>2%</b>	<b>\$7,118,188</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$105,542,510</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$205,125,714	774	14.80%	\$26,201,593	122	2.30%	\$24,432,026	5,124	98.10%	\$255,759,332
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$232,102,833	3,227	31.20%	\$57,150,808	168	1.60%	\$15,294,189	10,321	99.90%	\$304,547,831
Town of Bear Grass	69	51	73.90%	\$1,900,110	6	8.70%	\$169,609	12	17.40%	\$876,520	69	100%	\$2,946,238
Town of Everetts	145	138	95.20%	\$2,024,212	7	4.80%	\$175,665	0	0%	\$0	145	100%	\$2,199,877
Town of Hamilton	273	215	78.80%	\$5,233,818	26	9.50%	\$675,685	31	11.40%	\$1,576,397	272	99.60%	\$7,485,900
Town of Hassell	65	54	83.10%	\$1,884,681	11	16.90%	\$188,668	0	0%	\$0	65	100%	\$2,073,349
Town of Jamesville	276	210	76.10%	\$7,972,334	41	14.90%	\$4,792,866	21	7.60%	\$1,502,574	272	98.60%	\$14,267,774
Town of Oak City	287	276	96.20%	\$13,015,289	10	3.50%	\$165,548	1	0.30%	\$242,744	287	100%	\$13,423,581
Town of Parmele	137	120	87.60%	\$2,980,359	16	11.70%	\$452,192	1	0.70%	\$68,109	137	100%	\$3,500,661
Town of Robersonville	851	737	86.60%	\$28,893,225	104	12.20%	\$3,636,884	10	1.20%	\$445,385	851	100%	\$32,975,494
Town of Williamston	3,900	2,843	72.90%	\$69,200,042	818	21%	\$39,756,508	232	5.90%	\$18,729,220	3,893	99.80%	\$127,685,770
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$365,206,903</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$107,164,433</b>	<b>476</b>	<b>2.90%</b>	<b>\$38,735,138</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$511,106,475</b>

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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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$47,422,810	508	19.30%	\$5,489,709	48	1.80%	\$16,762,478	2,568	97.60%	\$69,674,997
Town of Columbia	512	408	79.70%	\$9,230,661	66	12.90%	\$5,783,387	38	7.40%	\$4,279,968	512	100%	\$19,294,016
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$56,653,471</b>	<b>574</b>	<b>18.30%</b>	<b>\$11,273,096</b>	<b>86</b>	<b>2.70%</b>	<b>\$21,042,446</b>	<b>3,080</b>	<b>98%</b>	<b>\$88,969,013</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$64,863,756	1,366	25.90%	\$8,559,954	77	1.50%	\$2,251,874	5,171	98.10%	\$75,675,583
Town of Creswell	365	274	75.10%	\$3,939,166	68	18.60%	\$990,855	22	6%	\$1,499,836	364	99.70%	\$6,429,856
Town of Plymouth	2,657	2,235	84.10%	\$27,701,655	321	12.10%	\$7,832,107	100	3.80%	\$4,067,614	2,656	100%	\$39,601,376
Town of Roper	578	473	81.80%	\$7,605,684	79	13.70%	\$1,458,238	21	3.60%	\$1,936,397	573	99.10%	\$11,000,320
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$104,110,261</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$18,841,154</b>	<b>220</b>	<b>2.50%</b>	<b>\$9,755,721</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$132,707,135</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$808,659,989</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$184,340,959</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$101,083,519</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$1,094,084,465</b>

Source: NCEM Risk Management Tool

## SECTION 4: RISK ASSESSMENT

### 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 4.64 summarizes the potential negative consequences of hurricanes and tropical storms.

**Table 4.64 – 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.

### Hazard Summary by Jurisdiction

The following table summarizes hurricane and tropical storm hazard risk by jurisdiction. Most aspects of hurricane risk do not vary substantially by jurisdiction. While hurricanes have the possibility of being catastrophic across all jurisdictions, certain areas may be even more vulnerable. Mobile home units are more vulnerable to wind damage; therefore, Bertie and Tyrrell Counties, which have higher rates of mobile homes, may experience more severe impacts. Inland areas may experience less damage due to storm surge commonly associated with hurricanes and tropical storms.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	4	4	4	1	3	3.6	H

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Town of Askeville	4	4	4	1	3	3.6	H
Town of Aulander	4	4	4	1	3	3.6	H
Town of Colerain	4	4	4	1	3	3.6	H
Town of Kelford	4	4	4	1	3	3.6	H
Town of Lewiston-Woodville	4	4	4	1	3	3.6	H
Town of Powellsville	4	4	4	1	3	3.6	H
Town of Roxobel	4	4	4	1	3	3.6	H
Town of Windsor	4	4	4	1	3	3.6	H
Hyde County	4	4	4	1	3	3.6	H
Martin County	4	4	4	1	3	3.6	H
Town of Bear Grass	4	4	4	1	3	3.6	H
Town of Everetts	4	4	4	1	3	3.6	H
Town of Hamilton	4	4	4	1	3	3.6	H
Town of Hassell	4	4	4	1	3	3.6	H
Town of Jamesville	4	4	4	1	3	3.6	H
Town of Oak City	4	4	4	1	3	3.6	H
Town of Parmele	4	4	4	1	3	3.6	H
Town of Robersonville	4	4	4	1	3	3.6	H
Town of Williamston	4	4	4	1	3	3.6	H
Tyrrell County	4	4	4	1	3	3.6	H
Town of Columbia	4	4	4	1	3	3.6	H
Washington County	4	4	4	1	3	3.6	H
Town of Creswell	4	4	4	1	3	3.6	H
Town of Plymouth	4	4	4	1	3	3.6	H
Town of Roper	4	4	4	1	3	3.6	H

### 4.5.8 Severe Weather (Thunderstorm Winds, Lightning & 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. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at earth's surface and causes strong winds associated with thunderstorms.

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

Thunderstorms are responsible for the development and formation of many severe weather phenomena, posing great hazards to the population and landscape. Damage that results from thunderstorms is mainly inflicted by 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 and wildland fires, and damage electrical systems and equipment.

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

*Warning Time: 4 – Less than six hours*

*Duration: 1 – Less than six hours*

### Hail

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

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

Hailstorms in 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.

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

*Warning Time: 4 – Less than six hours*

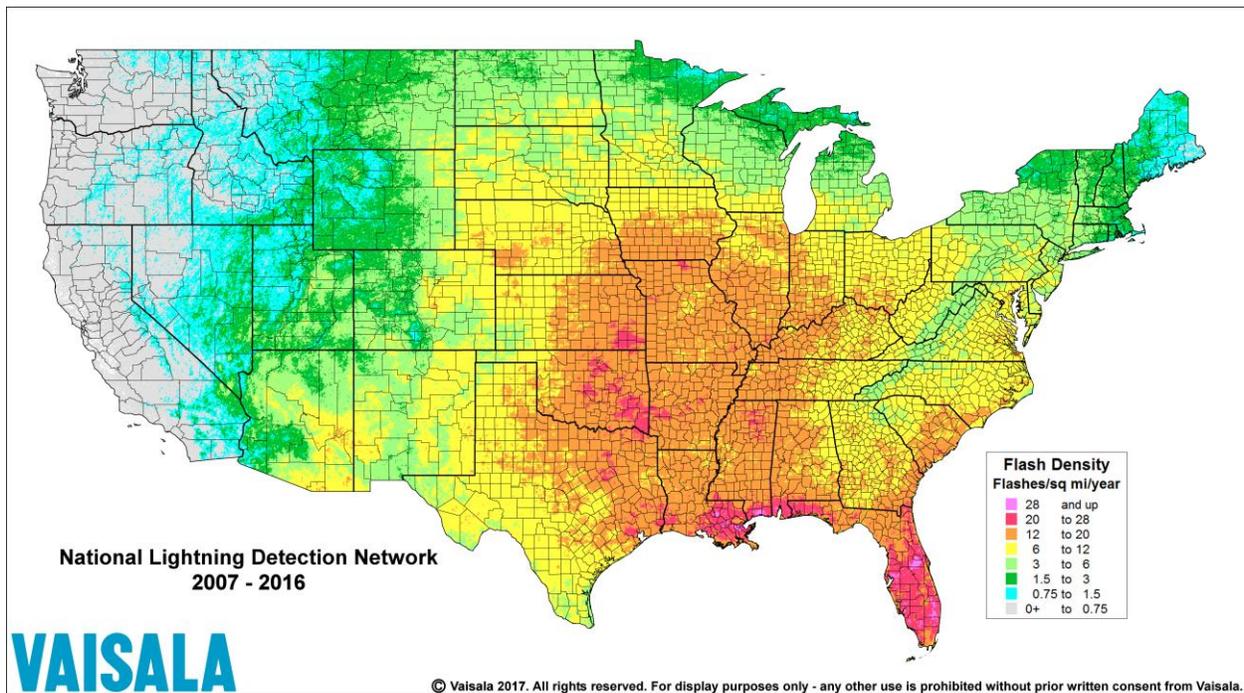
*Duration: 1 – Less than six hours*

### Location

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

According to the Vaisala flash density map, shown in Figure 4.43, the majority of the Northeastern NC Region is located in an area that experiences between 6 and 20 lightning flashes per square mile per year. It should be noted that future lightning occurrences may exceed these figures.

Figure 4.43 – Lightning Flash Density (2008-2016)



Source: Vaisala

## 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 strongest recorded thunderstorm wind event in the region occurred on March 5, 2008 with a measured gust of 90 mph in Kelford. The event caused \$25,000 in property damage, including a destroyed mobile home. A roof was also blown off a house and several outbuildings were destroyed.

*Impact: 2 – Limited*

*Spatial Extent: 4 – Large*

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### 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 4.65 – Lightning Activity Level Scale**

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

Source: National Weather Service

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

*Impact: 1 – Minor*

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

*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 4.66 indicates the hailstone measurements utilized by the National Weather Service.

**Table 4.66 – 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

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Average Diameter	Corresponding Household Object
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

The Tornado and Storm Research Organization (TORRO) has further described hail sizes by their typical damage impacts. Table 4.67 describes typical intensity and damage impacts of the various sizes of hail.

**Table 4.67 – Tornado and Storm Research Organization Hailstorm Intensity Scale**

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

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

It should be noted that in addition to hail diameter, factors including number and density of hailstones, hail fall speed, and surface wind speeds affect severity.

The average hailstone size recorded between 1999 and 2018 in the Northeastern NC Region was a little over 1" in diameter. The largest hailstones recorded during this period were 4.25", recorded on only one occasion. The worst instance occurred on May 9, 2003 in Colerain, where many vehicles and homes suffered damages.

### *Impact: 1 – Minor*

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

### *Spatial Extent: 2 – Small*

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### Historical Occurrences

#### Thunderstorm Winds

Between January 1, 1999 and December 31, 2018, the NCEI recorded 216 separate incidents of high winds, strong winds, and thunderstorm winds, occurring on 139 separate days. These events caused \$557,300 in recorded property damage, and 1 injury, with no recorded fatalities or crop damages. The recorded gusts averaged 60 mph, with the highest gust recorded at 89.8 mph. Of these events, 63 caused property damage. Wind gusts with property damage recorded averaged \$8,846 in damage. The largest damage estimate, approximately \$70,000 was caused by a 69 mph gust on January 7, 2009 in Williamston. All incidents causing property damage are recorded below:

**Table 4.68 – Recorded Wind Events with Property Damages in Northeastern NC Region, 1999-2018**

Location	Date	Time	Wind Speed (mph)	Fatalities	Injuries	Property Damage
Williamston	5/20/2000	2215	71	0	0	\$10,000
Roper	5/27/2000	2223	-	0	0	\$30,000
Bear Grass	5/27/2000	2245	-	0	0	\$10,000
Colerain	8/16/2000	2040	58	0	0	\$5,000
Merry Hill	8/18/2000	1750	58	0	0	\$3,000
Williamston	5/22/2001	2015	61	0	0	\$10,000
Columbia	4/25/2002	2000	-	0	0	\$5,000
Windsor	5/13/2002	2035	-	0	0	\$2,000
Lewiston	7/10/2002	1850	-	0	0	\$2,000
Windsor	11/11/2002	1230	-	0	0	\$2,000
Colerain	5/9/2003	1710	58	0	0	\$15,000
Aulander	6/7/2003	1736	58	0	0	\$2,000
Ocracoke	12/11/2003	27	63	0	0	\$10,000
Windsor	5/2/2004	1440	58	0	0	\$2,000
Countywide	3/8/2005	1200	75	0	1	\$50,000
Williamston	3/8/2005	1115	58	0	0	\$25,000
Countywide	3/8/2005	1140	63	0	0	\$25,000
Countywide	3/8/2005	1212	75	0	0	\$25,000
Windsor	9/17/2005	2235	58	0	0	\$2,000
Aulander	1/14/2006	225	58	0	0	\$4,000
Jamesville	4/3/2006	1125	69	0	0	\$10,000
Buena Vista	7/28/2006	1900	58	0	0	\$2,000
Windsor	7/28/2006	2115	58	0	0	\$2,000
Kelford	3/5/2008	100	90	0	0	\$25,000
Cremona	5/11/2008	1752	58	0	0	\$2,000
Trap	5/11/2008	1757	58	0	0	\$2,000
Colerain	5/11/2008	1800	58	0	0	\$2,000
Colerain	6/1/2008	1610	58	0	0	\$1,000
Cremona	6/1/2008	1822	58	0	0	\$1,000
Bertie (Zone)	12/31/2008	1723	46	0	0	\$1,000
Williamston	1/7/2009	1021	69	0	0	\$70,000
Bertie (Zone)	1/7/2009	2015	58	0	0	\$5,000
Woodville	4/6/2009	1130	60	0	0	\$25,000

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Location	Date	Time	Wind Speed (mph)	Fatalities	Injuries	Property Damage
Fairfield	5/29/2009	1505	63	0	0	\$2,000
Windsor	9/28/2009	2000	58	0	0	\$2,000
Martin (Zone)	2/10/2010	815	52	0	0	\$500
Woodville	6/16/2010	1614	58	0	0	\$2,000
Colerain	6/16/2010	1631	58	0	0	\$2,000
Merry Hill	8/12/2010	1608	58	0	0	\$2,000
Cremona	5/23/2011	1922	58	0	0	\$2,000
Windsor	6/27/2011	1515	58	0	0	\$2,000
Cahaba	6/27/2011	1550	58	0	0	\$2,000
Burden	7/20/2011	1600	58	0	0	\$2,000
Aulander	7/1/2012	1533	58	0	0	\$1,000
Woodard	7/24/2012	1635	58	0	0	\$2,000
Williamston	1/31/2013	203	69	0	0	\$20,000
Robersonville	1/31/2013	147	69	0	0	\$5,000
Windsor	1/31/2013	230	60	0	0	\$2,000
Martin (Zone)	3/6/2013	1300	49	0	0	\$500
Colerain	6/13/2013	1730	58	0	0	\$2,000
Bear Grass	6/13/2013	1803	58	0	0	\$300
Windsor	4/25/2014	1730	58	0	0	\$3,000
Creswell	6/5/2014	1250	64	0	0	\$4,000
Trap	6/19/2014	1925	58	0	0	\$2,000
Colerain	7/15/2014	1410	58	0	0	\$5,000
Fairfield	2/16/2016	946	69	0	0	\$5,000
Lake Comfort	2/16/2016	943	69	0	0	\$3,000
Robersonville	7/8/2016	1925	75	0	0	\$10,000
Bertie (Zone)	10/8/2016	1800	58	0	0	\$50,000
Midway	3/31/2017	1055	58	0	0	\$3,000
Trap	3/31/2017	1728	58	0	0	\$1,000
Bertie	6/5/2017	1553	58	0	0	\$30,000
Powellsville	6/5/2017	1600	58	0	0	\$3,000
<b>Total</b>				0	1	\$557,300

Source: NCEI

Of all 216 wind events during this period, there was 1 incident that directly caused one injury. This thunderstorm wind event occurred on March 3, 2005 in Hyde County. Wind gusts reached 75 mph and damage totaled \$50,000.

### Lightning

According to NCEI data, there were no lightning strikes reported between 1999 and 2018. Although no events were recorded, events could still occur in the future, causing damage, injury, or fatalities.

### Hail

NCEI records 101 separate hail incidents across 73 days between January 1, 1999 and December 31, 2018 in the Northeastern NC Region. Of these, one event was reported to have directly caused property damage and another event was reported to have directly caused crop damage; there were no reported deaths, or injuries. The largest diameter hail recorded in the Region was 4.25 inches; hail this size fell on May 9, 2003

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in Colerain. The average hail size in all storms was a little over one inch in diameter. Table 4.69 summarizes hail occurrences by county from 1999 through 2018.

**Table 4.69 – Summary of Hail Occurrences by County, 1999-2018**

County	Number of Occurrences	Average Hail Diameter	Total Property Damage	Total Crop Damage
Bertie County	16	1.42"	\$20,000	\$1,000
Hyde County	19	1.29"	\$0	\$0
Martin County	40	0.97"	\$0	\$0
Tyrrell County	7	0.89"	\$0	\$0
Washington County	19	0.92"	\$0	\$0
<b>Total</b>	<b>101</b>	<b>1.08"</b>	<b>\$20,000</b>	<b>\$1,000</b>

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

**June 15, 2000** – Hail caused \$1,000 in damage to tobacco fields.

**May 9, 2003** – Hail of up to 4.25" in diameter fell in Colerain, causing \$20,000 in property damages to vehicles and homes.

**July 24, 2009** – A cold front and upper level disturbance combined to produce widespread severe thunderstorms across the area mainly during the afternoon hours. The storm led to baseball size hail and tree limbs down on Highway 45 five miles southwest of Pungo Lake.

### Probability of Future Occurrence

Based on historical occurrences recorded by NCEI for the 20-year period from 1999 through 2018, the Northeastern NC Region averages 6.95 days with thunderstorm wind events per year. Additionally, the region has averaged 3.65 days with reported hail incidents per 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 also highly likely.

*Probability: 4 – Highly Likely*

### Climate Change

Research on the effects of climate change on severe weather is limited. However, according to the Fourth National Climate Assessment, some preliminary studies suggest that the frequency and intensity of severe thunderstorms may increase as the climate changes. Warm, moist air near the surface is a key ingredient of "convective available potential energy" or CAPE. Increases in air temperature and moisture content due to climate change may increase CAPE, making the atmosphere more conducive to the development of severe storms in the future. Conversely, warming in the arctic may result in less wind shear in the mid-latitudes, making storms less likely. Modeling consistently shows that climate change could increase the frequency and intensity of severe storms, but more research is needed to fully understand the implications of climate change on severe storms.

### Vulnerability Assessment

#### Methodologies and Assumptions

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

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### 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.

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. Individuals who work outdoors may face increased risk during severe weather events. Residents living in mobile homes are also more vulnerable to hail events due to the lack of shelter locations and the vulnerability of the housing unit to damages. Table 4.70 summarizes estimates of mobile home units in the Northeastern NC Region by county as of 2017. Based on these figures, vulnerability is high in Bertie and Tyrrell Counties.

**Table 4.70 – Mobile Home Units in the Northeastern NC Region, 2017**

County	Occupied Mobile Home Units	Total Occupied Housing Units	Percent of Occupied Housing
Bertie County	2,937	7,988	36.8%
Hyde County	420	1,835	22.9%
Martin County	2,116	9,624	22.0%
Tyrrell County	511	1,539	33.2%
Washington County	1,323	3,114	25.3%

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

Since 1999, the NCEI records no fatalities and 1 injury attributed to wind events in the Region. There are no injuries or fatalities attributed to hail or lightning.

### 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. There was no damage recorded due to lightning in the region, but often property damage is due to structure fires.

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 the 20-year span from 1999 and 2018, NCEI reported \$20,000 in damages caused by hail in the Northeastern NC Region, which equates to an annualized loss of \$1,000.

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 another accurate repository of hail damages, thus the NCEI is still used to form a baseline.

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When strong enough, wind events can cause significant direct damage to buildings and infrastructure. NCEM's IRISK database estimates damages from increasing magnitudes of wind events, detailed in Table 4.71 through Table 4.75. Note that these tables sum the total estimated damage should every exposed property in each jurisdiction be impacted by an event of the given magnitude. Therefore, these tables are not an approximation of the total damages that would occur from an event of each magnitude because a thunderstorm wind event would not uniformly impact the entire Region. These tables should only be used to understand potential damages relative to storms of varying degrees of severity.

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**Table 4.71 – Estimated Buildings Impacted by 25-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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$2,982,108	1,861	20.60%	\$672,230	144	1.60%	\$190,332	9,000	99.50%	\$3,844,670
Town of Askeville	425	327	76.90%	\$99,926	87	20.50%	\$11,598	11	2.60%	\$11,017	425	100%	\$122,541
Town of Aulander	675	577	85.50%	\$206,443	84	12.40%	\$26,141	14	2.10%	\$2,660	675	100%	\$235,243
Town of Colerain	377	291	77.20%	\$229,674	69	18.30%	\$29,091	13	3.40%	\$8,184	373	98.90%	\$266,949
Town of Kelford	159	141	88.70%	\$52,733	14	8.80%	\$751	4	2.50%	\$800	159	100%	\$54,284
Town of Lewiston-Woodville	685	558	81.50%	\$179,074	111	16.20%	\$19,239	16	2.30%	\$2,561	685	100%	\$200,874
Town of Powellsville	163	143	87.70%	\$90,068	13	8%	\$2,753	7	4.30%	\$2,501	163	100%	\$95,322
Town of Roxobel	205	151	73.70%	\$82,419	50	24.40%	\$26,816	4	2%	\$920	205	100%	\$110,155
Town of Windsor	1,584	1,247	78.70%	\$458,656	278	17.60%	\$77,024	59	3.70%	\$12,203	1,584	100%	\$547,884
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$4,381,101</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$865,643</b>	<b>272</b>	<b>2%</b>	<b>\$231,178</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$5,477,922</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$3,061,497	774	14.80%	\$315,673	122	2.30%	\$154,541	5,124	98.10%	\$3,531,712
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$4,949,208	3,227	31.20%	\$1,530,556	168	1.60%	\$320,277	10,321	99.90%	\$6,800,042
Town of Bear Grass	69	51	73.90%	\$34,095	6	8.70%	\$2,379	12	17.40%	\$11,329	69	100%	\$47,803
Town of Everetts	145	138	95.20%	\$65,659	7	4.80%	\$1,395	0	0%	\$0	145	100%	\$67,054
Town of Hamilton	273	215	78.80%	\$124,637	26	9.50%	\$11,143	31	11.40%	\$34,602	272	99.60%	\$170,383
Town of Hassell	65	54	83.10%	\$38,808	11	16.90%	\$3,020	0	0%	\$0	65	100%	\$41,827
Town of Jamesville	276	210	76.10%	\$133,351	41	14.90%	\$49,869	21	7.60%	\$13,428	272	98.60%	\$196,648
Town of Oak City	287	276	96.20%	\$243,398	10	3.50%	\$1,974	1	0.30%	\$7,441	287	100%	\$252,813
Town of Parmele	137	120	87.60%	\$80,158	16	11.70%	\$13,943	1	0.70%	\$1,372	137	100%	\$95,472
Town of Robersonville	851	737	86.60%	\$651,007	104	12.20%	\$79,720	10	1.20%	\$7,966	851	100%	\$738,693
Town of Williamston	3,900	2,843	72.90%	\$1,916,105	818	21%	\$787,446	232	5.90%	\$605,857	3,893	99.80%	\$3,309,408
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$8,236,426</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$2,481,445</b>	<b>476</b>	<b>2.90%</b>	<b>\$1,002,272</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$11,720,143</b>

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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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$1,156,247	508	19.30%	\$112,745	48	1.80%	\$466,312	2,568	97.60%	\$1,735,304
Town of Columbia	512	408	79.70%	\$164,889	66	12.90%	\$853,042	38	7.40%	\$97,574	512	100%	\$1,115,505
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$1,321,136</b>	<b>574</b>	<b>18.30%</b>	<b>\$965,787</b>	<b>86</b>	<b>2.70%</b>	<b>\$563,886</b>	<b>3,080</b>	<b>98%</b>	<b>\$2,850,809</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$1,989,171	1,366	25.90%	\$190,548	77	1.50%	\$20,124	5,171	98.10%	\$2,199,844
Town of Creswell	365	274	75.10%	\$122,834	68	18.60%	\$16,177	22	6%	\$10,147	364	99.70%	\$149,158
Town of Plymouth	2,657	2,235	84.10%	\$1,016,844	321	12.10%	\$248,233	100	3.80%	\$59,312	2,656	100%	\$1,324,389
Town of Roper	578	473	81.80%	\$229,479	79	13.70%	\$18,839	21	3.60%	\$150,130	573	99.10%	\$398,448
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$3,358,328</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$473,797</b>	<b>220</b>	<b>2.50%</b>	<b>\$239,713</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$4,071,839</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$20,358,488</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$5,102,345</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$2,191,590</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$27,652,425</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.72 – 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$4,658,936	1,861	20.60%	\$1,150,587	144	1.60%	\$309,961	9,000	99.50%	\$6,119,484
Town of Askeville	425	327	76.90%	\$160,002	87	20.50%	\$19,368	11	2.60%	\$19,982	425	100%	\$199,352
Town of Aulander	675	577	85.50%	\$330,934	84	12.40%	\$45,764	14	2.10%	\$5,163	675	100%	\$381,860
Town of Colerain	377	291	77.20%	\$359,816	69	18.30%	\$54,541	13	3.40%	\$17,981	373	98.90%	\$432,338
Town of Kelford	159	141	88.70%	\$81,874	14	8.80%	\$1,630	4	2.50%	\$1,742	159	100%	\$85,246
Town of Lewiston-Woodville	685	558	81.50%	\$284,501	111	16.20%	\$42,935	16	2.30%	\$5,234	685	100%	\$332,670
Town of Powellsville	163	143	87.70%	\$139,538	13	8%	\$5,556	7	4.30%	\$5,400	163	100%	\$150,494
Town of Roxobel	205	151	73.70%	\$133,469	50	24.40%	\$46,095	4	2%	\$2,134	205	100%	\$181,697
Town of Windsor	1,584	1,247	78.70%	\$708,413	278	17.60%	\$135,728	59	3.70%	\$22,373	1,584	100%	\$866,513
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$6,857,483</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$1,502,204</b>	<b>272</b>	<b>2%</b>	<b>\$389,970</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$8,749,654</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$5,173,197	774	14.80%	\$605,583	122	2.30%	\$358,737	5,124	98.10%	\$6,137,517
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$7,994,439	3,227	31.20%	\$3,060,042	168	1.60%	\$610,970	10,321	99.90%	\$11,665,451
Town of Bear Grass	69	51	73.90%	\$60,592	6	8.70%	\$5,028	12	17.40%	\$23,473	69	100%	\$89,093
Town of Everetts	145	138	95.20%	\$99,321	7	4.80%	\$3,103	0	0%	\$0	145	100%	\$102,425
Town of Hamilton	273	215	78.80%	\$195,016	26	9.50%	\$23,207	31	11.40%	\$69,421	272	99.60%	\$287,643
Town of Hassell	65	54	83.10%	\$70,023	11	16.90%	\$6,054	0	0%	\$0	65	100%	\$76,077
Town of Jamesville	276	210	76.10%	\$214,891	41	14.90%	\$96,964	21	7.60%	\$26,696	272	98.60%	\$338,551
Town of Oak City	287	276	96.20%	\$449,579	10	3.50%	\$4,137	1	0.30%	\$13,473	287	100%	\$467,189
Town of Parmele	137	120	87.60%	\$123,784	16	11.70%	\$26,104	1	0.70%	\$2,756	137	100%	\$152,644
Town of Robersonville	851	737	86.60%	\$1,060,340	104	12.20%	\$160,627	10	1.20%	\$15,779	851	100%	\$1,236,745
Town of Williamston	3,900	2,843	72.90%	\$2,992,889	818	21%	\$1,536,679	232	5.90%	\$1,142,842	3,893	99.80%	\$5,672,410
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$13,260,874</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$4,921,945</b>	<b>476</b>	<b>2.90%</b>	<b>\$1,905,410</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$20,088,228</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$2,249,837	508	19.30%	\$256,483	48	1.80%	\$1,394,563	2,568	97.60%	\$3,900,883
Town of Columbia	512	408	79.70%	\$414,687	66	12.90%	\$1,416,129	38	7.40%	\$238,048	512	100%	\$2,068,864
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$2,664,524</b>	<b>574</b>	<b>18.30%</b>	<b>\$1,672,612</b>	<b>86</b>	<b>2.70%</b>	<b>\$1,632,611</b>	<b>3,080</b>	<b>98%</b>	<b>\$5,969,747</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$3,173,952	1,366	25.90%	\$373,157	77	1.50%	\$43,825	5,171	98.10%	\$3,590,934
Town of Creswell	365	274	75.10%	\$179,028	68	18.60%	\$30,271	22	6%	\$21,543	364	99.70%	\$230,842
Town of Plymouth	2,657	2,235	84.10%	\$1,517,427	321	12.10%	\$403,825	100	3.80%	\$111,843	2,656	100%	\$2,033,095
Town of Roper	578	473	81.80%	\$341,183	79	13.70%	\$40,343	21	3.60%	\$227,055	573	99.10%	\$608,581
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$5,211,590</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$847,596</b>	<b>220</b>	<b>2.50%</b>	<b>\$404,266</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$6,463,452</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$33,167,668</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$9,549,940</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$4,690,994</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$47,408,598</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.73 – 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$7,296,861	1,861	20.60%	\$1,988,372	144	1.60%	\$507,892	9,000	99.50%	\$9,793,125
Town of Askeville	425	327	76.90%	\$337,464	87	20.50%	\$51,799	11	2.60%	\$50,965	425	100%	\$440,227
Town of Aulander	675	577	85.50%	\$513,321	84	12.40%	\$79,357	14	2.10%	\$10,463	675	100%	\$603,141
Town of Colerain	377	291	77.20%	\$578,389	69	18.30%	\$97,829	13	3.40%	\$35,773	373	98.90%	\$711,991
Town of Kelford	159	141	88.70%	\$125,833	14	8.80%	\$3,545	4	2.50%	\$3,906	159	100%	\$133,283
Town of Lewiston-Woodville	685	558	81.50%	\$455,125	111	16.20%	\$90,830	16	2.30%	\$10,853	685	100%	\$556,808
Town of Powellsville	163	143	87.70%	\$221,858	13	8%	\$10,704	7	4.30%	\$10,782	163	100%	\$243,343
Town of Roxobel	205	151	73.70%	\$217,772	50	24.40%	\$78,879	4	2%	\$5,141	205	100%	\$301,792
Town of Windsor	1,584	1,247	78.70%	\$1,069,954	278	17.60%	\$241,589	59	3.70%	\$42,249	1,584	100%	\$1,353,792
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$10,816,577</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$2,642,904</b>	<b>272</b>	<b>2%</b>	<b>\$678,024</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$14,137,502</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$10,274,792	774	14.80%	\$1,215,417	122	2.30%	\$774,259	5,124	98.10%	\$12,264,468
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$14,146,274	3,227	31.20%	\$5,273,189	168	1.60%	\$1,137,448	10,321	99.90%	\$20,556,911
Town of Bear Grass	69	51	73.90%	\$114,016	6	8.70%	\$10,770	12	17.40%	\$50,008	69	100%	\$174,793
Town of Everetts	145	138	95.20%	\$151,584	7	4.80%	\$7,328	0	0%	\$0	145	100%	\$158,912
Town of Hamilton	273	215	78.80%	\$331,535	26	9.50%	\$47,036	31	11.40%	\$131,474	272	99.60%	\$510,044
Town of Hassell	65	54	83.10%	\$135,615	11	16.90%	\$12,167	0	0%	\$0	65	100%	\$147,783
Town of Jamesville	276	210	76.10%	\$369,488	41	14.90%	\$183,939	21	7.60%	\$53,305	272	98.60%	\$606,731
Town of Oak City	287	276	96.20%	\$891,901	10	3.50%	\$8,720	1	0.30%	\$22,795	287	100%	\$923,417
Town of Parmele	137	120	87.60%	\$140,045	16	11.70%	\$30,151	1	0.70%	\$5,171	137	100%	\$175,366
Town of Robersonville	851	737	86.60%	\$1,873,503	104	12.20%	\$301,062	10	1.20%	\$30,246	851	100%	\$2,204,811
Town of Williamston	3,900	2,843	72.90%	\$4,928,452	818	21%	\$2,931,969	232	5.90%	\$1,999,424	3,893	99.80%	\$9,859,844
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$23,082,413</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$8,806,331</b>	<b>476</b>	<b>2.90%</b>	<b>\$3,429,871</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$35,318,612</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$5,004,499	508	19.30%	\$581,246	48	1.80%	\$2,307,610	2,568	97.60%	\$7,893,355
Town of Columbia	512	408	79.70%	\$742,839	66	12.90%	\$1,759,611	38	7.40%	\$396,253	512	100%	\$2,898,703
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$5,747,338</b>	<b>574</b>	<b>18.30%</b>	<b>\$2,340,857</b>	<b>86</b>	<b>2.70%</b>	<b>\$2,703,863</b>	<b>3,080</b>	<b>98%</b>	<b>\$10,792,058</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$4,974,699	1,366	25.90%	\$669,308	77	1.50%	\$87,138	5,171	98.10%	\$5,731,145
Town of Creswell	365	274	75.10%	\$271,007	68	18.60%	\$54,036	22	6%	\$44,561	364	99.70%	\$369,603
Town of Plymouth	2,657	2,235	84.10%	\$2,209,543	321	12.10%	\$636,168	100	3.80%	\$200,294	2,656	100%	\$3,046,005
Town of Roper	578	473	81.80%	\$508,968	79	13.70%	\$78,650	21	3.60%	\$325,309	573	99.10%	\$912,927
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$7,964,217</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$1,438,162</b>	<b>220</b>	<b>2.50%</b>	<b>\$657,302</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$10,059,680</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$57,885,337</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$16,443,671</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$8,243,319</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$82,572,320</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.74 – 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$15,412,884	1,861	20.60%	\$4,227,350	144	1.60%	\$1,142,396	9,000	99.50%	\$20,782,630
Town of Askeville	425	327	76.90%	\$525,905	87	20.50%	\$88,443	11	2.60%	\$79,213	425	100%	\$693,562
Town of Aulander	675	577	85.50%	\$1,237,812	84	12.40%	\$254,504	14	2.10%	\$40,874	675	100%	\$1,533,190
Town of Colerain	377	291	77.20%	\$1,616,825	69	18.30%	\$304,719	13	3.40%	\$132,879	373	98.90%	\$2,054,422
Town of Kelford	159	141	88.70%	\$315,619	14	8.80%	\$14,535	4	2.50%	\$17,084	159	100%	\$347,239
Town of Lewiston-Woodville	685	558	81.50%	\$1,234,210	111	16.20%	\$333,285	16	2.30%	\$42,844	685	100%	\$1,610,339
Town of Powellsville	163	143	87.70%	\$374,386	13	8%	\$21,806	7	4.30%	\$22,496	163	100%	\$418,689
Town of Roxobel	205	151	73.70%	\$593,610	50	24.40%	\$212,999	4	2%	\$23,251	205	100%	\$829,860
Town of Windsor	1,584	1,247	78.70%	\$2,374,131	278	17.60%	\$770,877	59	3.70%	\$159,114	1,584	100%	\$3,304,122
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$23,685,382</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$6,228,518</b>	<b>272</b>	<b>2%</b>	<b>\$1,660,151</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$31,574,053</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$26,602,652	774	14.80%	\$3,400,273	122	2.30%	\$2,816,752	5,124	98.10%	\$32,819,677
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$42,472,218	3,227	31.20%	\$12,136,209	168	1.60%	\$3,239,005	10,321	99.90%	\$57,847,432
Town of Bear Grass	69	51	73.90%	\$422,369	6	8.70%	\$40,686	12	17.40%	\$191,912	69	100%	\$654,967
Town of Everetts	145	138	95.20%	\$416,169	7	4.80%	\$33,902	0	0%	\$0	145	100%	\$450,071
Town of Hamilton	273	215	78.80%	\$1,129,679	26	9.50%	\$163,780	31	11.40%	\$402,585	272	99.60%	\$1,696,044
Town of Hassell	65	54	83.10%	\$492,440	11	16.90%	\$42,772	0	0%	\$0	65	100%	\$535,212
Town of Jamesville	276	210	76.10%	\$1,199,785	41	14.90%	\$587,264	21	7.60%	\$185,239	272	98.60%	\$1,972,288
Town of Oak City	287	276	96.20%	\$3,287,984	10	3.50%	\$34,506	1	0.30%	\$61,551	287	100%	\$3,384,042
Town of Parmele	137	120	87.60%	\$362,856	16	11.70%	\$74,437	1	0.70%	\$9,391	137	100%	\$446,684
Town of Robersonville	851	737	86.60%	\$4,489,725	104	12.20%	\$650,511	10	1.20%	\$56,992	851	100%	\$5,197,228
Town of Williamston	3,900	2,843	72.90%	\$15,532,022	818	21%	\$9,559,239	232	5.90%	\$5,361,490	3,893	99.80%	\$30,452,750
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$69,805,247</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$23,323,306</b>	<b>476</b>	<b>2.90%</b>	<b>\$9,508,165</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$102,636,718</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$9,962,065	508	19.30%	\$1,136,544	48	1.80%	\$5,287,787	2,568	97.60%	\$16,386,396
Town of Columbia	512	408	79.70%	\$1,324,564	66	12.90%	\$2,158,923	38	7.40%	\$650,172	512	100%	\$4,133,659
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$11,286,629</b>	<b>574</b>	<b>18.30%</b>	<b>\$3,295,467</b>	<b>86</b>	<b>2.70%</b>	<b>\$5,937,959</b>	<b>3,080</b>	<b>98%</b>	<b>\$20,520,055</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$12,038,554	1,366	25.90%	\$1,764,232	77	1.50%	\$292,659	5,171	98.10%	\$14,095,445
Town of Creswell	365	274	75.10%	\$719,992	68	18.60%	\$163,459	22	6%	\$183,434	364	99.70%	\$1,066,885
Town of Plymouth	2,657	2,235	84.10%	\$3,366,014	321	12.10%	\$1,025,870	100	3.80%	\$374,137	2,656	100%	\$4,766,021
Town of Roper	578	473	81.80%	\$1,294,580	79	13.70%	\$268,789	21	3.60%	\$640,334	573	99.10%	\$2,203,702
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$17,419,140</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$3,222,350</b>	<b>220</b>	<b>2.50%</b>	<b>\$1,490,564</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$22,132,053</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$148,799,050</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$39,469,914</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$21,413,591</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$209,682,556</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.75 – 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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	6,995	77.30%	\$27,747,201	1,861	20.60%	\$7,504,841	144	1.60%	\$2,274,200	9,000	99.50%	\$37,526,243
Town of Askeville	425	327	76.90%	\$1,104,288	87	20.50%	\$191,881	11	2.60%	\$165,904	425	100%	\$1,462,073
Town of Aulander	675	577	85.50%	\$1,917,917	84	12.40%	\$443,663	14	2.10%	\$73,469	675	100%	\$2,435,048
Town of Colerain	377	291	77.20%	\$2,672,342	69	18.30%	\$531,123	13	3.40%	\$241,781	373	98.90%	\$3,445,246
Town of Kelford	159	141	88.70%	\$491,736	14	8.80%	\$25,739	4	2.50%	\$30,973	159	100%	\$548,448
Town of Lewiston-Woodville	685	558	81.50%	\$1,975,088	111	16.20%	\$568,409	16	2.30%	\$76,634	685	100%	\$2,620,131
Town of Powellsville	163	143	87.70%	\$1,010,102	13	8%	\$75,115	7	4.30%	\$78,319	163	100%	\$1,163,536
Town of Roxobel	205	151	73.70%	\$946,042	50	24.40%	\$324,577	4	2%	\$41,755	205	100%	\$1,312,374
Town of Windsor	1,584	1,247	78.70%	\$3,615,848	278	17.60%	\$1,303,228	59	3.70%	\$290,659	1,584	100%	\$5,209,734
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,430</b>	<b>78.30%</b>	<b>\$41,480,564</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$10,968,576</b>	<b>272</b>	<b>2%</b>	<b>\$3,273,694</b>	<b>13,269</b>	<b>99.60%</b>	<b>\$55,722,833</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,228	80.90%	\$55,358,578	774	14.80%	\$6,526,679	122	2.30%	\$5,544,465	5,124	98.10%	\$67,429,723
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$78,868,177	3,227	31.20%	\$21,449,690	168	1.60%	\$5,407,963	10,321	99.90%	\$105,725,829
Town of Bear Grass	69	51	73.90%	\$748,879	6	8.70%	\$68,671	12	17.40%	\$330,961	69	100%	\$1,148,511
Town of Everetts	145	138	95.20%	\$713,473	7	4.80%	\$62,431	0	0%	\$0	145	100%	\$775,904
Town of Hamilton	273	215	78.80%	\$1,995,465	26	9.50%	\$275,374	31	11.40%	\$647,659	272	99.60%	\$2,918,498
Town of Hassell	65	54	83.10%	\$832,693	11	16.90%	\$72,293	0	0%	\$0	65	100%	\$904,986
Town of Jamesville	276	210	76.10%	\$2,042,233	41	14.90%	\$973,822	21	7.60%	\$310,360	272	98.60%	\$3,326,416
Town of Oak City	287	276	96.20%	\$5,632,105	10	3.50%	\$60,738	1	0.30%	\$99,062	287	100%	\$5,791,905
Town of Parmele	137	120	87.60%	\$1,164,401	16	11.70%	\$194,611	1	0.70%	\$27,487	137	100%	\$1,386,499
Town of Robersonville	851	737	86.60%	\$11,402,505	104	12.20%	\$1,491,388	10	1.20%	\$169,838	851	100%	\$13,063,731
Town of Williamston	3,900	2,843	72.90%	\$26,836,361	818	21%	\$15,926,516	232	5.90%	\$8,258,852	3,893	99.80%	\$51,021,729
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$130,236,292</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$40,575,534</b>	<b>476</b>	<b>2.90%</b>	<b>\$15,252,182</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$186,064,008</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,012	76.40%	\$21,929,557	508	19.30%	\$2,593,772	48	1.80%	\$8,248,624	2,568	97.60%	\$32,771,952
Town of Columbia	512	408	79.70%	\$3,940,843	66	12.90%	\$3,416,572	38	7.40%	\$1,791,322	512	100%	\$9,148,737
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,420</b>	<b>77%</b>	<b>\$25,870,400</b>	<b>574</b>	<b>18.30%</b>	<b>\$6,010,344</b>	<b>86</b>	<b>2.70%</b>	<b>\$10,039,946</b>	<b>3,080</b>	<b>98%</b>	<b>\$41,920,689</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,728	70.70%	\$21,099,600	1,366	25.90%	\$2,979,393	77	1.50%	\$591,876	5,171	98.10%	\$24,670,870
Town of Creswell	365	274	75.10%	\$1,317,041	68	18.60%	\$320,957	22	6%	\$383,390	364	99.70%	\$2,021,389
Town of Plymouth	2,657	2,235	84.10%	\$8,132,332	321	12.10%	\$2,521,392	100	3.80%	\$1,153,338	2,656	100%	\$11,807,061
Town of Roper	578	473	81.80%	\$2,169,578	79	13.70%	\$476,732	21	3.60%	\$889,087	573	99.10%	\$3,535,397
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,710</b>	<b>75.60%</b>	<b>\$32,718,551</b>	<b>1,834</b>	<b>20.70%</b>	<b>\$6,298,474</b>	<b>220</b>	<b>2.50%</b>	<b>\$3,017,691</b>	<b>8,764</b>	<b>98.80%</b>	<b>\$42,034,717</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,358</b>	<b>75.40%</b>	<b>\$285,664,385</b>	<b>10,015</b>	<b>21.40%</b>	<b>\$70,379,607</b>	<b>1,176</b>	<b>2.50%</b>	<b>\$37,127,978</b>	<b>46,549</b>	<b>99.30%</b>	<b>\$393,171,970</b>

Source: NCEM Risk Management Tool

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Severe weather can also cause significant agricultural losses. Between 2007-2017, the sum of claims paid for crop damage due to hail and wind damages in the Region was \$3,221,766 or an average of \$292,887 in losses annually. Bertie and Martin Counties were responsible for most of these claims. Table 4.76 through Table 4.80 summarize the crop losses due to severe weather by county, as reported in the RMA system.

**Table 4.76 – Crop Losses Resulting from Severe Weather, Bertie County, 2007-2017**

Year	Determined Acres	Indemnity Amount
<b>Hail</b>		
2008	128.60	\$45,724.00
2009	1.92	\$1,621.00
2010	30.00	\$4,528.00
2011	2.10	\$4,121.00
2012	189.91	\$67,070.00
<b>Wind/Excess Wind</b>		
2008	328.50	\$358,459.00
2009	148.00	\$205,500.00
2011	385.43	\$105,803.00
2013	46.00	\$5,176.00
2014	15.80	\$48,621.00
2015	70.28	\$72,553.00
2016	21.77	\$4,594.20
2017	49.92	\$125,903.00
<b>Total</b>	<b>1,418.22</b>	<b>\$1,049,673.20</b>

Source: USDA Risk Management Agency

**Table 4.77 – Crop Losses Resulting from Severe Weather, Hyde County, 2007-2017**

Year	Determined Acres	Indemnity Amount
<b>Hail</b>		
2009	42.84	\$4,279.00
2012	34.93	\$6,272.00
2013	109.20	\$5,084.00
<b>Wind/Excess Wind</b>		
2008	49.50	\$2,083.00
2014	1,064.55	\$199,442.00
<b>Total</b>	<b>1,301.02</b>	<b>\$217,160.00</b>

Source: USDA Risk Management Agency

**Table 4.78 – Crop Losses Resulting from Severe Weather, Martin County, 2007-2017**

Year	Determined Acres	Indemnity Amount
<b>Hail</b>		
2010	16.60	\$2,669.00
2011	28.20	\$13,911.00
2012	74.91	\$80,951.00
2013	24.75	\$1,946.00
2014	20.75	\$54,763.15
<b>Wind/Excess Wind</b>		
2007	86.76	\$161,266.00
2008	4.87	\$4,218.00
2010	12.30	\$27,696.00
2011	29.55	\$37,946.00

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Year	Determined Acres	Indemnity Amount
2012	177.25	\$240,087.00
2014	143.96	\$227,804.45
2015	107.80	\$119,432.60
2016	303.64	\$642,896.17
2017	48.62	\$68,490.00
<b>Total</b>	<b>1,079.96</b>	<b>\$1,684,076.37</b>

Source: USDA Risk Management Agency

**Table 4.79 – Crop Losses Resulting from Severe Weather, Tyrrell County, 2007-2017**

Year	Determined Acres	Indemnity Amount
<b>Hail</b>		
2008	291.00	\$25,285.00
<b>Wind/Excess Wind</b>		
2008	40.00	\$1,683.00
2013	367.10	\$161,657.00
<b>Total</b>	<b>698.10</b>	<b>\$188,625.00</b>

Source: USDA Risk Management Agency

**Table 4.80 – Crop Losses Resulting from Severe Weather, Washington County, 2007-2017**

Year	Determined Acres	Indemnity Amount
<b>Hail</b>		
2012	31.52	\$4,596.00
2014	35.97	\$9,134.70
<b>Wind/Excess Wind</b>		
2008	49.60	\$2,088.00
2013	295.90	\$60,334.00
2016	32.82	\$6,078.60
<b>Total</b>	<b>445.81</b>	<b>\$82,231.30</b>

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 4.81 summarizes the potential negative consequences of severe weather.

**Table 4.81 – Consequence Analysis – Severe Weather (Thunderstorm Winds, Lightning, and Hail)**

Category	Consequences
Public	Injuries and fatalities possible
Responders	Injuries and fatalities unlikely; 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

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Category	Consequences
Property, Facilities and Infrastructure	Possibility of structure fire ignition; potential for disruptions in power and communications infrastructure; destruction and/or damage to any exposed property, especially windows, cars and siding; mobile homes see increased risk
Environment	Potential fire ignition from lightning; hail damage to wildlife and foliage
Economic Condition of the Jurisdiction	Lightning damage contingent on target; can severely impact/destroy critical infrastructure and other economic drivers
Public Confidence in the Jurisdiction's Governance	Public confidence is not generally affected by severe weather events.

### Hazard Summary by Jurisdiction

The following table summarizes severe weather hazard risk by jurisdiction. Most aspects of severe weather risk do not vary substantially by jurisdiction; however, wind and hail impacts may be greater in more highly developed areas with higher exposure in terms of both property and population density. Additionally, mobile home units are more vulnerable to wind damage. Mobile home units comprise over 30% of the housing mix of Bertie County and Tyrrell County; therefore, these areas may face more severe impacts from wind. Martin County and Bertie County also experienced high agricultural losses, so the unincorporated areas of these counties were rated higher for impact. Where priority ratings vary between thunderstorm wind, lightning, and hail for impact and spatial extent, these scores represent an average rating with greater weight given to thunderstorm wind because it occurs much more frequently.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	4	3	3	4	1	3.2	H
Town of Askewville	4	3	3	4	1	3.2	H
Town of Aulander	4	3	3	4	1	3.2	H
Town of Colerain	4	3	3	4	1	3.2	H
Town of Kelford	4	3	3	4	1	3.2	H
Town of Lewiston-Woodville	4	3	3	4	1	3.2	H
Town of Powellsville	4	3	3	4	1	3.2	H
Town of Roxobel	4	3	3	4	1	3.2	H
Town of Windsor	4	3	3	4	1	3.2	H
Hyde County	4	2	3	4	1	2.9	H
Martin County	4	3	3	4	1	3.2	H
Town of Bear Grass	4	2	3	4	1	2.9	H
Town of Everetts	4	2	3	4	1	2.9	H
Town of Hamilton	4	2	3	4	1	2.9	H
Town of Hassell	4	2	3	4	1	2.9	H
Town of Jamesville	4	2	3	4	1	2.9	H
Town of Oak City	4	2	3	4	1	2.9	H
Town of Parmele	4	2	3	4	1	2.9	H
Town of Robersonville	4	2	3	4	1	2.9	H
Town of Williamston	4	2	3	4	1	2.9	H
Tyrrell County	4	3	3	4	1	3.2	H
Town of Columbia	4	3	3	4	1	3.2	H
Washington County	4	2	3	4	1	2.9	H
Town of Creswell	4	2	3	4	1	2.9	H
Town of Plymouth	4	2	3	4	1	2.9	H
Town of Roper	4	2	3	4	1	2.9	H

### 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. Sleet 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 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 one week*

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

#### Location

Severe winter storms are usually a regional hazard, impacting the entire planning area at the same time. The risk of a severe winter storm occurring is generally 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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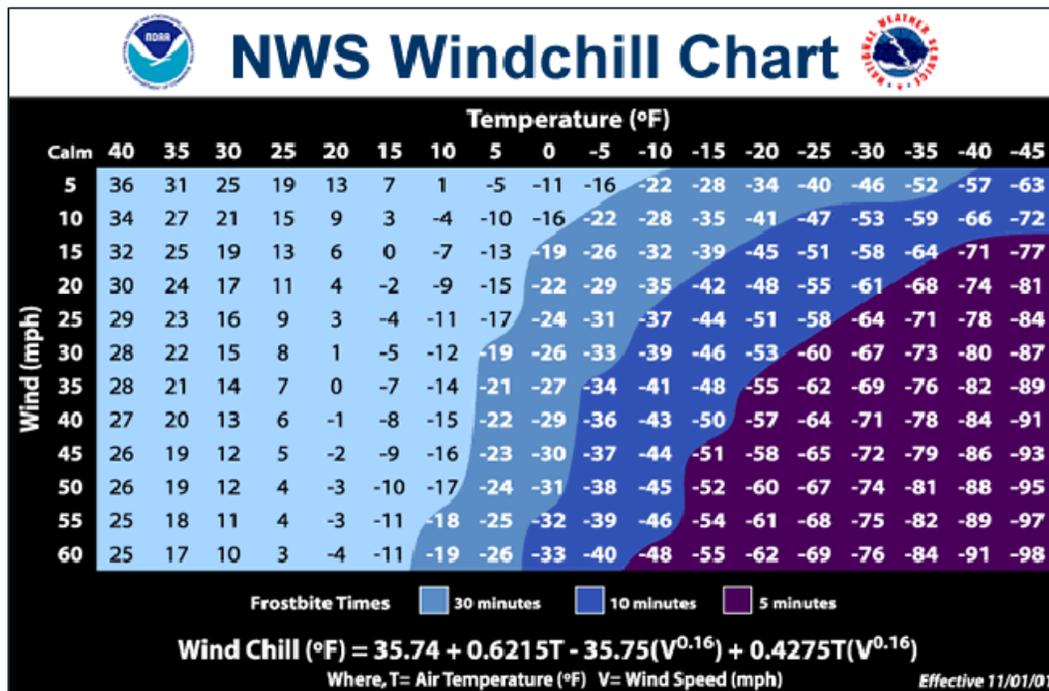
**Table 4.82 – Regional Snowfall Index (RSI) Values**

Category	RSI Value	Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18+	Extreme

Source: NOAA

Severe winter 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 4.44, provides a formula for calculating the dangers of winter winds and freezing temperatures.

**Figure 4.44 – NWS Wind Chill Temperature Index**



Source: <http://www.nws.noaa.gov/om/winter/windchill.shtml>

Table 4.83 notes greatest recorded one-day snowfall totals for each county in the Northeastern NC Region.

**Table 4.83 – Greatest One-Day Snowfall by County**

County	Inches	Location	Date
Bertie	11.5 in.	Lewiston	February 6, 1980
Hyde	10.0 in.	New Holland	Dec 25, 1989
Martin	17.0 in.	Williamston	March 3, 1980
Tyrrell	12.0 in.	Columbia	February 6, 1980
Washington	10.5 in.	Plymouth	February 6, 1980

Source: North Carolina Climate Office

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The most significant recorded snow depth over the last 20 years took place in December 2000, with recorded depths ranging from 5 to 15 inches across the five-county area.

*Impact: 1 – Minor*

*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 Northeastern NC Region is accustomed to moderate winter weather as a result of a nor'easter originating in the Gulf Stream and producing frozen precipitation. Given the atmospheric nature of the hazard, the entire planning area 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.

Summarized impacts from data collected for the years 1999 through 2018 are included in Table 4.84. As reported, the Northeastern NC Region experienced \$25,000 in property damage and no crop damage

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resulting from the 70 Severe Winter Storm incidents. While property and crop damage were not recorded for these incidents, they may have occurred and are possible impacts of future events. The region also experienced no fatalities or injuries from the impacts of severe winter storm, though these types of impacts are possible in future events. No blizzard, cold/wind chill, extreme cold/wind chill, or sleet events were recorded.

**Table 4.84 – Total Severe Winter Storm Impacts in Northeastern NC, 1999-2018**

Event Type	Event Count	Total Fatalities	Total Injuries	Total Property Damage	Total Crop Damage
<b>Bertie County</b>					
Winter Storm	17	0	0	\$25,000	\$0
Winter Weather	17	0	0	\$0	\$0
Frost/Freeze	4	0	0	\$0	\$0
<b>Hyde County</b>					
Winter Storm	8	0	0	\$0	\$0
Winter Weather	5	0	0	\$0	\$0
Heavy Snow	5	0	0	\$0	\$0
Frost/Freeze	1	0	0	\$0	\$0
<b>Martin County</b>					
Winter Storm	12	0	0	\$0	\$0
Winter Weather	7	0	0	\$0	\$0
Ice Storm	1	0	0	\$0	\$0
Heavy Snow	5	0	0	\$0	\$0
Frost/Freeze	1	0	0	\$0	\$0
<b>Tyrrell County</b>					
Winter Storm	8	0	0	\$0	\$0
Winter Weather	4	0	0	\$0	\$0
Heavy Snow	5	0	0	\$0	\$0
Frost/Freeze	1	0	0	\$0	\$0
<b>Washington County</b>					
Winter Storm	9	0	0	\$0	\$0
Winter Weather	6	0	0	\$0	\$0
Ice Storm	1	0	0	\$0	\$0
Heavy Snow	6	0	0	\$0	\$0
Frost/Freeze	1	0	0	\$0	\$0
<b>Northeastern NC Region</b>					
Winter Storm	30	0	0	\$25,000	\$0
Winter Weather	26	0	0	\$0	\$0
Ice Storm	1	0	0	\$0	\$0
Heavy Snow	8	0	0	\$0	\$0
Frost/Freeze	5	0	0	\$0	\$0
<b>Region Total</b>	<b>70</b>	<b>0</b>	<b>0</b>	<b>\$25,000</b>	<b>\$0</b>

Source: NCEI

Impacts in the Northeastern NC Region by incident are recorded in Table 4.85.

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**Table 4.85 – Recorded Severe Winter Storm Impacts in the Northeastern NC Region, 1999-2018**

Date	Event Type	Fatalities	Injuries	Property Damage	Crop Damage
1/24/2000	Winter Storm	0	0	\$0	\$0
12/3/2000	Heavy Snow	0	0	\$0	\$0
12/3/2000	Winter Storm	0	0	\$25,000	\$0
1/2/2002	Winter Storm	0	0	\$0	\$0
1/2/2002	Winter Storm	0	0	\$0	\$0
1/3/2002	Winter Storm	0	0	\$0	\$0
1/16/2003	Winter Storm	0	0	\$0	\$0
1/23/2003	Winter Storm	0	0	\$0	\$0
1/23/2003	Winter Storm	0	0	\$0	\$0
11/30/2003	Frost/Freeze	0	0	\$0	\$0
1/9/2004	Winter Storm	0	0	\$0	\$0
1/9/2004	Winter Weather	0	0	\$0	\$0
1/25/2004	Winter Storm	0	0	\$0	\$0
1/25/2004	Winter Storm	0	0	\$0	\$0
1/26/2004	Winter Storm	0	0	\$0	\$0
2/15/2004	Winter Storm	0	0	\$0	\$0
2/16/2004	Winter Weather	0	0	\$0	\$0
2/26/2004	Winter Weather	0	0	\$0	\$0
3/23/2004	Frost/Freeze	0	0	\$0	\$0
4/6/2004	Frost/Freeze	0	0	\$0	\$0
12/19/2004	Winter Weather	0	0	\$0	\$0
12/20/2004	Winter Weather	0	0	\$0	\$0
12/26/2004	Winter Storm	0	0	\$0	\$0
12/26/2004	Winter Storm	0	0	\$0	\$0
1/19/2005	Winter Weather	0	0	\$0	\$0
1/20/2005	Winter Weather	0	0	\$0	\$0
1/21/2005	Winter Weather	0	0	\$0	\$0
2/20/2006	Winter Weather	0	0	\$0	\$0
2/1/2007	Winter Weather	0	0	\$0	\$0
11/21/2008	Winter Weather	0	0	\$0	\$0
1/20/2009	Heavy Snow	0	0	\$0	\$0
1/20/2009	Winter Weather	0	0	\$0	\$0
1/20/2009	Heavy Snow	0	0	\$0	\$0
1/30/2010	Winter Storm	0	0	\$0	\$0
1/30/2010	Heavy Snow	0	0	\$0	\$0
2/12/2010	Heavy Snow	0	0	\$0	\$0
2/13/2010	Winter Weather	0	0	\$0	\$0
3/2/2010	Winter Weather	0	0	\$0	\$0
12/16/2010	Winter Weather	0	0	\$0	\$0
12/25/2010	Winter Storm	0	0	\$0	\$0
12/26/2010	Heavy Snow	0	0	\$0	\$0
1/22/2011	Heavy Snow	0	0	\$0	\$0
2/9/2011	Winter Storm	0	0	\$0	\$0
2/10/2011	Heavy Snow	0	0	\$0	\$0
1/25/2013	Winter Weather	0	0	\$0	\$0

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Date	Event Type	Fatalities	Injuries	Property Damage	Crop Damage
2/16/2013	Winter Weather	0	0	\$0	\$0
1/21/2014	Winter Weather	0	0	\$0	\$0
1/28/2014	Winter Storm	0	0	\$0	\$0
1/28/2014	Winter Storm	0	0	\$0	\$0
2/11/2014	Winter Storm	0	0	\$0	\$0
2/12/2014	Winter Weather	0	0	\$0	\$0
3/3/2014	Winter Weather	0	0	\$0	\$0
2/16/2015	Ice Storm	0	0	\$0	\$0
2/16/2015	Winter Storm	0	0	\$0	\$0
2/24/2015	Winter Weather	0	0	\$0	\$0
2/25/2015	Winter Storm	0	0	\$0	\$0
2/25/2015	Winter Storm	0	0	\$0	\$0
1/22/2016	Winter Weather	0	0	\$0	\$0
2/12/2016	Winter Weather	0	0	\$0	\$0
2/12/2016	Winter Storm	0	0	\$0	\$0
4/5/2016	Frost/Freeze	0	0	\$0	\$0
4/10/2016	Frost/Freeze	0	0	\$0	\$0
1/7/2017	Winter Storm	0	0	\$0	\$0
1/7/2017	Winter Storm	0	0	\$0	\$0
1/7/2017	Winter Storm	0	0	\$0	\$0
1/3/2018	Winter Storm	0	0	\$0	\$0
1/3/2018	Winter Storm	0	0	\$0	\$0
1/17/2018	Winter Weather	0	0	\$0	\$0
1/17/2018	Winter Weather	0	0	\$0	\$0
12/9/2018	Winter Weather	0	0	\$0	\$0

Source: NCEI

Several storm impacts from NCEI are summarized below:

**December 3, 2000** - A winter storm struck parts of northeast North Carolina. The storm struck a relatively small area, but the locations that had snow received impressive totals. Some specific snow totals were as follows: Aulander 15"; Woodland, Winton, and Murfreesboro 13"; Rich Square and Como 12"; Gatesville 11"; Windsor and Conway 10"; Eure and Milwaukee 9"; Edenton, Ahoskie, and Moyock 8"; South Mills and Sunbury 7"; Severn 6"; and Weeksville and Seaboard 5". Local law enforcement reported numerous traffic accidents but no injuries were recorded. NCEI reports \$25,000 in property damages in Bertie County.

**January 23, 2003** – A major winter storm affected eastern North Carolina on January 23, 2003. The storm dumped the highest amounts of snow east of highway 17 across the area known as the Outer Banks, where 8 to 12 inches of snow fell with isolated amounts up to 14 inches, including the counties of eastern Carteret, Dare and, and Hyde counties. This was the largest one-day snowfall on the Outer Banks in over a decade. Snowfall amounts from 4 to 8 inches fell across central sections of the county warning area including Craven, Pamlico, Beaufort, and Tyrrell counties. Other western counties received 2 to 4-inch snowfall amounts.

**December 26, 2004** – A winter storm produced a narrow band of six to as much as eleven inches of snow across interior northeast North Carolina. The snow caused very hazardous driving conditions, which resulted in numerous accidents. The highest amounts were reported at Gatesville in Gates county 11" Sunbury in Gates county 11", Gates in Gates county 10", Ahoskie in Hertford county 9.5", Pendleton in

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Northampton county 8.5", Murfreesboro in Hertford county 8", Askewville in Bertie county 7.5", and Lasker in Northampton county 6".

**January 28, 2014** – Weak low pressure developed to the south of eastern North Carolina on January 28th then lifted northeast offshore of the coast on January 29th. Widespread light wintry precipitation developed during the morning of January 28th, becoming heavier and more widespread through the afternoon as it spread north and east. The wintry weather lasted through the night of January 28th before finally ending during the morning of January 29th. Mainly snow was reported over the northern sections with 4 to 7 inches of accumulations. Over the southern tier the precipitation fell as a mix of sleet and freezing rain, with a little snow at the end. Sleet accumulated up to 2 inches in spots with 1/4 to 1/2 inch of freezing rain, heaviest over the southern Outer Banks. Roads became snow and ice covered during the event and persisted for a couple days. Many schools were closed for four days. Snow and sleet fell across the region through the morning of January 29<sup>th</sup>. Snow mixed with sleet at times and in total accumulated up to 7 inches in Bertie and Washington Counties. Power outages were reported for many residents as power lines were downed from the ice and gusty winds. Roads were icy for several days during and after the event.

The Northeastern NC Region received one emergency declaration and two presidential disaster declarations since 1968 for incidents related to severe winter storms. These declarations were made for Bertie, Hyde, Martin, and Washington Counties. As a state, North Carolina received eight disaster declarations related to severe winter storms during this timeframe.

**Table 4.86 – Emergency & Disaster Declarations in Northeastern NC Region for Severe Winter Storms**

Disaster Number	Date	Disaster Type	Incident Start	Incident End
234	1968	Severe Ice Storm	2/10/1968	2/10/1968
3110	1993	Severe Snow and Winter Storm	3/13/1993	3/17/1993
1087	1996	Snow	1/6/1996	1/12/1996

Source: FEMA, December 20, 2018

### Probability of Future Occurrence

NCEI records 70 severe winter storm related events during the 20-year period from 1999 through 2018, which equates to an average of 3.5 events per year or more than 100 percent likelihood of an occurrence in any given 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 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

#### People

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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

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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 1999 and 2018, the Northeastern NC Region experienced minimal – \$25,000 – property damage related to the impacts of severe winter storm. Losses due to severe winter weather may not have been reported but should be expected during severe winter weather incidents.

### 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 4.87 summarizes the potential negative consequences of severe winter storm.

**Table 4.87 – 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.

### Hazard Summary by Jurisdiction

The following table summarizes severe winter storm hazard risk by jurisdiction. Severe winter storm risk does not vary substantially by jurisdiction because these events are typically regional in nature.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	4	1	4	1	3	2.7	H
Town of Askewville	4	1	4	1	3	2.7	H
Town of Aulander	4	1	4	1	3	2.7	H

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Town of Colerain	4	1	4	1	3	2.7	H
Town of Kelford	4	1	4	1	3	2.7	H
Town of Lewiston-Woodville	4	1	4	1	3	2.7	H
Town of Powellsville	4	1	4	1	3	2.7	H
Town of Roxobel	4	1	4	1	3	2.7	H
Town of Windsor	4	1	4	1	3	2.7	H
Hyde County	4	1	4	1	3	2.7	H
Martin County	4	1	4	1	3	2.7	H
Town of Bear Grass	4	1	4	1	3	2.7	H
Town of Everetts	4	1	4	1	3	2.7	H
Town of Hamilton	4	1	4	1	3	2.7	H
Town of Hassell	4	1	4	1	3	2.7	H
Town of Jamesville	4	1	4	1	3	2.7	H
Town of Oak City	4	1	4	1	3	2.7	H
Town of Parmele	4	1	4	1	3	2.7	H
Town of Robersonville	4	1	4	1	3	2.7	H
Town of Williamston	4	1	4	1	3	2.7	H
Tyrrell County	4	1	4	1	3	2.7	H
Town of Columbia	4	1	4	1	3	2.7	H
Washington County	4	1	4	1	3	2.7	H
Town of Creswell	4	1	4	1	3	2.7	H
Town of Plymouth	4	1	4	1	3	2.7	H
Town of Roper	4	1	4	1	3	2.7	H

### 4.5.10 Sinkhole

#### Hazard Background

Sinkholes are a natural and common geologic feature in areas with underlying limestone and other rock types that are soluble in natural water. Most limestone is porous, allowing the acidic water of rain to percolate through their strata, dissolving some limestone and carrying it away in solution. Over time, this persistent erosional process can create extensive underground voids and drainage systems in much of the carbonate rocks. Collapse of overlying sediments into the underground cavities produces sinkholes.

The three general types of sinkholes are: subsidence, solution, and collapse. Collapse sinkholes are most common in areas where the overburden (the sediments and water contained in the unsaturated zone, surficial aquifer system, and the confining layer above an aquifer) is thick, but the confining layer is breached or absent. Collapse sinkholes can form with little warning and leave behind a deep, steep sided hole. Subsidence sinkholes form gradually where the overburden is thin and only a veneer of sediments is overlying the limestone. Solution sinkholes form where no overburden is present and the limestone is exposed at land surface.

Sinkholes occur in many shapes, from steep-walled holes to bowl or cone shaped depressions. Sinkholes can be dramatic because the land generally stays intact for a while until the underground spaces get too big. If there is not enough support for the land above the spaces, then a sudden collapse of the land surface can occur. Under natural conditions, sinkholes form slowly and expand gradually. However, human activities such as dredging, constructing reservoirs, diverting surface water, and pumping groundwater can accelerate the rate of sinkhole expansions, resulting in the abrupt formation of collapse sinkholes.

Although a sinkhole can form without warning, specific signs can signal potential development:

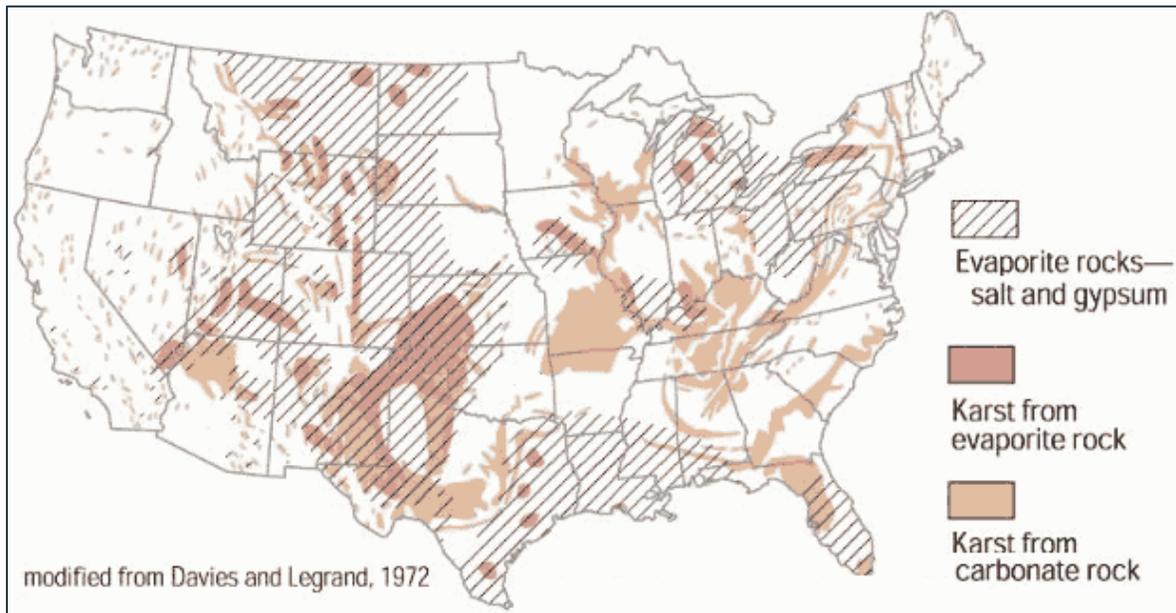
- ▶ Slumping or falling fenceposts, trees, or foundations;
- ▶ Sudden formation of small ponds;
- ▶ Wilting vegetation;
- ▶ Discolored well water; and/or
- ▶ Structural cracks in walls, floors.

Sinkhole formation can be accelerated by urbanization. Development increases water usage, alters drainage pathways, overloads the ground surface, and redistributes soil. According to FEMA, the number of human-induced sinkholes has doubled since 1930, insurance claims for damages as a result of sinkholes has increased 1,200 percent from 1987 to 1991, costing nearly \$100 million.

*Warning Time: 4 – Less than six hours*

*Duration: 1 – Less than six hours*

Figure 4.45 – Rock Formations in the United States



#### Location

According to the North Carolina Department of Environmental Quality (NC DEQ), in North Carolina sinkholes mainly occur in the coastal plain. NC DEQ does not specifically identify vulnerability in any counties in the Northeastern NC region, but it does note sinkhole occurrence in counties adjacent to the region. Additionally, per the 2018 North Carolina Hazard Mitigation Plan, there may be some areas with karst soils in the region.

#### Extent

Sinkholes are relatively unpredictable, causing greater impacts when they do occur. They can range dramatically in size, from a few feet wide to hundreds of acres wide and from less than 1 foot to more than 100 feet deep. Sinkholes can also vary in shape. Some are shaped like shallow bowls or saucers while others have vertical walls. In North Carolina, sinkholes sometimes hold water and form natural ponds. There is no formal scale for measuring the extent of sinkholes.

Sinkholes can have dramatic effects if they occur in urban settings, particularly when infrastructure, such as roads, or buildings are on top of the cavity, causing catastrophic damage. They can also contaminate water resources and have been known to swallow up vehicles, swimming pools, parts of roadways, and even buildings.

The extent of sinkhole activity is measured in terms of the dimensions of the sinkhole. Per the 2017 Northeastern NC Hazard Mitigation Plan, sinkholes in the Northeastern NC region on average impact an area of four square feet and a depth of three feet.

*Impact: 2 – Limited*

*Spatial Extent: 1 – Negligible*

#### Past Occurrences

There are limited records of sinkholes in the Northeastern NC region. Records reported here were found in local news reports and are likely only a sample of past occurrences.

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**August 2011** – A sinkhole formed in U.S. 264 at the Dare-Hyde County line, closing the highway to traffic in both directions.

**April 2013** – A sinkhole in Bertie County was reported to WITN local news, but this report was not confirmed.

**April 2013** – A sinkhole was reported in Martin County on Lee Road, which spanned the width of the road and required that the road be closed. This sinkhole was approximately two feet in diameter and three feet deep.

### Probability of Future Occurrence

Sinkholes are a potential occurrence in localized areas of the Northeastern NC region based on geologic conditions. Future occurrence of sinkholes may be impacted by weather events, including heavy rain, as well as human activity, including increased development and groundwater pumping. There are two known recent occurrences of sinkhole that blocked roadways and required emergency repair. Though small events do occur, the region is unlikely to experience a significant sinkhole event, therefore the probability of future sinkhole events is considered possible.

*Probability: 1 – Unlikely*

### Climate Change

Direct effects from global warming and climate change such as an increase in droughts, floods and hurricanes could contribute to an increase in sinkholes. Climate change raises the likelihood of extreme weather, meaning the torrential rain and flooding conditions which often lead to the exposure of sinkholes are likely to become increasingly common. Certain events such as a hurricane following a period of drought can trigger a sinkhole due to low levels of groundwater combined with a heavy influx of rain. As discussed in Sections 4.5.2 Drought, 4.5.5 Flood, and 4.5.6 Hurricane, potential increases in these contributing events are possible. Therefore, an increase in the occurrence of sinkholes in the future is possible.

### Vulnerability Assessment

#### People

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A person's vulnerability is directly related to the speed in which the sinkhole opens and the person being above the sinkhole. Records exist for deaths associated with sinkholes opening beneath homes while occupants were present or from motor vehicle deaths when drivers could not avoid driving into the sinkhole before protective barriers were in place. However, there are not records of such severe events in the Northeastern NC region.

#### Property

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Similar to people, property's vulnerability to a sinkhole is dependent on a variety of factors including the speed at which the sinkhole develops. Property above a large sinkhole that suddenly collapses can suffer catastrophic damages ranging from cracked foundations to damaged roadways and totaled vehicles.

#### Environment

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Sinkholes are unlikely to cause substantial impacts to the natural environment. Natural areas that are damaged will recover quickly.

#### Consequence Analysis

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Table 4.88 summarizes the potential negative consequences of sinkhole.

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**Table 4.88 - Consequence Analysis – Sinkhole**

Category	Consequences
Public	Impacts are expected to be minimal to the larger population. Impacts for those effected could cause anxiety or depression about economic and property losses and personal injury.
Responders	First responders will be impacted similarly to other events that have advance warning.
Continuity of Operations (including Continued Delivery of Services)	Continuity of operations is generally not disrupted by sinkholes.
Property, Facilities and Infrastructure	Although sinkhole extents are localized, buildings located on or adjacent to a sinkhole are susceptible to foundation damage or building collapse. If the building is located close enough to the sinkhole it can be completely destroyed or in worst cases, completely collapse into the sinkhole. Remediation costs can be high due to costly foundation shoring or cost of stabilization of the sinkhole itself.
Environment	Sinkholes are natural occurring process and local plants and animals adjust quickly. Many naturally occurring sinkholes fill with rainwater creating new aquatic habitat.
Economic Condition of the Jurisdiction	Sinkholes located in open areas or that impact only small numbers of buildings, while having a high impact to the local property owner, do not have substantial impacts to the economy. Sinkholes that open up in major traffic thoroughfares can include significant impact to daily work traffic and flow of goods.
Public Confidence in the Jurisdiction’s Governance	Sinkholes are relatively unpredictable, however if a sinkhole occurs after a recent inspection and causes harm to people or property, the public may lose confidence in the jurisdiction’s ability to manage a future sinkhole event.

### Hazard Summary by Jurisdiction

The following table summarizes sinkhole hazard risk by jurisdiction. Sinkhole hazard risk does not vary substantially by jurisdiction. Jurisdictions with known recent sinkhole occurrences were given a probability rating of 2; all others were given a probability rating of 1. However, the overall hazard priority for sinkhole remains low for all jurisdictions.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Bertie County	1	1	1	4	1	1.3	L
Town of Askeville	1	1	1	4	1	1.3	L
Town of Aulander	1	1	1	4	1	1.3	L
Town of Colerain	1	1	1	4	1	1.3	L
Town of Kelford	1	1	1	4	1	1.3	L
Town of Lewiston-Woodville	1	1	1	4	1	1.3	L
Town of Powellsville	1	1	1	4	1	1.3	L
Town of Roxobel	1	1	1	4	1	1.3	L
Town of Windsor	1	1	1	4	1	1.3	L
Hyde County	2	1	1	4	1	1.6	L
Martin County	2	1	1	4	1	1.6	L
Town of Bear Grass	1	1	1	4	1	1.3	L
Town of Everetts	1	1	1	4	1	1.3	L
Town of Hamilton	1	1	1	4	1	1.3	L
Town of Hassell	1	1	1	4	1	1.3	L

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Town of Jamesville	1	1	1	4	1	1.3	L
Town of Oak City	1	1	1	4	1	1.3	L
Town of Parmele	1	1	1	4	1	1.3	L
Town of Robersonville	1	1	1	4	1	1.3	L
Town of Williamston	1	1	1	4	1	1.3	L
Tyrrell County	1	1	1	4	1	1.3	L
Town of Columbia	1	1	1	4	1	1.3	L
Washington County	1	1	1	4	1	1.3	L
Town of Creswell	1	1	1	4	1	1.3	L
Town of Plymouth	1	1	1	4	1	1.3	L
Town of Roper	1	1	1	4	1	1.3	L

**4.5.11 Tornado**

**Hazard Background**

According to the Glossary of Meteorology (AMS 2000), a tornado is "a violently rotating column of air, pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud." Tornadoes can appear from any direction. Most move from southwest to northeast, or west to east. Some tornadoes have changed direction amid path, or even backtracked.

Tornadoes are commonly produced by land falling tropical cyclones. Those making landfall along the Gulf coast traditionally produce more tornadoes than those making landfall along the Atlantic coast. Tornadoes that form within hurricanes are more common in the right front quadrant with respect to the forward direction but can occur in other areas as well. According to the NHC, about 10% of the tropical cyclone-related fatalities are caused by tornadoes. Tornadoes are more likely to be spawned within 24 hours of landfall and are usually within 30 miles of the tropical cyclone’s center.

Tornadoes have the potential to produce winds in excess of 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive – some in the Great Plains have exceeded two miles in width. Tornadoes associated with tropical cyclones, however, tend to be of lower intensity (EF0 to EF2) and much smaller in size than ones that form in the Great Plains.

		
<b>Weak Tornadoes</b>	<b>Strong Tornadoes</b>	<b>Violent Tornadoes</b>
<ul style="list-style-type: none"> <li>■ 88% of all tornadoes</li> <li>■ Less than 5% of tornado deaths</li> <li>■ Lifetime 1 – 10+ minutes</li> <li>■ Winds less than 110 mph</li> <li>■ Produces EF0 or EF1 damage</li> </ul>	<ul style="list-style-type: none"> <li>■ 11% of all tornadoes</li> <li>■ Nearly 30% of all tornado deaths</li> <li>■ May last 20 minutes or longer</li> <li>■ Winds 111-165 mph</li> <li>■ Produces EF2 or EF3 damage</li> </ul>	<ul style="list-style-type: none"> <li>■ Less than 1% of all tornadoes</li> <li>■ 70% of all tornado deaths</li> <li>■ Can exceed 1 hour</li> <li>■ Winds greater than 166 mph</li> <li>■ Produces EF4 or EF5 damage</li> </ul>

Source: NOAA National Weather Service

*Warning Time: 4 – Less than six hours*

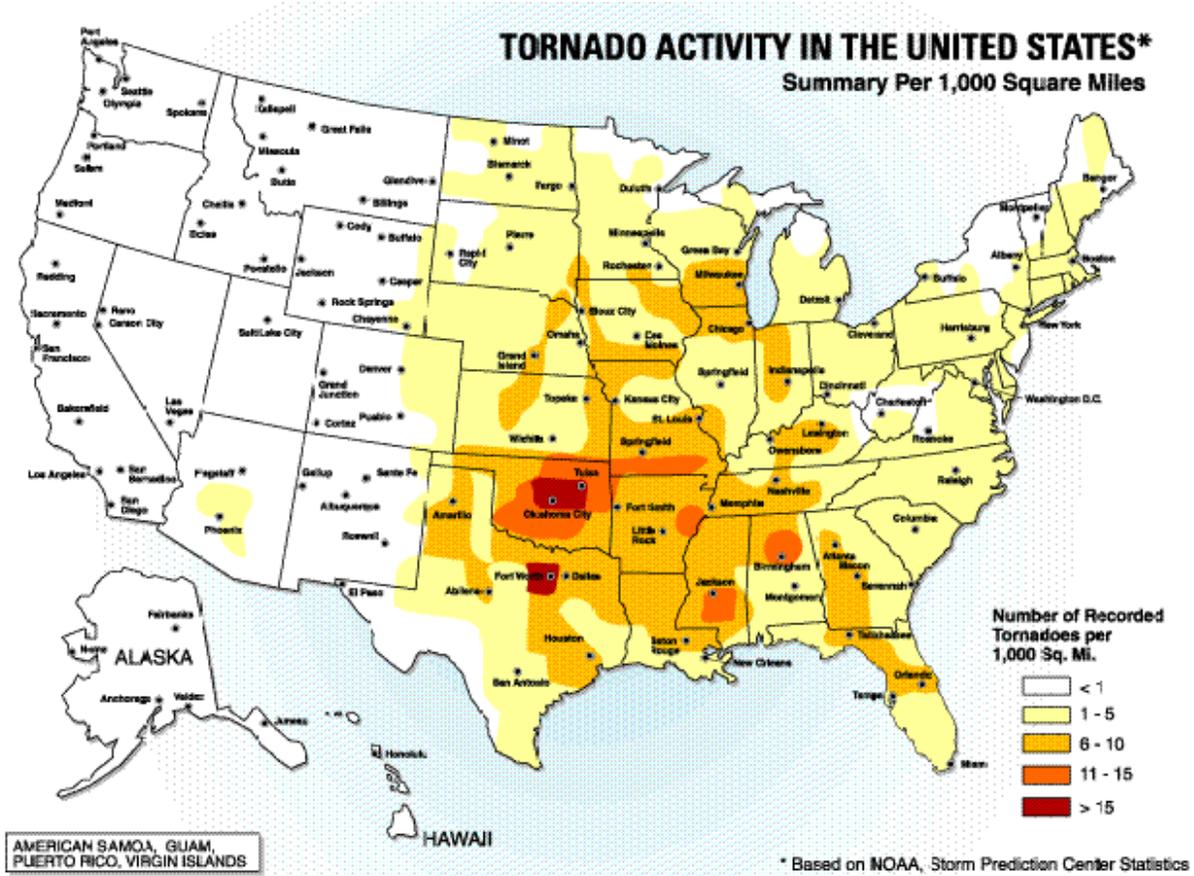
*Duration: 1 – Less than six hours*

According to the NOAA Storm Prediction Center (SPC), the highest concentration of tornadoes in the United States has been in Oklahoma, Texas, Kansas and Florida respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous

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tornadoes (earning the designation of “tornado alley”), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002). The below figure shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.

**Figure 4.46 – Tornado Activity in the U.S.**



**Figure 1.1 The number of tornadoes recorded per 1,000 square miles**

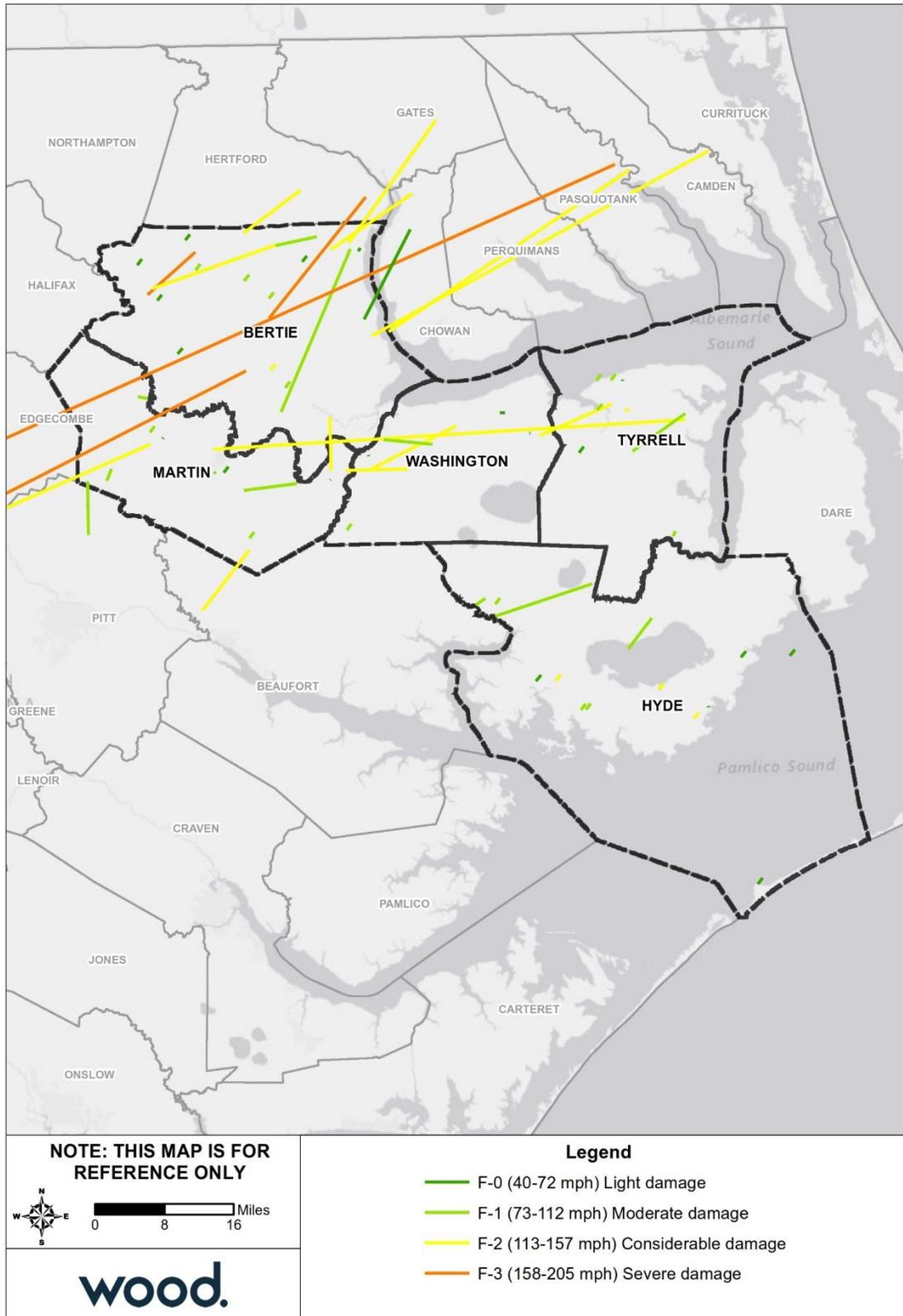
Source: American Society of Civil Engineers

**Location**

Figure 4.47 reflects the tracks of past tornadoes that passed through the Northeastern NC Region from 1950 through 2018 according to data from the NOAA/National Weather Service Storm Prediction Center.

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**Figure 4.47 – Tornado Paths Through Northeastern NC Region, 1950-2018**



Source: NOAA/NWS Storm Prediction Center

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Tornados can occur anywhere in the Region. Tornadoes typically impact a small area, but damage may be extensive. Tornado locations are completely random, meaning risk to tornado isn't increased in one area of the county versus another. All of the Northeastern NC Region is uniformly exposed to this hazard.

### Extent

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita (EF) scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis, 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 4.89 shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different levels of intensity.

**Table 4.89 – Enhanced Fujita Scale**

EF Number	3 Second Gust (mph)	Damage
0	65-85	<b>Light damage.</b> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
1	96-110	<b>Moderate damage.</b> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
2	111-135	<b>Considerable damage.</b> 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	<b>Severe damage.</b> 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	<b>Devastating damage.</b> Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
5	Over 200	<b>Incredible damage.</b> 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 Northeastern NC Region in the past 20 years was an EF3 in April 2011. This tornado resulted in 12 fatalities, 55 injuries and \$2,250,000 in property damage – the most of any tornado in the region.

*Impact: 3 – Critical*

*Spatial Extent: 2 – Small*

### Historical Occurrences

NCEI storm reports were reviewed from 1999 through 2018 to assess whether recent trends varied from the longer historical record. According to NCEI, the Northeastern NC Region experienced 48 tornado incidents between 1999 and 2018, causing 12 fatalities, 67 injuries, \$5.4 million in property damage and \$1.4 million in crop damage. Table 4.90 shows historical tornadoes in the Northeastern NC Region during this time period.

**SECTION 4: RISK ASSESSMENT**
**Table 4.90 – Recorded Tornadoes in Northeastern NC Region, 1999-2018**

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Creswell	9/15/1999	1820	F0	0	0	\$0	\$0
Swanquarter	9/15/1999	1825	F0	0	0	\$0	\$0
Windsor	9/15/1999	1840	F0	0	0	\$2,000	\$0
Williamston	2/14/2000	607	F0	0	0	\$0	\$0
Aulander	9/24/2001	1700	F0	0	0	\$20,000	\$0
Williamston	5/13/2002	2025	F0	0	0	\$30,000	\$0
Ocracoke	9/10/2002	1105	F0	0	0	\$1,000	\$0
Colerain	5/9/2003	1650	F0	0	0	\$5,000	\$0
Plymouth	5/9/2003	1742	F1	0	0	\$250,000	\$1,400,000
Jamesville	6/4/2004	1435	F0	0	0	\$0	\$0
Columbia	6/4/2004	1715	F1	0	1	\$75,000	\$0
Columbia	6/11/2004	2200	F0	0	0	\$0	\$0
Rose Bay	8/14/2004	1440	F0	0	0	\$0	\$0
Columbia	8/14/2004	1515	F0	0	0	\$15,000	\$0
Oak City	9/27/2004	1900	F1	0	0	\$100,000	\$0
Roper	5/14/2006	1606	F0	0	0	\$10,000	\$0
Robersonville	5/14/2006	1946	F0	0	0	\$0	\$0
Columbia	5/14/2006	2025	F1	0	0	\$75,000	\$0
Williamston	2/18/2008	450	EF1	0	0	\$100,000	\$0
Cahaba	4/20/2008	1805	EF0	0	0	\$3,000	\$0
Panzer	4/28/2008	1640	EF0	0	0	\$0	\$0
Trap	5/9/2008	729	EF2	0	0	\$50,000	\$0
Lewiston	5/11/2008	1725	EF2	0	2	\$1,000,000	\$0
Aulander	9/26/2008	953	EF0	0	0	\$75,000	\$0
Parmeles	11/15/2008	430	EF1	0	0	\$50,000	\$0
Plymouth	9/29/2010	2115	EF0	0	0	\$0	\$0
Askeville	4/16/2011	1755	EF3	12	55	\$2,250,000	\$0
Colerain	4/16/2011	1805	EF2	0	8	\$250,000	\$0
Williamston Arpt	4/16/2011	1809	EF0	0	0	\$10,000	\$0
Jerry	4/16/2011	2001	EF1	0	0	\$400,000	\$0
Williamston	4/26/2011	1315	EF0	0	0	\$500	\$0
Darden	4/28/2011	1530	EF0	0	0	\$0	\$0
Scuppernong	8/26/2011	2112	EF0	0	0	\$75,000	\$0
Columbia	8/26/2011	2255	EF2	0	0	\$150,000	\$0
Jerry	9/29/2011	310	EF1	0	1	\$20,000	\$0
Wenona	3/21/2012	1000	EF0	0	0	\$0	\$0
Gurlock	7/10/2012	1640	EF0	0	0	\$0	\$0
Ponzer	4/7/2014	1500	EF1	0	0	\$50,000	\$0
Edenhouse	4/25/2014	1820	EF2	0	0	\$5,000	\$0
Hamilton	7/3/2014	1950	EF1	0	0	\$26,000	\$0
Columbia	6/4/2015	100	EF0	0	0	\$5,000	\$0
Williamston	6/13/2015	1650	EF1	0	0	\$5,000	\$0
Colerain	2/24/2016	1454	EF0	0	0	\$25,000	\$0
Cremo	3/31/2017	1715	EF1	0	0	\$250,000	\$0

## SECTION 4: RISK ASSESSMENT

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Mt Gould	5/5/2017	627	EF0	0	0	\$5,000	\$0
Gum Neck	5/23/2017	1716	EF1	0	0	\$0	\$0
Swindell	9/13/2018	1004	EF1	0	0	\$0	\$0
San Souci	9/14/2018	903	EF0	0	0	\$2,000	\$0
<b>Total</b>				<b>12</b>	<b>67</b>	<b>\$5,389,500</b>	<b>\$1,400,000</b>

Source: NCEI

Specific incidents with some level of impact include:

**May 9, 2003:** A tornado producing F1 damage was reported 2 miles northeast of Plymouth moved east northeast to Roper causing 1.4 million dollars in damage to crops, and \$250,000 in damage to property, including several farm homes, and other farm structures.

**May 11, 2008:** Scattered severe thunderstorms produced damaging winds, large hail and one tornado across portions of northeast North Carolina. The tornado first touched down about two miles north-northwest of Lewiston Woodville. The tornado path then continued east-northeast across the county producing EF0 to EF2 damage. The tornado path ended as EF0 damage about one mile south of Powellsville. In total, the tornado caused 2 injuries and \$1 million in property damages. Damage included EF0 damage, demolishing a porch attached to a mobile home and snapping several trees, EF1 damage, downing numerous trees, damaging several trailers, brick homes, mobile homes, and EF2 damage, which destroyed several mobile homes and demolished a church.

**April 16, 2011:** One of the largest tornado outbreaks ever observed across eastern North Carolina occurred during the afternoon and evening of April 16th 2011. Several powerful super-cell thunderstorms developed ahead of an approaching cold front. Conditions ahead of the front were favorable for tornadoes and altogether 12 tornadoes were reported across the Newport/Morehead City county warning area. These tornadoes combined to produce over 40 million dollars in damages. In the Northeastern NC Region, four different tornados touched down causing 12 fatalities, 63 injuries, and \$2.9 million in damages ranging from EF0 to EF3. The most damaging tornado first touched down about one mile south of Askewville, producing minor tree and building damage. The tornado began producing significant damage on the east side of Askewville, where numerous structures and several mobile homes sustained major damage or were destroyed. The tornado then tracked continuously for nearly 19 miles finally lifting east of Harrellsville. For much of the tornado's life, the path width was one half to nearly three quarters of a mile wide. EF2 and EF3 damage was widespread from just east of Askewville northeast to about 3 miles west of Colerain, then gradually decreased as the tornado crossed into Hertford county. Numerous homes were destroyed, and many others suffered varying degrees of damage. Overall, this one tornado accounted for all of the fatalities, 55 of the injuries, and \$2,250,000 worth of damages to the region.

A distinct separation in the damage paths northwest of Colerain suggested that a second tornado formed just northwest of Colerain and tracked northeast nearly parallel to the original tornado. North of Colerain, the tornado tracked parallel to Route 45 for about 1 mile then continued northeast into southeast Hertford county just west of the Chowan River. In the Bertie county portion of the tornado, several homes and other buildings were damaged. Poultry houses and other farm equipment were also damaged. Many trees were downed or snapped off. This split left 8 injuries and \$250,000 in damages in its wake.

## SECTION 4: RISK ASSESSMENT

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### Probability of Future Occurrence

Probability of future occurrence was calculated based on past occurrences and was assumed to be uniform across the county.

In a twenty-year span between 1999 and 2018, the Northeastern NC Region experienced 48 separate tornado incidents over 40 separate days. This correlates to an over-100-percent annual probability that the county will experience a tornado somewhere in its boundaries. Only six of these past tornado events were a magnitude EF2 or greater; therefore, the annual probability of a significant tornado event is approximately 30 percent.

*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

#### People

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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 the 2017 American Community Survey (ACS), 7,307 occupied housing units (27.9%) in the Northeastern NC Region are classified as “mobile homes or other types of housing.” Based on an estimated average of 2.4 persons per household from the 2017 ACS, there are approximately 17,537 people in the Northeastern NC Region living in mobile homes.

**Table 4.91 – Mobile Home Units in Northeastern NC Region, 2017**

County	Occupied Mobile Home Units	Total Occupied Housing Units	Percent of Occupied Housing
Bertie County	2,937	7,988	36.8%
Hyde County	420	1,835	22.9%
Martin County	2,116	9,624	22.0%
Tyrrell County	511	1,539	33.2%
Washington County	1,323	3,114	25.3%

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

Since 1950, the NCEI records 18 fatalities and 115 injuries attributed to tornadoes in the Northeastern NC Region; these fatalities and injuries were the result of tornadoes rated as low as EF1, illustrating the destructive power of tornadoes and the dangers they pose to exposed populations without proper shelter.

### Property

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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 in the County are directly responsible for \$38 million worth of damage to property, and \$1.4 million reported damage to crops, according to NCEI data.

Table 4.92 through Table 4.96 detail the estimated buildings impacted from tornado events of magnitudes ranging from EF0 to EF4. Note that these tables provide 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 county.

**SECTION 4: RISK ASSESSMENT**

**Table 4.92 – Estimated Buildings Impacted by EF0 Tornado**

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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.80%	\$41,949,368	1,861	20.60%	\$22,220,542	144	1.60%	\$2,609,141	9,040	99.90%	\$66,779,051
Town of Askeville	425	327	76.90%	\$1,792,935	87	20.50%	\$776,372	11	2.60%	\$188,494	425	100%	\$2,757,801
Town of Aulander	675	577	85.50%	\$3,555,162	84	12.40%	\$1,729,050	14	2.10%	\$210,282	675	100%	\$5,494,494
Town of Colerain	377	295	78.20%	\$1,991,958	69	18.30%	\$593,227	13	3.40%	\$215,368	377	100%	\$2,800,552
Town of Kelford	159	141	88.70%	\$765,354	14	8.80%	\$74,665	4	2.50%	\$27,780	159	100%	\$867,799
Town of Lewiston-Woodville	685	558	81.50%	\$3,313,666	111	16.20%	\$2,203,548	16	2.30%	\$108,304	685	100%	\$5,625,518
Town of Powellsville	163	143	87.70%	\$884,401	13	8%	\$111,017	7	4.30%	\$69,809	163	100%	\$1,065,226
Town of Roxobel	205	151	73.70%	\$1,016,906	50	24.40%	\$461,507	4	2%	\$21,590	205	100%	\$1,500,002
Town of Windsor	1,584	1,247	78.70%	\$8,409,063	278	17.60%	\$4,905,745	59	3.70%	\$795,600	1,584	100%	\$14,110,408
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.60%</b>	<b>\$63,678,813</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$33,075,673</b>	<b>272</b>	<b>2%</b>	<b>\$4,246,368</b>	<b>13,313</b>	<b>99.90%</b>	<b>\$101,000,851</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,318	82.60%	\$27,383,090	774	14.80%	\$8,292,576	123	2.40%	\$1,976,604	5,215	99.80%	\$37,652,271
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$61,229,199	3,227	31.20%	\$34,239,791	168	1.60%	\$5,282,075	10,321	99.90%	\$100,751,064
Town of Bear Grass	69	51	73.90%	\$412,221	6	8.70%	\$84,110	12	17.40%	\$434,232	69	100%	\$930,563
Town of Everetts	145	138	95.20%	\$1,118,315	7	4.80%	\$80,360	0	0%	\$0	145	100%	\$1,198,675
Town of Hamilton	273	215	78.80%	\$1,578,611	26	9.50%	\$437,985	31	11.40%	\$430,032	272	99.60%	\$2,446,627
Town of Hassell	65	54	83.10%	\$444,217	11	16.90%	\$181,008	0	0%	\$0	65	100%	\$625,225
Town of Jamesville	276	210	76.10%	\$1,690,173	41	14.90%	\$1,514,387	21	7.60%	\$620,447	272	98.60%	\$3,825,007
Town of Oak City	287	276	96.20%	\$2,571,488	10	3.50%	\$95,284	1	0.30%	\$45,911	287	100%	\$2,712,683
Town of Parmele	137	120	87.60%	\$870,319	16	11.70%	\$272,389	1	0.70%	\$10,680	137	100%	\$1,153,388
Town of Robersonville	851	737	86.60%	\$7,846,362	104	12.20%	\$3,557,505	10	1.20%	\$131,010	851	100%	\$11,534,877
Town of Williamston	3,900	2,843	72.90%	\$23,915,171	818	21%	\$27,397,144	232	5.90%	\$7,189,892	3,893	99.80%	\$58,502,207
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$101,676,076</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$67,859,963</b>	<b>476</b>	<b>2.90%</b>	<b>\$14,144,279</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$183,680,316</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,073	78.80%	\$13,871,088	510	19.40%	\$4,216,480	49	1.90%	\$1,701,453	2,632	100%	\$19,789,021
Town of Columbia	512	408	79.70%	\$2,693,382	66	12.90%	\$1,444,059	38	7.40%	\$995,242	512	100%	\$5,132,683
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,481</b>	<b>78.90%</b>	<b>\$16,564,470</b>	<b>576</b>	<b>18.30%</b>	<b>\$5,660,539</b>	<b>87</b>	<b>2.80%</b>	<b>\$2,696,695</b>	<b>3,144</b>	<b>100%</b>	<b>\$24,921,704</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,813	72.30%	\$21,667,680	1,373	26%	\$7,549,693	77	1.50%	\$643,014	5,263	99.80%	\$29,860,387
Town of Creswell	365	274	75.10%	\$1,358,217	68	18.60%	\$588,562	22	6%	\$535,142	364	99.70%	\$2,481,920
Town of Plymouth	2,657	2,235	84.10%	\$11,366,753	321	12.10%	\$4,042,604	100	3.80%	\$979,582	2,656	100%	\$16,388,939
Town of Roper	578	473	81.80%	\$2,187,143	79	13.70%	\$497,064	21	3.60%	\$372,424	573	99.10%	\$3,056,631
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,795</b>	<b>76.60%</b>	<b>\$36,579,793</b>	<b>1,841</b>	<b>20.80%</b>	<b>\$12,677,923</b>	<b>220</b>	<b>2.50%</b>	<b>\$2,530,162</b>	<b>8,856</b>	<b>99.80%</b>	<b>\$51,787,877</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,638</b>	<b>76%</b>	<b>\$245,882,242</b>	<b>10,024</b>	<b>21.40%</b>	<b>\$127,566,674</b>	<b>1,178</b>	<b>2.50%</b>	<b>\$25,594,108</b>	<b>46,840</b>	<b>99.90%</b>	<b>\$399,043,019</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.93 – Estimated Buildings Impacted by EF1 Tornado**

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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.80%	\$300,179,549	1,861	20.60%	\$146,921,111	144	1.60%	\$15,206,819	9,040	99.90%	\$462,307,479
Town of Askeville	425	327	76.90%	\$12,758,203	87	20.50%	\$5,091,827	11	2.60%	\$1,221,288	425	100%	\$19,071,318
Town of Aulander	675	577	85.50%	\$25,560,049	84	12.40%	\$12,054,641	14	2.10%	\$1,280,347	675	100%	\$38,895,037
Town of Colerain	377	295	78.20%	\$14,505,601	69	18.30%	\$4,057,331	13	3.40%	\$1,187,519	377	100%	\$19,750,451
Town of Kelford	159	141	88.70%	\$5,497,242	14	8.80%	\$421,410	4	2.50%	\$223,644	159	100%	\$6,142,296
Town of Lewiston-Woodville	685	558	81.50%	\$23,807,289	111	16.20%	\$15,009,090	16	2.30%	\$846,369	685	100%	\$39,662,747
Town of Powellsville	163	143	87.70%	\$6,396,960	13	8%	\$609,683	7	4.30%	\$543,703	163	100%	\$7,550,346
Town of Roxobel	205	151	73.70%	\$7,351,003	50	24.40%	\$2,989,928	4	2%	\$173,809	205	100%	\$10,514,740
Town of Windsor	1,584	1,247	78.70%	\$60,900,907	278	17.60%	\$31,641,567	59	3.70%	\$5,361,623	1,584	100%	\$97,904,096
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.60%</b>	<b>\$456,956,803</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$218,796,588</b>	<b>272</b>	<b>2%</b>	<b>\$26,045,121</b>	<b>13,313</b>	<b>99.90%</b>	<b>\$701,798,510</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,318	82.60%	\$199,020,677	774	14.80%	\$53,225,247	123	2.40%	\$13,118,908	5,215	99.80%	\$265,364,832
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$443,832,486	3,227	31.20%	\$225,543,641	168	1.60%	\$29,082,483	10,321	99.90%	\$698,458,610
Town of Bear Grass	69	51	73.90%	\$3,009,043	6	8.70%	\$479,817	12	17.40%	\$1,817,972	69	100%	\$5,306,832
Town of Everetts	145	138	95.20%	\$8,103,441	7	4.80%	\$403,647	0	0%	\$0	145	100%	\$8,507,088
Town of Hamilton	273	215	78.80%	\$11,462,413	26	9.50%	\$2,676,281	31	11.40%	\$3,467,130	272	99.60%	\$17,605,825
Town of Hassell	65	54	83.10%	\$3,266,291	11	16.90%	\$819,914	0	0%	\$0	65	100%	\$4,086,205
Town of Jamesville	276	210	76.10%	\$12,261,546	41	14.90%	\$10,190,499	21	7.60%	\$2,772,847	272	98.60%	\$25,224,892
Town of Oak City	287	276	96.20%	\$18,866,946	10	3.50%	\$528,828	1	0.30%	\$370,155	287	100%	\$19,765,929
Town of Parmele	137	120	87.60%	\$6,330,423	16	11.70%	\$1,718,932	1	0.70%	\$86,108	137	100%	\$8,135,463
Town of Robersonville	851	737	86.60%	\$56,922,135	104	12.20%	\$23,142,894	10	1.20%	\$1,012,320	851	100%	\$81,077,349
Town of Williamston	3,900	2,843	72.90%	\$173,176,922	818	21%	\$175,190,769	232	5.90%	\$47,843,367	3,893	99.80%	\$396,211,058
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$737,231,646</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$440,695,222</b>	<b>476</b>	<b>2.90%</b>	<b>\$86,452,382</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$1,264,379,251</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,073	78.80%	\$98,822,093	510	19.40%	\$27,991,401	49	1.90%	\$11,974,725	2,632	100%	\$138,788,219
Town of Columbia	512	408	79.70%	\$19,429,887	66	12.90%	\$9,191,509	38	7.40%	\$5,484,377	512	100%	\$34,105,773
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,481</b>	<b>78.90%</b>	<b>\$118,251,980</b>	<b>576</b>	<b>18.30%</b>	<b>\$37,182,910</b>	<b>87</b>	<b>2.80%</b>	<b>\$17,459,102</b>	<b>3,144</b>	<b>100%</b>	<b>\$172,893,992</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,813	72.30%	\$155,191,348	1,373	26%	\$51,462,458	77	1.50%	\$4,189,013	5,263	99.80%	\$210,842,819
Town of Creswell	365	274	75.10%	\$9,662,280	68	18.60%	\$3,555,773	22	6%	\$2,558,507	364	99.70%	\$15,776,560
Town of Plymouth	2,657	2,235	84.10%	\$82,403,950	321	12.10%	\$25,095,001	100	3.80%	\$6,417,687	2,656	100%	\$113,916,638
Town of Roper	578	473	81.80%	\$15,710,885	79	13.70%	\$2,866,450	21	3.60%	\$2,110,211	573	99.10%	\$20,687,545
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,795</b>	<b>76.60%</b>	<b>\$262,968,463</b>	<b>1,841</b>	<b>20.80%</b>	<b>\$82,979,682</b>	<b>220</b>	<b>2.50%</b>	<b>\$15,275,418</b>	<b>8,856</b>	<b>99.80%</b>	<b>\$361,223,562</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,638</b>	<b>76%</b>	<b>\$1,774,429,569</b>	<b>10,024</b>	<b>21.40%</b>	<b>\$832,879,649</b>	<b>1,178</b>	<b>2.50%</b>	<b>\$158,350,931</b>	<b>46,840</b>	<b>99.90%</b>	<b>\$2,765,660,147</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.94 – Estimated Buildings Impacted by EF2 Tornado**

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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.80%	\$526,196,822	1,861	20.60%	\$240,176,902	144	1.60%	\$49,025,294	9,040	99.90%	\$815,399,018
Town of Askeville	425	327	76.90%	\$22,879,276	87	20.50%	\$8,425,690	11	2.60%	\$4,112,740	425	100%	\$35,417,706
Town of Aulander	675	577	85.50%	\$48,986,951	84	12.40%	\$27,056,500	14	2.10%	\$4,206,027	675	100%	\$80,249,478
Town of Colerain	377	295	78.20%	\$26,804,217	69	18.30%	\$9,265,846	13	3.40%	\$3,731,677	377	100%	\$39,801,739
Town of Kelford	159	141	88.70%	\$9,686,349	14	8.80%	\$1,039,045	4	2.50%	\$809,271	159	100%	\$11,534,664
Town of Lewiston-Woodville	685	558	81.50%	\$41,981,429	111	16.20%	\$33,778,847	16	2.30%	\$3,036,205	685	100%	\$78,796,481
Town of Powellsville	163	143	87.70%	\$11,772,721	13	8%	\$1,632,920	7	4.30%	\$1,948,486	163	100%	\$15,354,127
Town of Roxobel	205	151	73.70%	\$13,183,830	50	24.40%	\$7,366,831	4	2%	\$628,939	205	100%	\$21,179,601
Town of Windsor	1,584	1,247	78.70%	\$112,004,104	278	17.60%	\$75,256,335	59	3.70%	\$18,321,434	1,584	100%	\$205,581,873
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.60%</b>	<b>\$813,495,699</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$403,998,916</b>	<b>272</b>	<b>2%</b>	<b>\$85,820,073</b>	<b>13,313</b>	<b>99.90%</b>	<b>\$1,303,314,687</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,318	82.60%	\$364,998,656	774	14.80%	\$92,758,590	123	2.40%	\$44,579,440	5,215	99.80%	\$502,336,686
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$818,891,056	3,227	31.20%	\$496,404,149	168	1.60%	\$91,297,888	10,321	99.90%	\$1,406,593,093
Town of Bear Grass	69	51	73.90%	\$5,529,423	6	8.70%	\$1,104,097	12	17.40%	\$4,840,531	69	100%	\$11,474,051
Town of Everetts	145	138	95.20%	\$14,603,580	7	4.80%	\$1,241,799	0	0%	\$0	145	100%	\$15,845,379
Town of Hamilton	273	215	78.80%	\$20,771,217	26	9.50%	\$6,106,104	31	11.40%	\$12,547,414	272	99.60%	\$39,424,736
Town of Hassell	65	54	83.10%	\$6,115,969	11	16.90%	\$1,603,168	0	0%	\$0	65	100%	\$7,719,137
Town of Jamesville	276	210	76.10%	\$23,258,491	41	14.90%	\$23,128,138	21	7.60%	\$7,731,642	272	98.60%	\$54,118,271
Town of Oak City	287	276	96.20%	\$35,131,810	10	3.50%	\$1,308,772	1	0.30%	\$1,339,576	287	100%	\$37,780,157
Town of Parmele	137	120	87.60%	\$11,524,442	16	11.70%	\$3,770,442	1	0.70%	\$311,620	137	100%	\$15,606,504
Town of Robersonville	851	737	86.60%	\$107,003,885	104	12.20%	\$52,826,569	10	1.20%	\$3,618,148	851	100%	\$163,448,602
Town of Williamston	3,900	2,843	72.90%	\$331,428,493	818	21%	\$401,983,333	232	5.90%	\$162,683,597	3,893	99.80%	\$896,095,422
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$1,374,258,366</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$989,476,571</b>	<b>476</b>	<b>2.90%</b>	<b>\$284,370,416</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$2,648,105,352</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,073	78.80%	\$178,581,536	510	19.40%	\$47,785,895	49	1.90%	\$41,547,116	2,632	100%	\$267,914,547
Town of Columbia	512	408	79.70%	\$36,042,676	66	12.90%	\$21,609,915	38	7.40%	\$17,228,551	512	100%	\$74,881,143
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,481</b>	<b>78.90%</b>	<b>\$214,624,212</b>	<b>576</b>	<b>18.30%</b>	<b>\$69,395,810</b>	<b>87</b>	<b>2.80%</b>	<b>\$58,775,667</b>	<b>3,144</b>	<b>100%</b>	<b>\$342,795,690</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,813	72.30%	\$272,267,083	1,373	26%	\$93,382,368	77	1.50%	\$14,136,019	5,263	99.80%	\$379,785,470
Town of Creswell	365	274	75.10%	\$17,101,028	68	18.60%	\$7,475,894	22	6%	\$7,447,187	364	99.70%	\$32,024,109
Town of Plymouth	2,657	2,235	84.10%	\$158,522,187	321	12.10%	\$62,516,224	100	3.80%	\$21,702,892	2,656	100%	\$242,741,303
Town of Roper	578	473	81.80%	\$29,134,476	79	13.70%	\$7,663,154	21	3.60%	\$6,716,834	573	99.10%	\$43,514,464
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,795</b>	<b>76.60%</b>	<b>\$477,024,774</b>	<b>1,841</b>	<b>20.80%</b>	<b>\$171,037,640</b>	<b>220</b>	<b>2.50%</b>	<b>\$50,002,932</b>	<b>8,856</b>	<b>99.80%</b>	<b>\$698,065,346</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,638</b>	<b>76%</b>	<b>\$3,244,401,707</b>	<b>10,024</b>	<b>21.40%</b>	<b>\$1,726,667,527</b>	<b>1,178</b>	<b>2.50%</b>	<b>\$523,548,528</b>	<b>46,840</b>	<b>99.90%</b>	<b>\$5,494,617,761</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.95 – Estimated Buildings Impacted by EF3 Tornado**

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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.80%	\$604,690,500	1,861	20.60%	\$262,672,807	144	1.60%	\$76,637,265	9,040	99.90%	\$944,000,571
Town of Askeville	425	327	76.90%	\$27,331,912	87	20.50%	\$9,239,770	11	2.60%	\$6,473,167	425	100%	\$43,044,848
Town of Aulander	675	577	85.50%	\$61,252,364	84	12.40%	\$30,209,912	14	2.10%	\$6,594,605	675	100%	\$98,056,881
Town of Colerain	377	295	78.20%	\$31,381,525	69	18.30%	\$10,815,150	13	3.40%	\$5,809,117	377	100%	\$48,005,792
Town of Kelford	159	141	88.70%	\$11,095,625	14	8.80%	\$1,295,681	4	2.50%	\$1,287,235	159	100%	\$13,678,542
Town of Lewiston-Woodville	685	558	81.50%	\$48,099,816	111	16.20%	\$38,519,295	16	2.30%	\$4,823,505	685	100%	\$91,442,616
Town of Powellsville	163	143	87.70%	\$13,931,958	13	8%	\$2,194,990	7	4.30%	\$3,095,044	163	100%	\$19,221,992
Town of Roxobel	205	151	73.70%	\$15,177,343	50	24.40%	\$8,957,919	4	2%	\$1,000,398	205	100%	\$25,135,660
Town of Windsor	1,584	1,247	78.70%	\$132,069,080	278	17.60%	\$94,284,983	59	3.70%	\$28,900,612	1,584	100%	\$255,254,675
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.60%</b>	<b>\$945,030,123</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$458,190,507</b>	<b>272</b>	<b>2%</b>	<b>\$134,620,948</b>	<b>13,313</b>	<b>99.90%</b>	<b>\$1,537,841,577</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,318	82.60%	\$425,599,509	774	14.80%	\$109,143,822	123	2.40%	\$70,261,466	5,215	99.80%	\$605,004,797
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$968,380,235	3,227	31.20%	\$589,231,582	168	1.60%	\$142,102,187	10,321	99.90%	\$1,699,714,005
Town of Bear Grass	69	51	73.90%	\$6,407,991	6	8.70%	\$1,574,046	12	17.40%	\$7,310,277	69	100%	\$15,292,314
Town of Everetts	145	138	95.20%	\$16,834,062	7	4.80%	\$1,760,503	0	0%	\$0	145	100%	\$18,594,565
Town of Hamilton	273	215	78.80%	\$23,980,167	26	9.50%	\$7,516,476	31	11.40%	\$19,959,258	272	99.60%	\$51,455,901
Town of Hassell	65	54	83.10%	\$7,123,341	11	16.90%	\$1,934,310	0	0%	\$0	65	100%	\$9,057,650
Town of Jamesville	276	210	76.10%	\$28,277,397	41	14.90%	\$26,736,259	21	7.60%	\$11,782,685	272	98.60%	\$66,796,342
Town of Oak City	287	276	96.20%	\$40,858,376	10	3.50%	\$1,841,216	1	0.30%	\$2,130,872	287	100%	\$44,830,465
Town of Parmele	137	120	87.60%	\$13,321,663	16	11.70%	\$4,597,706	1	0.70%	\$495,696	137	100%	\$18,415,065
Town of Robersonville	851	737	86.60%	\$128,873,307	104	12.20%	\$62,485,285	10	1.20%	\$5,745,239	851	100%	\$197,103,831
Town of Williamston	3,900	2,843	72.90%	\$408,188,955	818	21%	\$505,437,840	232	5.90%	\$256,438,126	3,893	99.80%	\$1,170,064,921
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$1,642,245,494</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$1,203,115,223</b>	<b>476</b>	<b>2.90%</b>	<b>\$445,964,340</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$3,291,325,059</b>

**SECTION 4: RISK ASSESSMENT**

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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,073	78.80%	\$214,496,894	510	19.40%	\$52,182,114	49	1.90%	\$65,686,255	2,632	100%	\$332,365,263
Town of Columbia	512	408	79.70%	\$43,275,328	66	12.90%	\$27,406,644	38	7.40%	\$26,818,453	512	100%	\$97,500,425
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,481</b>	<b>78.90%</b>	<b>\$257,772,222</b>	<b>576</b>	<b>18.30%</b>	<b>\$79,588,758</b>	<b>87</b>	<b>2.80%</b>	<b>\$92,504,708</b>	<b>3,144</b>	<b>100%</b>	<b>\$429,865,688</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,813	72.30%	\$312,473,033	1,373	26%	\$99,976,459	77	1.50%	\$22,256,169	5,263	99.80%	\$434,705,661
Town of Creswell	365	274	75.10%	\$20,151,492	68	18.60%	\$9,248,512	22	6%	\$11,440,342	364	99.70%	\$40,840,346
Town of Plymouth	2,657	2,235	84.10%	\$195,566,979	321	12.10%	\$80,905,807	100	3.80%	\$34,180,742	2,656	100%	\$310,653,529
Town of Roper	578	473	81.80%	\$35,299,130	79	13.70%	\$10,193,291	21	3.60%	\$10,478,202	573	99.10%	\$55,970,623
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,795</b>	<b>76.60%</b>	<b>\$563,490,634</b>	<b>1,841</b>	<b>20.80%</b>	<b>\$200,324,069</b>	<b>220</b>	<b>2.50%</b>	<b>\$78,355,455</b>	<b>8,856</b>	<b>99.80%</b>	<b>\$842,170,159</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,638</b>	<b>76%</b>	<b>\$3,834,137,982</b>	<b>10,024</b>	<b>21.40%</b>	<b>\$2,050,362,379</b>	<b>1,178</b>	<b>2.50%</b>	<b>\$821,706,917</b>	<b>46,840</b>	<b>99.90%</b>	<b>\$6,706,207,280</b>

Source: NCEM Risk Management Tool

**SECTION 4: RISK ASSESSMENT**

**Table 4.96 – Estimated Buildings Impacted by EF4 Tornado**

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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	7,035	77.80%	\$605,446,159	1,861	20.60%	\$265,916,726	144	1.60%	\$81,835,510	9,040	99.90%	\$953,198,395
Town of Askeville	425	327	76.90%	\$27,597,495	87	20.50%	\$9,354,395	11	2.60%	\$6,830,514	425	100%	\$43,782,404
Town of Aulander	675	577	85.50%	\$62,281,233	84	12.40%	\$30,606,653	14	2.10%	\$7,005,430	675	100%	\$99,893,316
Town of Colerain	377	295	78.20%	\$31,454,071	69	18.30%	\$11,085,274	13	3.40%	\$6,248,228	377	100%	\$48,787,573
Town of Kelford	159	141	88.70%	\$11,095,625	14	8.80%	\$1,359,061	4	2.50%	\$1,333,428	159	100%	\$13,788,114
Town of Lewiston-Woodville	685	558	81.50%	\$48,099,816	111	16.20%	\$39,193,613	16	2.30%	\$5,007,384	685	100%	\$92,300,813
Town of Powellsville	163	143	87.70%	\$14,007,577	13	8%	\$2,346,060	7	4.30%	\$3,213,838	163	100%	\$19,567,476
Town of Roxobel	205	151	73.70%	\$15,177,343	50	24.40%	\$9,308,044	4	2%	\$1,036,298	205	100%	\$25,521,685
Town of Windsor	1,584	1,247	78.70%	\$132,667,164	278	17.60%	\$97,249,359	59	3.70%	\$30,378,251	1,584	100%	\$260,294,775
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>10,474</b>	<b>78.60%</b>	<b>\$947,826,483</b>	<b>2,567</b>	<b>19.30%</b>	<b>\$466,419,185</b>	<b>272</b>	<b>2%</b>	<b>\$142,888,881</b>	<b>13,313</b>	<b>99.90%</b>	<b>\$1,557,134,551</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	4,318	82.60%	\$426,354,864	774	14.80%	\$111,920,312	123	2.40%	\$73,962,552	5,215	99.80%	\$612,237,728
<b>Martin</b>													
Unincorporated Martin County	10,328	6,926	67.10%	\$973,279,819	3,227	31.20%	\$605,369,835	168	1.60%	\$152,882,702	10,321	99.90%	\$1,731,532,355
Town of Bear Grass	69	51	73.90%	\$6,407,991	6	8.70%	\$1,651,513	12	17.40%	\$8,281,113	69	100%	\$16,340,618
Town of Everetts	145	138	95.20%	\$16,834,062	7	4.80%	\$1,917,164	0	0%	\$0	145	100%	\$18,751,226
Town of Hamilton	273	215	78.80%	\$23,980,167	26	9.50%	\$7,765,889	31	11.40%	\$20,674,599	272	99.60%	\$52,420,656
Town of Hassell	65	54	83.10%	\$7,123,341	11	16.90%	\$1,985,681	0	0%	\$0	65	100%	\$9,109,022
Town of Jamesville	276	210	76.10%	\$28,570,176	41	14.90%	\$27,236,937	21	7.60%	\$13,143,976	272	98.60%	\$68,951,090
Town of Oak City	287	276	96.20%	\$40,858,376	10	3.50%	\$1,953,541	1	0.30%	\$2,207,243	287	100%	\$45,019,160
Town of Parmele	137	120	87.60%	\$13,321,663	16	11.70%	\$4,778,720	1	0.70%	\$513,462	137	100%	\$18,613,844
Town of Robersonville	851	737	86.60%	\$129,972,687	104	12.20%	\$64,106,663	10	1.20%	\$5,969,659	851	100%	\$200,049,009
Town of Williamston	3,900	2,843	72.90%	\$413,523,655	818	21%	\$524,295,163	232	5.90%	\$269,893,276	3,893	99.80%	\$1,207,712,094
<b>Subtotal Martin</b>	<b>16,331</b>	<b>11,570</b>	<b>70.80%</b>	<b>\$1,653,871,937</b>	<b>4,266</b>	<b>26.10%</b>	<b>\$1,241,061,106</b>	<b>476</b>	<b>2.90%</b>	<b>\$473,566,030</b>	<b>16,312</b>	<b>99.90%</b>	<b>\$3,368,499,074</b>

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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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	2,073	78.80%	\$216,763,263	510	19.40%	\$52,771,423	49	1.90%	\$68,771,165	2,632	100%	\$338,305,850
Town of Columbia	512	408	79.70%	\$43,649,322	66	12.90%	\$28,648,828	38	7.40%	\$28,848,301	512	100%	\$101,146,451
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>2,481</b>	<b>78.90%</b>	<b>\$260,412,585</b>	<b>576</b>	<b>18.30%</b>	<b>\$81,420,251</b>	<b>87</b>	<b>2.80%</b>	<b>\$97,619,466</b>	<b>3,144</b>	<b>100%</b>	<b>\$439,452,301</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	3,813	72.30%	\$312,735,039	1,373	26%	\$100,427,758	77	1.50%	\$23,471,810	5,263	99.80%	\$436,634,606
Town of Creswell	365	274	75.10%	\$20,295,192	68	18.60%	\$9,683,208	22	6%	\$12,589,583	364	99.70%	\$42,567,982
Town of Plymouth	2,657	2,235	84.10%	\$198,141,835	321	12.10%	\$84,661,717	100	3.80%	\$36,027,333	2,656	100%	\$318,830,886
Town of Roper	578	473	81.80%	\$35,687,274	79	13.70%	\$10,814,156	21	3.60%	\$11,229,129	573	99.10%	\$57,730,558
<b>Subtotal Washington</b>	<b>8,871</b>	<b>6,795</b>	<b>76.60%</b>	<b>\$566,859,340</b>	<b>1,841</b>	<b>20.80%</b>	<b>\$205,586,839</b>	<b>220</b>	<b>2.50%</b>	<b>\$83,317,855</b>	<b>8,856</b>	<b>99.80%</b>	<b>\$855,764,032</b>
<b>Region Total</b>	<b>46,891</b>	<b>35,638</b>	<b>76%</b>	<b>\$3,855,325,209</b>	<b>10,024</b>	<b>21.40%</b>	<b>\$2,106,407,693</b>	<b>1,178</b>	<b>2.50%</b>	<b>\$871,354,784</b>	<b>46,840</b>	<b>99.90%</b>	<b>\$6,833,087,686</b>

Source: NCEM Risk Management Tool

## SECTION 4: RISK ASSESSMENT

### 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

Table 4.97 summarizes the potential negative consequences of tornado.

**Table 4.97 – 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.

### Hazard Summary by Jurisdiction

The following table summarizes tornado hazard risk by jurisdiction. Tornado risk does not vary substantially by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	3	3	2	4	1	2.7	H
Town of Askewville	3	3	2	4	1	2.7	H
Town of Aulander	3	3	2	4	1	2.7	H
Town of Colerain	3	3	2	4	1	2.7	H
Town of Kelford	3	3	2	4	1	2.7	H
Town of Lewiston-Woodville	3	3	2	4	1	2.7	H
Town of Powellville	3	3	2	4	1	2.7	H
Town of Roxobel	3	3	2	4	1	2.7	H
Town of Windsor	3	3	2	4	1	2.7	H
Hyde County	3	3	2	4	1	2.7	H
Martin County	3	3	2	4	1	2.7	H
Town of Bear Grass	3	3	2	4	1	2.7	H
Town of Everetts	3	3	2	4	1	2.7	H
Town of Hamilton	3	3	2	4	1	2.7	H
Town of Hassell	3	3	2	4	1	2.7	H
Town of Jamesville	3	3	2	4	1	2.7	H
Town of Oak City	3	3	2	4	1	2.7	H

## SECTION 4: RISK ASSESSMENT

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Town of Parmele	3	3	2	4	1	2.7	H
Town of Robersonville	3	3	2	4	1	2.7	H
Town of Williamston	3	3	2	4	1	2.7	H
Tyrrell County	3	3	2	4	1	2.7	H
Town of Columbia	3	3	2	4	1	2.7	H
Washington County	3	3	2	4	1	2.7	H
Town of Creswell	3	3	2	4	1	2.7	H
Town of Plymouth	3	3	2	4	1	2.7	H
Town of Roper	3	3	2	4	1	2.7	H

### 4.5.12 Wildfire

#### Hazard Background

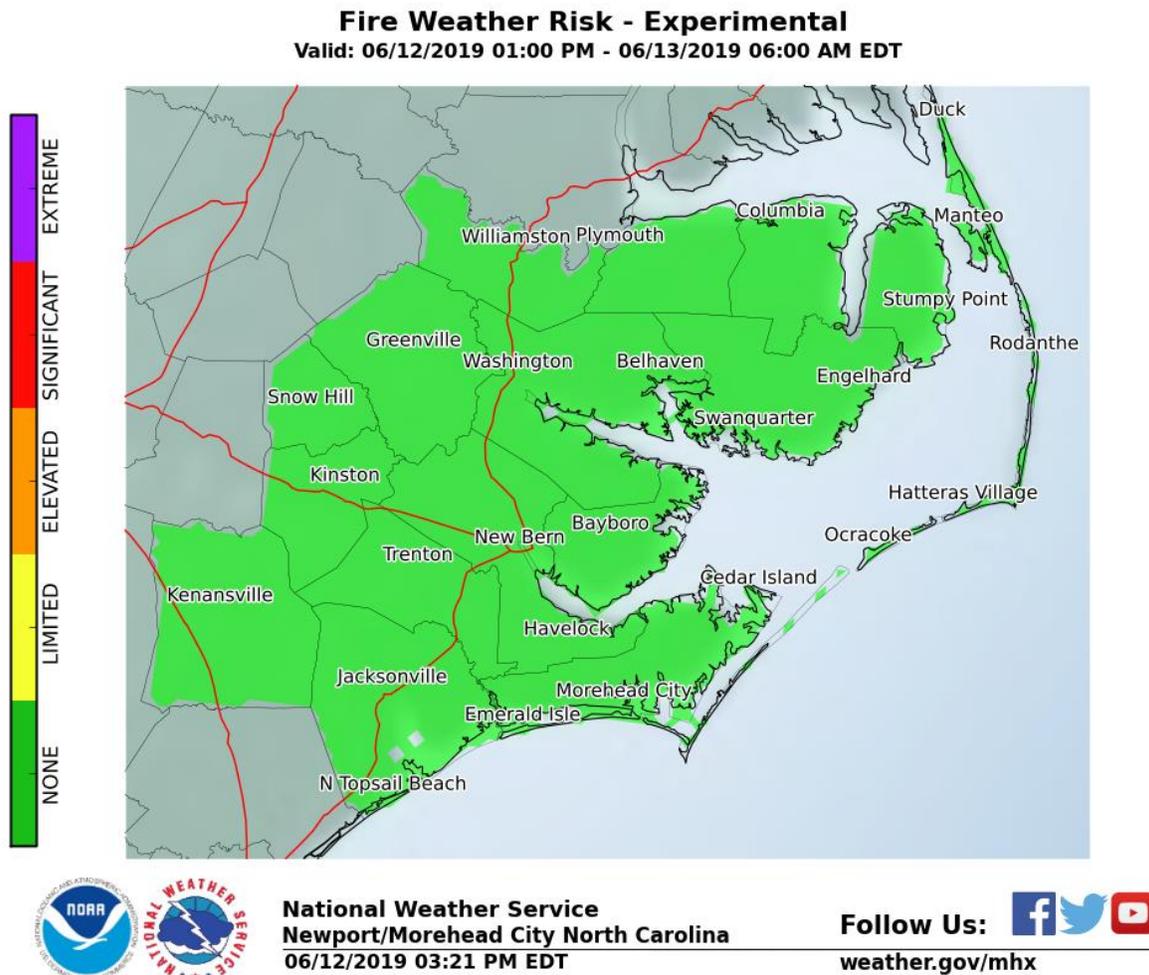
A wildfire is an uncontained fire that spreads through the environment. Wildfires have the ability to consume large areas, including infrastructure, property, and resources. When massive fires, or conflagrations, develop near populated areas, evacuations possibly ensue. Not only do the flames impact 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. In support of forecasting for fire weather, the National Weather Service Fire Weather Program emerged in response to a need for weather support to large and dangerous wildfires. This service is provided to federal and state land management agencies for the prevention, suppression, and management of forest and rangeland fires. As shown in Figure 4.48, the National Weather Service Newport/Morehead City, NC Forecast Office provides year-round fire weather forecasts for the Northeastern NC Region.

Figure 4.48 – Fire Weather Forecast, Northeastern NC Region



Source: National Weather Service

Weather conditions favorable to wildfire include drought, which increases flammability of surface fuels, and winds, which aid a wildfire’s progress. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Rapid response can contain wildfires and limit their threat to property.

The Northeastern NC Region experiences a variety of wildfire conditions found in the Keetch-Byram Drought Index, which is described in Table 4.98. The Keetch-Byram Drought Index (KBDI) for May 9, 2019 is shown in Figure 4.49 along with a Daily Fire Danger Estimate Adjective Rating for certain points across the state. The KBDI for the Northeastern NC Region at this time was between 100 and 400, and the Fire Danger Estimate for the nearby area was “Low” to “Moderate.”

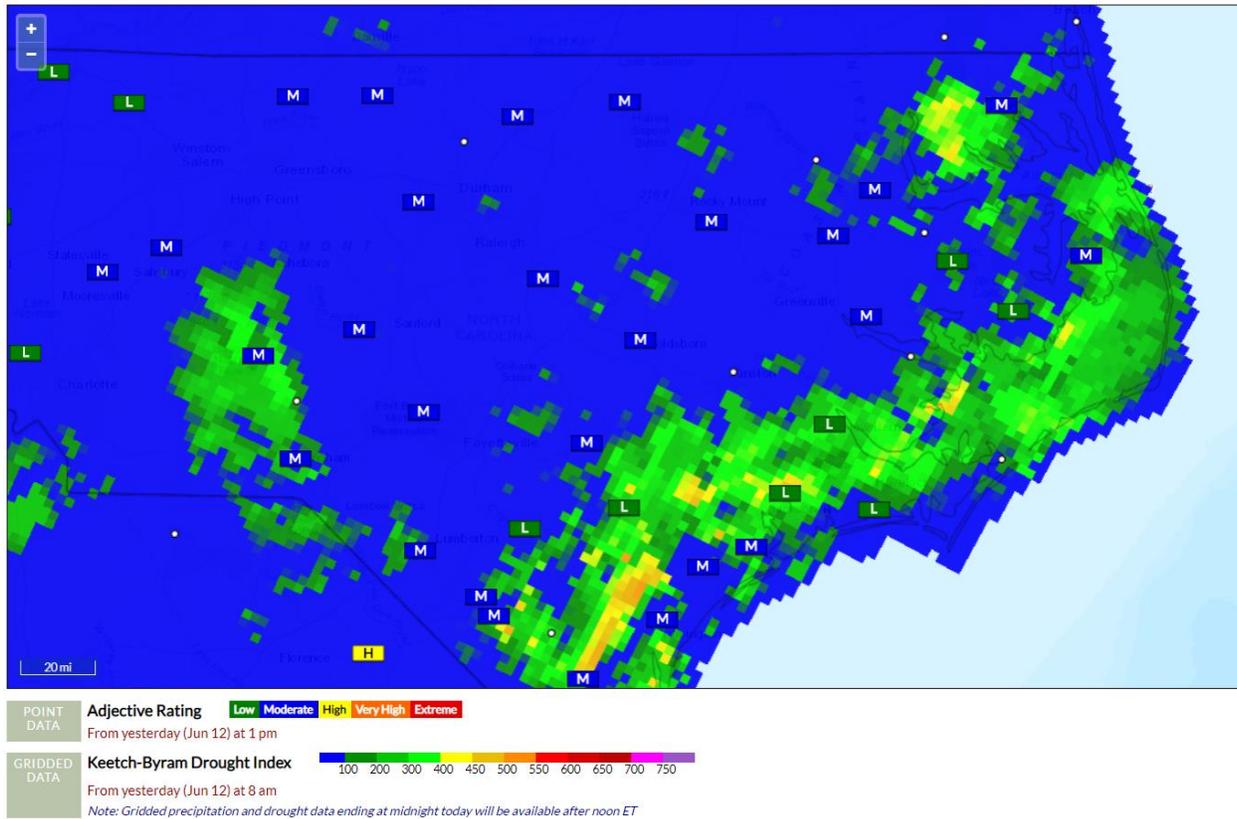
**Table 4.98 – Keetch-Byram Drought Index Fire Danger Rating System**

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.

## SECTION 4: RISK ASSESSMENT

KBDI	Description
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, June 2019



Source: State Climate Office of North Carolina, Fire Weather Intelligence Portal

*Warning Time: 4 – Less than six hours*

*Duration: 3 – Less than one week*

### Location

The location of wildfire risk can be defined by the acreage of Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels, and thus demarcates the spatial extent of wildfire risk. The WUI is essentially all the land in the county that is not heavily urbanized. The Southern Wildfire Risk Assessment (SWRA) estimates that 97.4 percent of the Northeastern NC Region 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 4.99 details the extent of the WUI in the Northeastern NC Region, and Figure 4.50 maps the WUI areas in the Region.

### Northeastern NC

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2020

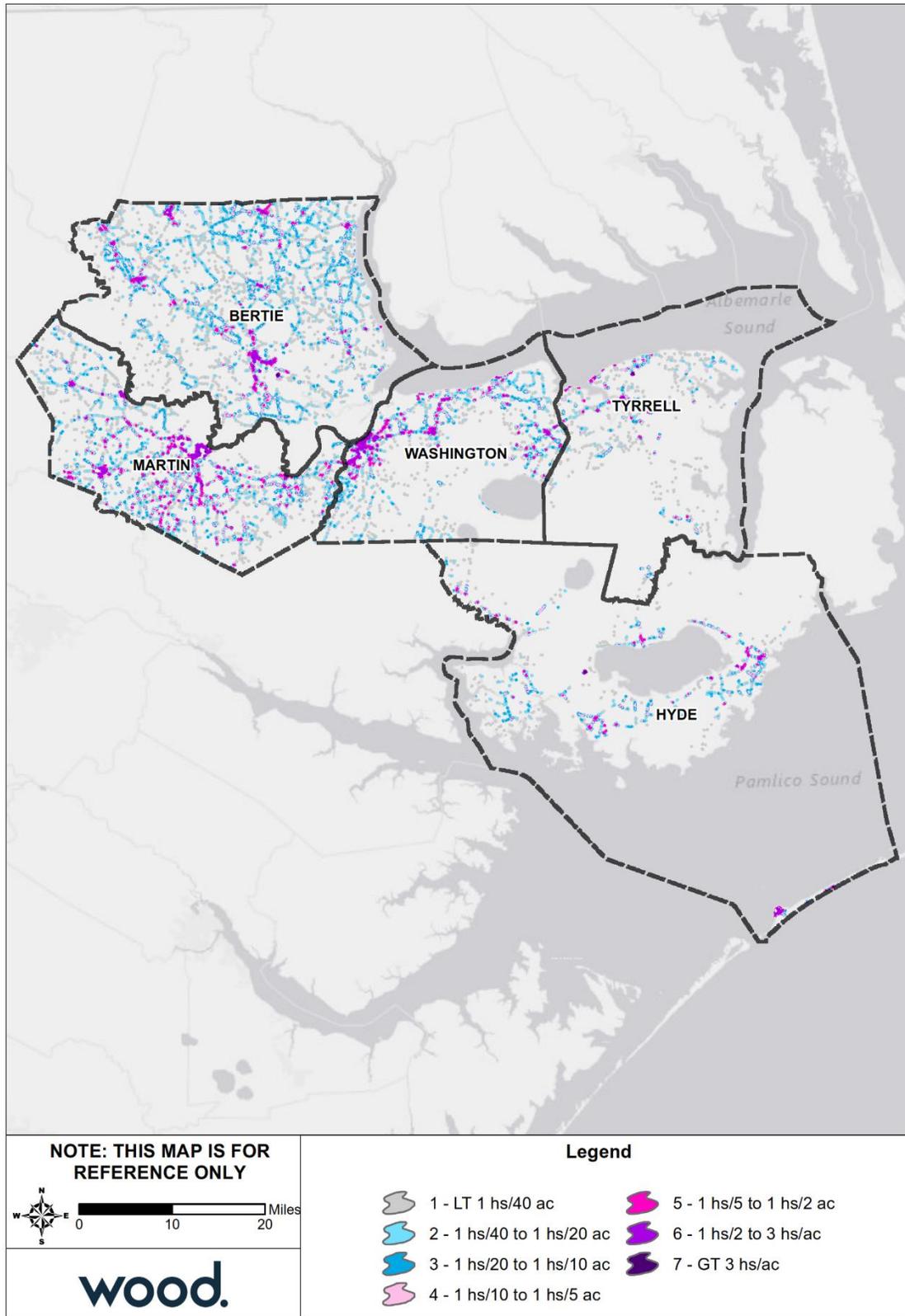
**SECTION 4: RISK ASSESSMENT**

**Table 4.99 – Wildland Urban Interface, Population and Acres**

	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
	LT 1hs/40ac	3,607	5.3 %	181,642	47.9 %
	1hs/40ac to 1hs/20ac	4,392	6.5 %	68,925	18.2 %
	1hs/20ac to 1hs/10ac	7,716	11.4 %	56,908	15.0 %
	1hs/10ac to 1hs/5ac	10,356	15.4 %	37,333	9.9 %
	1hs/5ac to 1hs/2ac	15,412	22.8 %	23,609	6.2 %
	1hs/2ac to 3hs/1ac	23,399	34.7 %	10,350	2.7 %
	GT 3hs/1ac	2,577	3.8 %	214	0.1 %
	<b>Total</b>	<b>67,459</b>	<b>100.0 %</b>	<b>378,981</b>	<b>100.0 %</b>

Source: Southern Wildfire Risk Assessment

Figure 4.50 – Wildland Urban Interface, Northeastern NC Region



Source: Southern Wildfire Risk Assessment

## SECTION 4: RISK ASSESSMENT

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### Extent

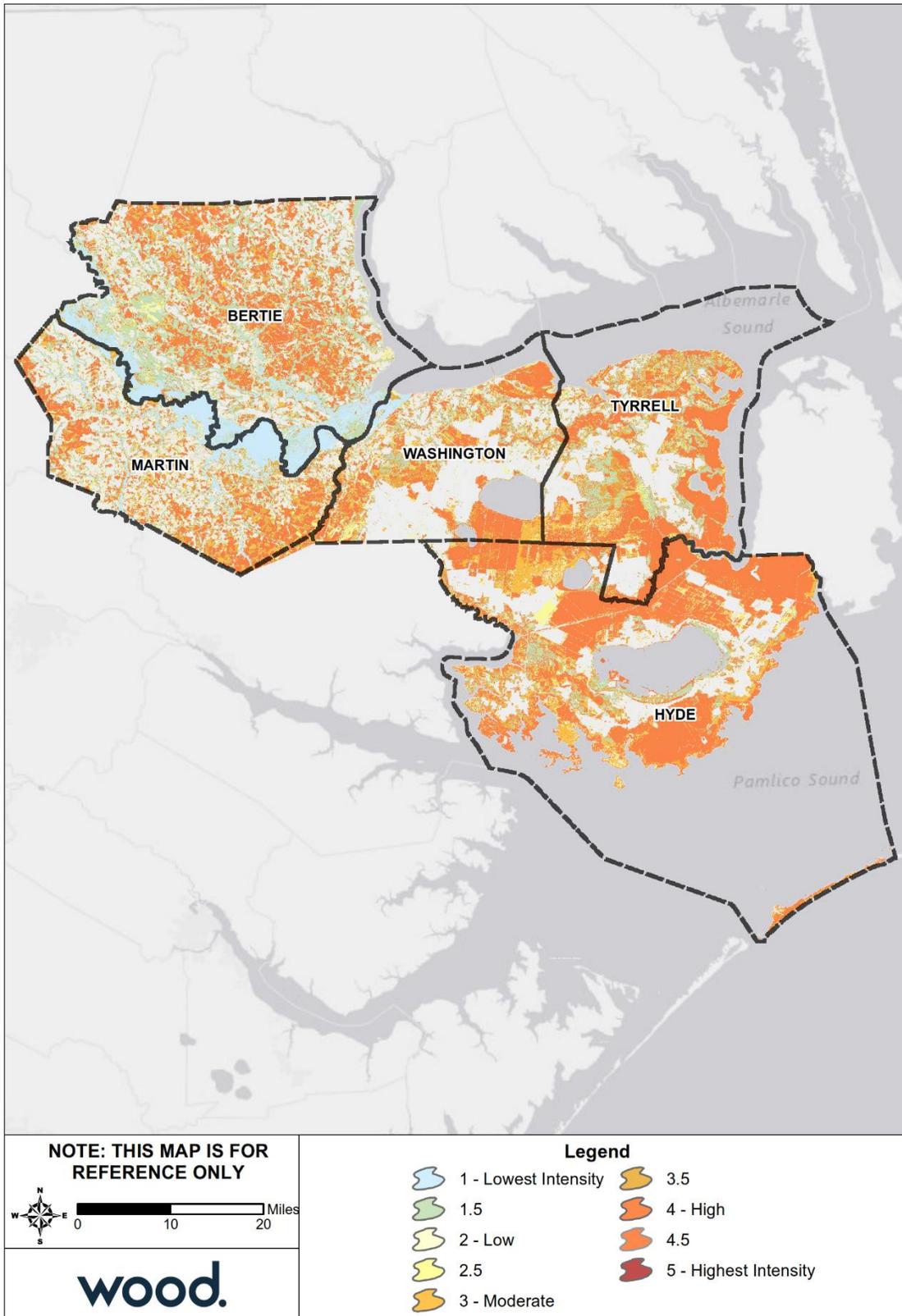
Wildfire extent can be defined by the fire's intensity and measured by the Characteristic Fire Intensity Scale, which identifies areas where significant fuel hazards which could produce dangerous fires exist. Fire Intensity ratings identify where significant fuel hazards and dangerous fire behavior potential 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. Figure 4.51 shows the potential fire intensity across the Northeastern NC Region.

**Table 4.100 – Fire Intensity Scale**

<b>Class</b>	<b>Description</b>
<b>1, Very Low</b>	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.
<b>2, Low</b>	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.
<b>3, Moderate</b>	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.
<b>4, High</b>	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.
<b>5, Very High</b>	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, Northeastern NC Region



Source: Southern Wildfire Risk Assessment

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Approximately 23 percent of the Northeastern NC Region may experience a Class 4 or Class 4.5 Fire Intensity, which poses significant harm or damage to life and property. Over 9 percent of the Region may experience Class 3 Fire Intensity, which has potential for harm to life and property but is easier to suppress with dozer and plows. The remainder of the county is either non-burnable (50.4%) or would face a Class 1 or Class 2 Fire Intensity, which are easily suppressed.

*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 4.101 lists past occurrences of wildfire in the Northeastern NC Region since 1999 as provided by the North Carolina Forest Service (NCFS) in May 2019. This data only accounts for occurrences within unincorporated areas within the region, which fall 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 are higher than what can be reported here.

**Table 4.101 – Records for Wildfire in the Northeastern NC Region, 2009-2018**

Year	Wildfire Count	Acres Burned	Average Acreage Burned
1999	76	223.4	2.94
2000	76	630.7	8.30
2001	156	846.8	5.43
2002	106	518.8	4.89
2003	32	161.3	5.04
2004	56	324.4	5.79
2005	59	156.9	2.66
2006	105	435.3	4.15
2007	153	825.8	5.40
2008	141	18,284.6	129.68
2009	104	508.0	4.88
2010	82	290.5	3.54
2011	126	534.0	4.24
2012	73	166.8	2.28
2013	70	206.9	2.96
2014	60	254.8	4.25
2015	74	169.4	2.29
2016	54	6,958.3	128.86
2017	103	176.0	1.71
2018	72	43.8	0.61
<b>Total</b>	<b>1,778</b>	<b>31,716</b>	<b>17.84</b>

Source: NC Forest Service

In 2008 and 2016, the Northeastern NC Region saw an exceptional number of acres burned, averaging 129.68 and 128.86 per fire event, respectively. The region experienced drought in 2008, and acres burned

## SECTION 4: RISK ASSESSMENT

were higher on average across all counties in the region. In both 2008 and 2016, however, Hyde County experienced significant fires. In 2008, over 16,500 acres burned, and in 2016 almost 7,000 acres burned. In June 2008, a record breaking fire started at the Pocosin Lakes National Wildlife Refuge and spread to privately owned rural land in Hyde, Tyrrell, and Washington Counties. The Whipping Creek fire started as two smaller fires in April 2016, and Hyde County officials were forced to shut down a 30-mile stretch of U.S. Highway 264. Despite its large size, the fire occurred where no people or communities were threatened, according to the North Carolina Forestry Service.

On average, the Northeastern NC Region experiences 89 fires and 1,586 acres burned annually from fires that require the North Carolina Forest Service to respond. Actual number of fires and acreage burned is likely higher because smaller fires within jurisdictional boundaries are managed by local fire departments.

### Probability of Future Occurrence

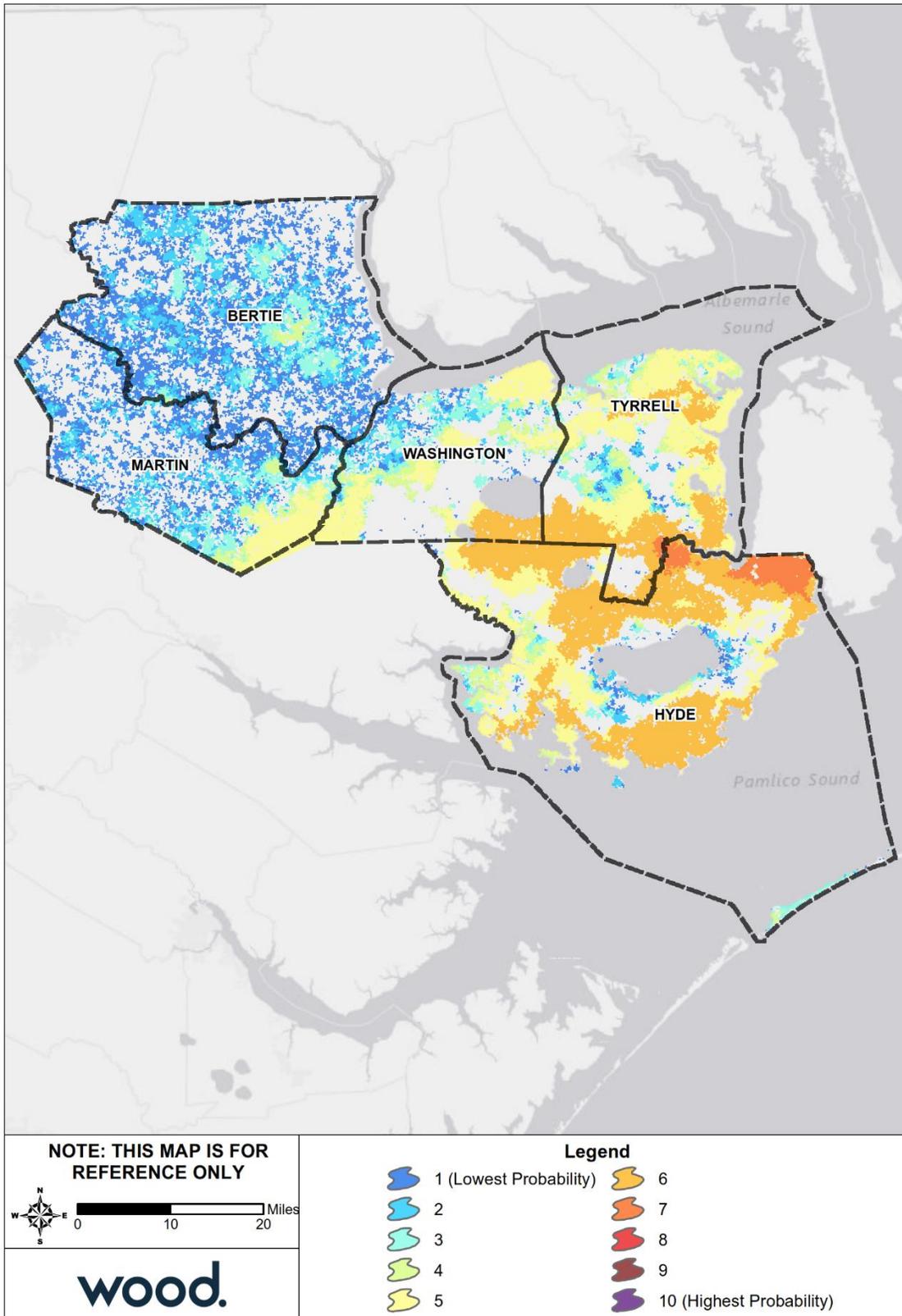
The Southern Wildfire Risk Assessment provides a Burn Probability analysis which predicts the probability of an area burning based on landscape conditions, weather, historical ignition patterns, and historical fire prevention and suppression efforts. Burn Probability data is generated by simulating fires 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 Northeastern NC Region is presented in Table 4.102 and illustrated in Figure 4.52.

**Table 4.102 – Burn Probability, Northeastern NC Region**

	Class	Acres	Percent
	1	235,677	22.9 %
	2	147,552	14.4 %
	3	98,374	9.6 %
	4	66,886	6.5 %
	5	222,761	21.7 %
	6	234,632	22.8 %
	7	22,013	2.1 %
	8	0	0.0 %
	9	0	0.0 %
	10	0	0.0 %
	<b>Total</b>	<b>1,027,895</b>	<b>100.0 %</b>

Source: Southern Wildfire Risk Assessment

Figure 4.52 – Burn Probability, Northeastern NC Region



Source: Southern Wildfire Risk Assessment

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The entirety of the Northeastern NC Region has a burn probability of 7 or less, and 75 percent of the region has a burn probability of 5 or less. The areas of relatively higher burn probability are located in Northeastern Hyde County as well as along the border between Washington, Tyrrell, and Hyde Counties.

The probability of wildfire across the Region is considered likely, defined as between a 10% and 100% annual chance of occurrence. While all jurisdictions fall within this threshold, the areas containing moderate burn probability, noted above, have a comparatively higher probability of occurrence.

### *Probability: 3 – Likely*

#### 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

##### Methodologies and Assumptions

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

Within IRISK, wildfire hazard areas were determined using the Wildland Fire Susceptibility Index (WFSI). The following parameters were applied:

- ▶ Areas with a WFSI value of 0.01 – 0.05 were considered to be at moderate risk.
- ▶ Areas with a WFSI value greater than 0.05 were considered to be at high risk.
- ▶ Areas with a WFSI value less than 0.01 were considered to not be at risk.

The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the state have this value determined consistently, it allows for comparison and ordination of areas of the state as to the likelihood of an acre burning.

#### 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 4.103 details the population estimated to be at risk to wildfire according to the NCEM IRISK database.

**Table 4.103 – Estimated Population Impacted by Wildfire**

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
<b>Bertie</b>									
Unincorporated Bertie County	13,731	5,761	42%	2,359	990	42%	759	318	41.9%
Town of Askewville	551	431	78.2%	95	74	77.9%	30	23	76.7%
Town of Aulander	1,055	5	0.5%	181	1	0.6%	58	0	0%
Town of Colerain	394	119	30.2%	68	21	30.9%	22	7	31.8%
Town of Kelford	248	0	0%	43	0	0%	14	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
Town of Lewiston-Woodville	931	176	18.9%	160	30	18.8%	51	10	19.6%
Town of Powellsville	257	208	80.9%	44	36	81.8%	14	11	78.6%
Town of Roxobel	240	0	0%	41	0	0%	13	0	0%
Town of Windsor	3,877	689	17.8%	666	118	17.7%	214	38	17.8%
<b>Subtotal Bertie</b>	<b>21,284</b>	<b>7,389</b>	<b>34.7%</b>	<b>3657</b>	<b>1270</b>	<b>34.7%</b>	<b>1175</b>	<b>407</b>	<b>34.6%</b>
<b>Hyde</b>									
Unincorporated Hyde County	5,809	2,301	39.6%	875	347	39.7%	293	116	39.6%
<b>Martin</b>									
Unincorporated Martin County	13,965	3,402	24.4%	2,450	597	24.4%	798	194	24.3%
Town of Bear Grass	55	41	74.5%	10	7	70%	3	2	66.7%
Town of Everetts	164	67	40.9%	29	12	41.4%	9	4	44.4%
Town of Hamilton	390	0	0%	68	0	0%	22	0	0%
Town of Hassell	83	9	10.8%	15	2	13.3%	5	1	20%
Town of Jamesville	481	158	32.8%	84	28	33.3%	27	9	33.3%
Town of Oak City	327	0	0%	57	0	0%	19	0	0%
Town of Parmele	229	40	17.5%	40	7	17.5%	13	2	15.4%
Town of Robersonville	1,410	107	7.6%	247	19	7.7%	81	6	7.4%
Town of Williamston	7,393	1,028	13.9%	1,297	180	13.9%	423	59	13.9%
<b>Subtotal Martin</b>	<b>24,497</b>	<b>4,852</b>	<b>19.8%</b>	<b>4297</b>	<b>852</b>	<b>19.8%</b>	<b>1400</b>	<b>277</b>	<b>19.8%</b>
<b>Tyrrell</b>									
Unincorporated Tyrrell County	3,621	2,191	60.5%	610	369	60.5%	191	116	60.7%
Town of Columbia	786	463	58.9%	132	78	59.1%	42	25	59.5%
<b>Subtotal Tyrrell</b>	<b>4,407</b>	<b>2,654</b>	<b>60.2%</b>	<b>742</b>	<b>447</b>	<b>60.2%</b>	<b>233</b>	<b>141</b>	<b>60.5%</b>
<b>Washington</b>									
Unincorporated Washington County	7,168	5,599	78.1%	1,309	1,022	78.1%	465	363	78.1%
Town of Creswell	461	411	89.2%	84	75	89.3%	30	27	90%
Town of Plymouth	4,682	4,258	90.9%	855	778	91%	303	276	91.1%
Town of Roper	912	648	71.1%	167	119	71.3%	59	42	71.2%
<b>Subtotal Washington</b>	<b>13,223</b>	<b>10,916</b>	<b>82.6%</b>	<b>2415</b>	<b>1994</b>	<b>82.6%</b>	<b>857</b>	<b>708</b>	<b>82.6%</b>
<b>Region Total</b>	<b>69,220</b>	<b>28,112</b>	<b>40.6%</b>	<b>11986</b>	<b>4910</b>	<b>41%</b>	<b>3958</b>	<b>1649</b>	<b>41.7%</b>

Source: NCEM Risk Management Tool

### 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

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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.

Table 4.104 details the buildings at risk to wildfire in the Northeastern NC Region and The sectors facing the greatest risk to wildfire in Northeastern NC Region are energy, commercial facilities, government facilities, and food and agriculture.

Table 4.105 details critical facilities by sector.

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**Table 4.104 – Estimated Buildings Impacted by Wildfire**

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
<b>Bertie</b>													
Unincorporated Bertie County	9,047	2,951	32.60%	\$248,393,889	628	6.90%	\$102,362,098	78	0.90%	\$51,036,154	3,657	40.40%	\$401,792,142
Town of Askeville	425	256	60.20%	\$21,889,154	58	13.60%	\$5,104,591	9	2.10%	\$6,561,413	323	76%	\$33,555,158
Town of Aulander	675	3	0.40%	\$232,641	4	0.60%	\$2,758,440	0	0%	\$0	7	1%	\$2,991,081
Town of Colerain	377	89	23.60%	\$8,795,652	5	1.30%	\$1,298,198	8	2.10%	\$4,003,961	102	27.10%	\$14,097,811
Town of Kelford	159	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Lewiston-Woodville	685	106	15.50%	\$9,178,073	11	1.60%	\$2,595,178	2	0.30%	\$720,771	119	17.40%	\$12,494,021
Town of Powellsville	163	116	71.20%	\$11,308,983	10	6.10%	\$2,068,981	4	2.50%	\$2,238,531	130	79.80%	\$15,616,496
Town of Roxobel	205	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Windsor	1,584	218	13.80%	\$18,040,882	27	1.70%	\$9,108,834	13	0.80%	\$6,685,593	258	16.30%	\$33,835,309
<b>Subtotal Bertie</b>	<b>13,320</b>	<b>3,739</b>	<b>28.10%</b>	<b>\$317,839,274</b>	<b>743</b>	<b>5.60%</b>	<b>\$125,296,320</b>	<b>114</b>	<b>0.90%</b>	<b>\$71,246,423</b>	<b>4,596</b>	<b>34.50%</b>	<b>\$514,382,018</b>
<b>Hyde</b>													
Unincorporated Hyde County	5,225	1,711	32.70%	\$167,734,471	307	5.90%	\$47,823,560	46	0.90%	\$16,351,942	2,064	39.50%	\$231,909,974
<b>Martin</b>													
Unincorporated Martin County	10,328	1,680	16.30%	\$218,911,989	614	5.90%	\$97,694,432	40	0.40%	\$43,555,965	2,334	22.60%	\$360,162,385
Town of Bear Grass	69	38	55.10%	\$4,525,306	5	7.20%	\$1,547,545	10	14.50%	\$7,689,624	53	76.80%	\$13,762,476
Town of Everetts	145	56	38.60%	\$6,951,462	0	0%	\$0	0	0%	\$0	56	38.60%	\$6,951,462
Town of Hamilton	273	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Hassell	65	6	9.20%	\$537,920	1	1.50%	\$42,815	0	0%	\$0	7	10.80%	\$580,735
Town of Jamesville	276	69	25%	\$11,153,069	4	1.40%	\$2,383,513	9	3.30%	\$9,399,962	82	29.70%	\$22,936,544
Town of Oak City	287	0	0%	\$0	0	0%	\$0	0	0%	\$0	0	0%	\$0
Town of Parmele	137	21	15.30%	\$2,205,366	0	0%	\$0	0	0%	\$0	21	15.30%	\$2,205,366
Town of Robersonville	851	56	6.60%	\$7,507,795	5	0.60%	\$920,636	0	0%	\$0	61	7.20%	\$8,428,431
Town of Williamston	3,900	399	10.20%	\$54,500,399	157	4%	\$57,945,435	58	1.50%	\$113,520,785	614	15.70%	\$225,966,619
<b>Subtotal Martin</b>	<b>16,331</b>	<b>2,325</b>	<b>14.20%</b>	<b>\$306,293,306</b>	<b>786</b>	<b>4.80%</b>	<b>\$160,534,376</b>	<b>117</b>	<b>0.70%</b>	<b>\$174,166,336</b>	<b>3,228</b>	<b>19.80%</b>	<b>\$640,994,018</b>

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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
<b>Tyrrell</b>													
Unincorporated Tyrrell County	2,632	1,255	47.70%	\$124,399,257	229	8.70%	\$24,628,657	30	1.10%	\$31,353,790	1,514	57.50%	\$180,381,703
Town of Columbia	512	241	47.10%	\$25,662,629	20	3.90%	\$6,934,356	17	3.30%	\$14,332,979	278	54.30%	\$46,929,964
<b>Subtotal Tyrrell</b>	<b>3,144</b>	<b>1,496</b>	<b>47.60%</b>	<b>\$150,061,886</b>	<b>249</b>	<b>7.90%</b>	<b>\$31,563,013</b>	<b>47</b>	<b>1.50%</b>	<b>\$45,686,769</b>	<b>1,792</b>	<b>57%</b>	<b>\$227,311,667</b>
<b>Washington</b>													
Unincorporated Washington County	5,271	2,979	56.50%	\$241,442,537	779	14.80%	\$56,793,759	67	1.30%	\$20,671,321	3,825	72.60%	\$318,907,617
Town of Creswell	365	244	66.80%	\$18,161,501	56	15.30%	\$6,545,082	22	6%	\$12,849,739	322	88.20%	\$37,556,322
Town of Plymouth	2,657	2,032	76.50%	\$183,580,329	266	10%	\$73,232,846	90	3.40%	\$34,523,520	2,388	89.90%	\$291,336,695
Town of Roper	578	336	58.10%	\$25,503,978	53	9.20%	\$8,798,487	17	2.90%	\$10,298,002	406	70.20%	\$44,600,467
<b>Subtotal Washington</b>	<b>8,871</b>	<b>5,591</b>	<b>63%</b>	<b>\$468,688,345</b>	<b>1,154</b>	<b>13%</b>	<b>\$145,370,174</b>	<b>196</b>	<b>2.20%</b>	<b>\$78,342,582</b>	<b>6,941</b>	<b>78.20%</b>	<b>\$692,401,101</b>
<b>Region Total</b>	<b>46,891</b>	<b>14,862</b>	<b>31.70%</b>	<b>\$1,410,617,282</b>	<b>3,239</b>	<b>6.90%</b>	<b>\$510,587,443</b>	<b>520</b>	<b>1.10%</b>	<b>\$385,794,052</b>	<b>18,621</b>	<b>39.70%</b>	<b>\$2,306,998,778</b>

Source: NCEM Risk Management Tool

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The sectors facing the greatest risk to wildfire in Northeastern NC Region are energy, commercial facilities, government facilities, and food and agriculture.

**Table 4.105 – Critical Facilities at Risk to Wildfire**

Sector	Number of Buildings at Risk	Estimated Damages
Banking and Finance	12	\$5,315,080
Commercial Facilities	877	\$306,647,248
Communications	2	\$205,453
Critical Manufacturing	194	\$61,219,391
Emergency Services	16	\$8,500,559
Energy	4	\$500,588,329
Food and Agriculture	2,293	\$166,561,140
Government Facilities	244	\$253,521,179
Healthcare and Public Health	56	\$63,299,391
Nuclear Reactors, Materials and Waste	2	\$352,540
Postal and Shipping	3	\$1,600,000
Transportation Systems	95	\$30,975,093
Water	13	\$60,324,577
<b>All Categories</b>	<b>3,811</b>	<b>\$1,459,109,980</b>

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 4.106 summarizes the potential detrimental consequences of wildfire.

**Table 4.106 – 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

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Category	Consequences
	include the costs of maintenance and damage assessment teams, field data collection, and replacement or repair costs. Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground distribution lines, and soil erosion or debris deposits into waterways after the fire. Utilities and communications repairs are also necessary for equipment damaged by a fire. This includes power lines, transformers, cell phone towers, and phone lines.
Environment	Wildfires cause damage to the natural environment, killing vegetation and animals. The risk of floods and debris flows increases after wildfires due to the exposure of bare ground and the loss of vegetation. In addition, the secondary effects of wildfires, including erosion, landslides, introduction of invasive species, and changes in water quality, are often more disastrous than the fire itself.
Economic Condition of the Jurisdiction	Wildfires can have significant short-term and long-term effects on the local economy. Wildfires, and extreme fire danger, may reduce recreation and tourism in and near the fires. If aesthetics are impaired, local property values can decline. Extensive fire damage to trees can significantly alter the timber supply, both through a short-term surplus from timber salvage and a longer-term decline while the trees regrow. Water supplies can be degraded by post-fire erosion and stream sedimentation. 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. Public confidence in the jurisdiction's governance may be influenced by: <ul style="list-style-type: none"> <li>• The jurisdiction's actions taken pre-disaster to mitigate and prepare for impacts, including the amount of public education provided</li> <li>• The jurisdiction's efforts to provide warning to residents</li> <li>• The jurisdiction's actions taken to respond to the event</li> <li>• The jurisdiction's actions taken to recover from the impacts and return impacted communities to the same or better state before the wildfire occurred</li> </ul>

### Hazard Summary by Jurisdiction

The following table summarizes wildfire hazard risk by jurisdiction. Warning time and duration do not vary by jurisdiction. Spatial extent ratings were based on the proportion of area within the WUI. Impact ratings were based on fire intensity data from SWRA. Jurisdictions with significant clusters of moderate to high fire intensity were assigned a rating of 3; all other jurisdictions were assigned a rating of 2. Probability ratings were determined based on burn probability data from SWRA. Jurisdictions with clusters of moderate burn probability were assigned a rating of 3; all others were assigned a probability of 2.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Bertie County	2	3	3	4	3	2.8	H
Town of Askewville	2	3	4	4	3	3.0	H
Town of Aulander	2	3	4	4	3	3.0	H
Town of Colerain	2	2	4	4	3	2.7	H
Town of Kelford	2	2	4	4	3	2.7	H
Town of Lewiston-Woodville	2	2	4	4	3	2.7	H
Town of Powellsville	2	2	4	4	3	2.7	H
Town of Roxobel	2	2	4	4	3	2.7	H
Town of Windsor	2	2	4	4	3	2.7	H

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Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
Hyde County	3	3	2	4	3	2.9	H
Martin County	3	3	3	4	3	3.1	H
Town of Bear Grass	2	2	3	4	3	2.5	H
Town of Everetts	2	2	4	4	3	2.7	H
Town of Hamilton	2	2	4	4	3	2.7	H
Town of Hassell	2	2	4	4	3	2.7	H
Town of Jamesville	3	2	4	4	3	3.0	H
Town of Oak City	2	2	4	4	3	2.7	H
Town of Parmele	2	2	4	4	3	2.7	H
Town of Robersonville	2	2	4	4	3	2.7	H
Town of Williamston	2	2	4	4	3	2.7	H
Tyrrell County	3	3	2	4	3	2.9	H
Town of Columbia	3	3	4	4	3	3.3	H
Washington County	3	3	3	4	3	3.1	H
Town of Creswell	3	2	4	4	3	3.0	H
Town of Plymouth	2	2	4	4	3	2.7	H
Town of Roper	2	2	4	4	3	2.7	H

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 4.107 summarizes the degree of risk assigned to each identified hazard using the PRI method.

Table 4.107 – Summary of PRI Results

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Coastal Erosion	Highly Likely	Limited	Negligible	More than 24 hrs	Less than 6 hrs	2.2
Dam & Levee Failure	Unlikely	Critical	Negligible	Less than 6 hrs	Less than 1 week	2.1
Drought	Possible	Minor	Large	More than 24 hrs	More than 1 week	2.2
Earthquake	Unlikely	Minor	Large	Less than 6 hrs	Less than 6 hrs	1.9
Extreme Heat	Highly Likely	Critical	Large	More than 24 hrs	Less than 1 week	3.2
Flood	Likely	Critical	Moderate	6 to 12 hours	Less than 1 week	3.0
Hurricane & Tropical Storm	Highly Likely	Catastrophic	Large	More than 24 hrs	Less than 1 week	3.6
Severe Weather: Hail <sup>1</sup>	Highly Likely	Minor	Small	Less than 6 hrs	Less than 6 hrs	2.4
Severe Weather: Lightning <sup>1</sup>	Highly Likely	Minor	Negligible	Less than 6 hrs	Less than 6 hrs	2.2
Severe Weather: Thunderstorm Winds <sup>1</sup>	Highly Likely	Limited	Large	Less than 6 hrs	Less than 6 hrs	3.1
Severe Winter Storm	Highly Likely	Minor	Large	More than 24 hrs	Less than 1 week	2.7
Tornado	Likely	Critical	Small	Less than 6 hrs	Less than 6 hrs	2.7
Wildfire	Likely	Limited	Moderate	Less than 6 hrs	Less than 1 week	2.8

<sup>1</sup>Note: Severe Weather hazards average to a score of 2.6 and are therefore considered together as a high risk hazard.

The results from the PRI have been classified into three categories based on the assigned risk value which are summarized in Table 4.108:

- ▶ **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 4.108 – Summary of Hazard Risk Classification**

<b>High Risk (&gt; 2.4)</b>	Hurricane & Tropical Storm Extreme Heat Wildfire Flood Severe Winter Storm Tornado Severe Weather
<b>Moderate Risk (2.0 – 2.4)</b>	Coastal Erosion Drought Dam & Levee Failure
<b>Low Risk (&lt; 2.0)</b>	Earthquake

## 5 Capability Assessment

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This section discusses the capability of the Northeastern NC 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 Northeastern NC 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

## SECTION 5: CAPABILITY ASSESSMENT

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 Northeastern NC 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 Northeastern NC 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 Northeastern NC 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
<b>Bertie County</b>	√	√		√		√	√	√	√	√		√	√		√	√	√	√			√	√		√		
Town of Askewville	√	√				+	+	+	+	+						√	√	√	√			√	√			
Town of Aulander	√					+	+	+	+	+						√	√	√	√			√	√		√	
Town of Colerain	√	√				+	+	+	+	+						√	√	√	√			√	√		√	
Town of Kelford	√					+	+	+	+	+						√	√	√	√			√	√		√	
Town of Lewiston-Woodville	√					+	+	+	+	+						√	√	√	√			√	√			
Town of Powellsville	√					+	+	+	+	+						√	√	√	√			√	√			
Town of Roxobel	√					+	+	+	+	+						√	√	√	√			√	√		√	
Town of Windsor	√	√	√			+	+	+	+	+					√	√	√	√	√	√		√	√		√	
<b>Hyde County</b>	√	√				√	√	√	√	√					√	√		√	√			√	√		√	√
<b>Martin County</b>	√	√				√	√	√	√	√					√	√		√	√			√	√		√	
Town of Bear Grass	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	
Town of Everetts	√	√				+	+	+	+	+					√	√	√	√	√			√	√			
Town of Hamilton	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	
Town of Hassell	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	
Town of Jamesville	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	

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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
Town of Oak City	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	
Town of Parmele	√	√				+	+	+	+	+					√	√	√	√	√			√	√			
Town of Robersonville	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	
Town of Williamston	√	√		√		+	+	+	+	+		√			√	√	√	√	√			√	√		√	
<b>Tyrrell County</b>	√	√				√	√	√	√	√	√				√	√		√	√			√	√		√	
Town of Columbia	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	
<b>Washington County</b>	√	√		√		√	√	√	√	√		√			√	√	√	√	√			√	√		√	√
Town of Creswell	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	√
Town of Plymouth	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	√
Town of Roper	√	√				+	+	+	+	+					√	√	√	√	√			√	√		√	√

Source: Local Capability Assessment Survey

## SECTION 5: CAPABILITY ASSESSMENT

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 Northeastern NC 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.

- ▶ 1 of the 26 participating jurisdictions have a disaster recovery plan 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 (5 jurisdictions have one in place; 21 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 (5 jurisdictions have one in place; 21 covered under a county plan).

### 5.3.1.2 General Planning

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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.

- ▶ 21 of the 26 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.

- ▶ 3 of the 26 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.

- ▶ None of the participating jurisdictions have an historic preservation plan in place or under development.

### 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.

- ▶ 22 of the 26 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.

- ▶ All 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

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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

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mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program. 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 Northeastern NC region.

Of the 26 jurisdictions, 21 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. The Towns of Askeville, Lewiston Woodville, Powellsville, Everetts, and Parmele do not participate in the NFIP because they have little to no land in high-risk flood zones. Details on flood zone acreage by community are provided in the annexes.

### Community Rating System

An additional indicator of floodplain management capability is active participation in the Community Rating System (CRS). The CRS is an incentive-based program that encourages communities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP. Each of the CRS mitigation activities is assigned a point value. As a community earns points and reaches identified thresholds, they can apply for an improved CRS class. Class ratings, which range from 10 to 1 and increase on 500-point increments, are tied to flood insurance premium reductions. Every class improvement earns an additional 5 percent discount for NFIP policyholders, with a starting discount of 5 percent for Class 9 communities and a maximum possible discount of 45 percent for Class 1 communities.

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it.

- ▶ 5 of 26 participating jurisdictions in the Northeastern NC Region participate in the Community Rating System. 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 Joined NFIP	CRS Class	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Written Premium in Force	Closed Losses	Total Payments
<b>Bertie County</b>	09/29/78	-	02/04/09	91	\$16,389,700	\$59,305	86	\$2,567,926
Town of Askeville	<i>Not participating</i>	-	02/04/09	0	0	0	0	0
Town of Aulander	02/04/09	-	02/04/09	10	\$1,044,000	\$9,935	7	\$51,959
Town of Colerain	02/04/09	-	02/04/09	2	\$630,000	\$887	0	0
Town of Kelford	02/04/09	-	02/04/09	1	\$70,000	\$695	0	0
Town of Lewiston-Woodville	<i>Not participating</i>	-	02/04/09	0	0	0	0	0
Town of Powellsville	<i>Not participating</i>	-	02/04/09	0	0	0	0	0
Town of Roxobel	09/20/74	-	02/04/09	1	\$140,000	\$285	0	0
Town of Windsor	09/20/74	-	02/04/09	121	\$19,882,800	\$89,109	280	\$10,318,671
<b>Hyde County</b>	12/27/74	9	01/16/04	1,289	\$248,922,600	\$1,221,685	947	\$15,782,315
<b>Martin County</b>	11/29/74	-	09/19/07	39	\$7,401,700	\$22,104	21	\$282,478
Town of Bear Grass	09/19/07	-	09/19/07	0	0	0	0	0
Town of Everetts	<i>Not participating</i>	-	09/19/07	0	0	0	0	0
Town of Hamilton	05/05/78	-	09/19/07	0	0	0	1	\$26,019
Town of Hassell	09/19/07	-	09/19/07	0	0	0	0	0
Town of Jamesville	09/19/07	-	09/19/07	0	0	0	0	0
Town of Oak City	09/19/07	-	09/19/07	0	0	0	0	0
Town of Parmele	<i>Not participating</i>	-	09/19/07	0	0	0	0	0
Town of Robersonville	06/07/74	-	09/19/07	5	\$1,260,000	\$1,694	3	\$39,838
Town of Williamston	12/28/74	-	09/19/07	45	\$8,389,900	\$36,838	10	\$210,522
<b>Tyrrell County</b>	01/10/75	-	01/16/04	141	\$24,571,400	\$264,220	131	\$3,373,300
Town of Columbia	02/08/74	-	01/16/04	425	\$65,375,400	\$335,595	288	\$4,480,794
<b>Washington County</b>	06/14/74	8	09/19/07	9	\$1,276,700	\$3,457	5	\$25,575
Town of Creswell	06/09/78	8	09/19/07	73	\$19,272,600	\$69,951	36	\$1,189,169
Town of Plymouth	05/20/77	8	09/19/07	10	\$1,928,500	\$6,572	3	\$100,477
Town of Roper	06/09/78	8	09/19/07	161	\$33,549,100	\$84,121	72	\$1,305,102
<b>Region Total</b>	-	-	-	<b>2,423</b>	<b>\$450,104,400.00</b>	<b>\$2,206,453.00</b>	<b>1,890</b>	<b>\$39,754,145.00</b>

Source: FEMA NFIP Policy Statistics

### 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.

- ▶ 1 of the 26 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.

- ▶ 3 of the 26 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.

- ▶ None of the 26 participating jurisdictions have a stormwater management plan in place.

## 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
<b>Bertie County</b>	√	√	√	√	√	√			√	√	√	√	√	√
Town of Askewville													√	√
Town of Aulander													√	
Town of Colerain													√	√
Town of Kelford													√	
Town of Lewiston-Woodville													√	
Town of Powellsville													√	
Town of Roxobel													√	
Town of Windsor	√		√						√	√	√	√	√	√
<b>Hyde County</b>				√	√	√			√	√	√	√	√	√
<b>Martin County</b>		√		√	√	√			√	√		√	√	√
Town of Bear Grass													√	
Town of Everetts													√	
Town of Hamilton													√	
Town of Hassell													√	
Town of Jamesville		√	√							√			√	√
Town of Oak City													√	
Town of Parmele													√	
Town of Robersonville		√	√							√			√	√
Town of Williamston		√	√							√			√	√
<b>Tyrrell County</b>	√	√	√	√	√	√			√	√		√	√	√
Town of Columbia		√		√	√				√	√			√	√

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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
Washington County		√		√	√	√			√	√		√	√	√
Town of Creswell		√										√	√	
Town of Plymouth		√										√	√	
Town of Roper		√										√	√	

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
<b>Bertie County</b>	√	√			√						
Town of Askewville											
Town of Aulander											
Town of Colerain											
Town of Kelford											
Town of Lewiston-Woodville											
Town of Powellsville											
Town of Roxobel											
Town of Windsor		√		√	√						
<b>Hyde County</b>		√			√						
<b>Martin County</b>					√						
Town of Bear Grass											
Town of Everetts											
Town of Hamilton											
Town of Hassell											
Town of Jamesville					√						
Town of Oak City					√						
Town of Parmele											
Town of Robersonville					√						
Town of Williamston	√				√						

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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
<b>Tyrrell County</b>		√	√		√				√		
Town of Columbia					√						
<b>Washington County</b>					√						
Town of Creswell											
Town of Plymouth											
Town of Roper											

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
<b>Bertie County</b>	√	√	√			√	
Town of Askewville							
Town of Aulander							

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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
Town of Colerain							
Town of Kelford							
Town of Lewiston-Woodville							
Town of Powellsville							
Town of Roxobel							
Town of Windsor	√	√				√	
<b>Hyde County</b>	√	√					
<b>Martin County</b>	√	√	√				
Town of Bear Grass							
Town of Everetts							
Town of Hamilton							
Town of Hassell							
Town of Jamesville							
Town of Oak City							
Town of Parmele							
Town of Robersonville							
Town of Williamston		√					
<b>Tyrrell County</b>	√	√	√	√		√	
Town of Columbia	√	√	√				
<b>Washington County</b>	√	√	√				
Town of Creswell	√	√					
Town of Plymouth	√	√					
Town of Roper	√	√					

Source: Local Capability Assessment Survey

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### 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?
<b>Bertie County</b>	√	√	√	√
Town of Askewville	√	√	√	√
Town of Aulander	√	√	√	√
Town of Colerain	√	√	√	√
Town of Kelford	√	√	√	√
Town of Lewiston-Woodville	√	√	√	√
Town of Powellsville	√	√	√	√
Town of Roxobel	√	√	√	√
Town of Windsor	√	√	√	√
<b>Hyde County</b>	√	√	√	√
<b>Martin County</b>	√	√	√	√
Town of Bear Grass	√	√	√	√
Town of Everetts	√	√	√	√
Town of Hamilton	√	√	√	√
Town of Hassell	√	√	√	√
Town of Jamesville	√	√	√	√
Town of Oak City	√	√	√	√
Town of Parmele	√	√	√	√
Town of Robersonville	√	√	√	√
Town of Williamston	√	√	√	√
<b>Tyrrell County</b>	√	√	√	√
Town of Columbia	√	√	√	√
<b>Washington County</b>	√	√	√	√
Town of Creswell	√	√	√	√
Town of Plymouth	√	√	√	√
Town of Roper	√	√	√	√

**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 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 of the participating jurisdictions have some local standards that exceed state requirements. For example, Washington County, Creswell, Plymouth, Roper, and Columbia have a two-foot freeboard requirement; Hyde County and Tyrrell County require a one-foot freeboard. Bertie County has the most restrictive freeboard requirement with the County and all its municipalities requiring a five-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 Northeastern NC 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 Northeastern NC 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
<b>Bertie County</b>	High	High	High	High	High	High	High
Town of Askewville	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Aulander	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Colerain	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Kelford	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Lewiston-Woodville	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate

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Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	Overall Capability
Town of Powellsville	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Roxobel	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Windsor	High	High	High	High	High	High	High
<b>Hyde County</b>	High	High	High	High	High	High	High
<b>Martin County</b>	High	High	High	High	High	High	High
Town of Bear Grass	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Everetts	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Hamilton	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Hassell	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Jamesville	High	High	High	High	High	High	High
Town of Oak City	High	High	High	High	High	High	High
Town of Parmele	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Robersonville	High	High	High	High	High	High	High
Town of Williamston	High	High	High	High	High	High	High
<b>Tyrrell County</b>	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Columbia	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
<b>Washington County</b>	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Creswell	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Plymouth	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Roper	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate

Source: Local Capability Assessment Survey

## 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 Northeastern NC 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 66, which falls into the Low capability ranking.

**Table 5.8 – Capability Assessment Results**

Jurisdiction	Overall Capability Score	Overall Capability Rating
<b>Bertie County</b>	95	Moderate
Town of Askewville	54	Low
Town of Aulander	53	Low
Town of Colerain	57	Low
Town of Kelford	53	Low
Town of Lewiston-Woodville	53	Low
Town of Powellsville	53	Low
Town of Roxobel	53	Low
Town of Windsor	85	Moderate
<b>Hyde County</b>	83	Moderate
<b>Martin County</b>	77	Moderate
Town of Bear Grass	59	Low
Town of Everetts	56	Low
Town of Hamilton	59	Low
Town of Hassell	59	Low
Town of Jamesville	71	Moderate
Town of Oak City	67	Low
Town of Parmele	56	Low
Town of Robersonville	71	Moderate
Town of Williamston	79	Moderate
<b>Tyrrell County</b>	83	Moderate
Town of Columbia	69	Low
<b>Washington County</b>	85	Moderate
Town of Creswell	66	Low
Town of Plymouth	66	Low
Town of Roper	66	Low

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 Northeastern NC 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 Northeastern NC 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, the HMPC reviewed and discussed the goals from the 2017 plan. The goals of the 2017 Northeastern NC Regional Hazard Mitigation Plan were as follows:

#1

Promote the public health, safety, and general welfare of residents and minimize public and private losses due to 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	Pursue funds to reduce the risk of natural hazards to existing developments where such hazards are clearly identified and the mitigation efforts are cost-effective.
#4	Effectively expedite post-disaster reconstruction.
#5	Provide education to citizens that empower them to protect themselves and their families from natural hazards.
#6	Protect fragile natural and scenic areas within the planning jurisdiction.

The HMPC was presented with recommended changes to delete goal #2 and goal #6 and revise goal #1 and goal #4 in order to consolidate into fewer, stronger goals.

During the third planning meeting, held on July 26, 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:

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**Goal 1 – Promote the public health, safety, and general welfare of residents and minimize public and private losses due to natural hazards through local land development regulations, capital improvements, planning/investment, and proactive long-range planning.**

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**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.

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**Goal 2 – Pursue funds to reduce the risk of natural hazards to existing developments where such hazards are clearly identified and the mitigation efforts are cost-effective.**

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**Objective 2.1:** Improve all participating Jurisdictions' general hazard mitigation capability.

**Objective 2.2:** 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.

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**Goal 3 – Effectively expedite post-disaster reconstruction through the implementation of mitigation strategies and intergovernmental coordination.**

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**Objective 3.1:** Reduce the risk of damage from wildfires (including under fires) to existing and future development.

**Objective 3.2:** Ensure effective local/interagency communication and response during disaster events.

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**Goal 4 – Provide education to citizens that empowers them to protect themselves and their families from natural hazards.**

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**Objective 4.1:** 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 4.2:** Improve the public awareness and understanding of local vulnerability to hazards and improve disaster warning/post-disaster information efforts.

### 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:

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

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 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. The prioritization criteria 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

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**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.

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, Bertie 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
B1	Revise/update regulatory maps upon completion of FIRM update.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PP	<ul style="list-style-type: none"> <li>Bertie County Board of Commissioners</li> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, FEMA (NFIP)	2020-2025	In Progress – Carry Forward	Bertie County will continue to monitor the status of the County's FIRM Maps and as new maps are developed facilitate the public review process and adoption.
B2	Continue to develop a Geographic Information System (GIS) to map current land uses and to map proposed future land uses (CAMA Land Use Plan Update) as an aid in assessing community vulnerability.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	Medium	1.1	P	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Emergency Management</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Bertie County continues to establish additional insights and observations regarding the potential impacts of hazards throughout the County. Through implementation of this plan, the County will incorporate this information into County GIS system.
B3	Consider participating in the Community Rating System (CRS) to reduce flood insurance premiums for citizens.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.1	PP	<ul style="list-style-type: none"> <li>Bertie County Board of Commissioners</li> <li>Bertie County Planning Department</li> <li>Municipal Administrations</li> </ul>	\$10,000	General Fund, NCDPS	2 to 3 Years	Not Started – Carry Forward	Bertie County, as well as all participating jurisdictions, will consider joining the CRS program through implementation of this plan.
B4	Accomplish the following during the next CAMA Land Use Plan update: <ul style="list-style-type: none"> <li>Establish more specific growth guidelines and policies and specifically delineate sensitive environmental areas for protection;</li> <li>Adopt a more limited policy on the types of uses allowed within flood hazard areas;</li> <li>Adopt a policy to not extend public services and utilities into flood hazard or other environmentally sensitive areas to discourage growth.</li> </ul>	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	Medium	1.3	PP	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	\$45,000	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Started – Carry Forward	Bertie County will consider updating the County's CAMA Land Use Plan through implementation of this plan. The County's municipalities will be provided the option to participate in this effort.
B5	Consider adopting a zoning ordinance that: <ul style="list-style-type: none"> <li>Establishes zoning districts and sets standards for future development.</li> <li>Includes standards for clustering of residential lot development to help preserve flood hazard areas from development.</li> <li>Includes a flood hazard overlay zone to ensure that inappropriate development is adequately controlled.</li> </ul>	Bertie County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	PP	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Board of Commissioners</li> </ul>	\$75,000	General Fund	3 to 5 years	Not Started – Carry Forward	Bertie County will consider developing and adopting Countywide zoning regulations through implementation of this plan.
B6	Consider adopting subdivision regulations that include minimum standards for property divisions.	Bertie County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	PP	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Board of Commissioners</li> </ul>	\$10,000	General Fund	3 to 5 years	Not Started – Carry Forward	Bertie County will consider revising its subdivision regulations through implementation of this plan.

**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
B7	Review and update the flood damage prevention ordinance to: <ul style="list-style-type: none"> <li>• Ensure maximum protection from flood hazard events.</li> <li>• Raise the minimum finished floor elevation to at least 2' above base flood elevation (BFE) to provide more flood protection for new or substantially improved structures.</li> <li>• Consider prohibiting any fill within the 100-year floodplain to discourage development.</li> <li>• Prohibit enclosures to the lower areas of elevated buildings, including breakaway walls.</li> <li>• Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain.</li> </ul>	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.2	PP	<ul style="list-style-type: none"> <li>• Bertie County Board of Commissioners</li> <li>• Bertie County Planning Department</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	1 to 3 Years	In Progress – Carry Forward	Bertie County will continue to monitor the County's Flood Damage Prevention Ordinance in regard to the potential impacts associated with flooding events. When necessary, the County will amend these regulations to mitigate the impacts of potential flooding events.
B8	Identify repetitive flood loss properties for acquisition and relocation. Seek Federal and State funding (voluntary program).	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	SP	<ul style="list-style-type: none"> <li>• Bertie County Administration</li> <li>• Bertie County Board of Commissioners</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	Carry Forward – In progress	Bertie County continues to diligently carry out active mitigation projects based on both annual funding, as well as post disaster mitigation funding associated with both Hurricanes Matthew and Florence. The County will continue these efforts through implementation of this plan.
B9	Establish a coordinating committee to ensure that all parties responsible for stormwater management within the county communicate to ensure maximum cooperation in developing and maintaining stormwater drainage systems.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.3	SP	<ul style="list-style-type: none"> <li>• Bertie County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	1 year	Not Started – Carry Forward	Bertie County will work to establish this working committee through implementation of this plan.
B10	Establish and maintain a coordinated debris inspection and removal program.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricanes & Tropical Storm, Severe Winter Storm, Extreme Heat, Earthquake, Wildfire, Dam & Levee Failure, Severe Weather, Tornado	High	2.2	ES	<ul style="list-style-type: none"> <li>• Bertie County Board of Commissioners</li> <li>• Bertie County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Bertie County will maintain a post disaster debris management contractor. The County will review this contract and update it annually prior to hurricane season.
B11	Review rebuilding activities in wake of recent hurricanes and flooding and establish policies/procedures for minimizing repetitive flood losses.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.1	P	<ul style="list-style-type: none"> <li>• Bertie County Administration</li> <li>• Bertie County Planning Department</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	Bertie County assesses the impacts of storms on the community as they occur. By documenting these impacts, the County, as well as participating jurisdictions, will utilize this information to make decisions regarding land development policy and regulation.

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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
B12	Advise/assist property owners in retrofitting homes and businesses.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	The Bertie County Planning and Inspection Department works closely with property owners and builders to retrofit homes in an effort to minimize future flood damages.
B13	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.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	High	1.1	ES	<ul style="list-style-type: none"> <li>Bertie County Emergency Management</li> <li>American Red Cross</li> <li>Bertie County School System</li> <li>Municipal Administrations</li> </ul>	To Be Determined	General Fund, NCDPS	1 to 3 years	New	N/A
B14	Work to improve the emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	High	4.1	PIO	<ul style="list-style-type: none"> <li>Bertie County Emergency Management</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	New	N/A
B15	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation (addressed above), mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	SP	<ul style="list-style-type: none"> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	To Be Determined	NCDPS, FEMA	2020-2025	New	N/A
B16	Work to implement all strategies and recommendations outlined within the Bertie County Hurricane Matthew Resilient Redevelopment Plan.	Bertie County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.1	SP	<ul style="list-style-type: none"> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	To Be Determined	General Fund, NCDPS, FEMA	5 years	New	N/A

SECTION 7: MITIGATION ACTION PLANS

Table 7.2 – Mitigation Action Plan, Hyde 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
H1	Consider revising the county's Flood Damage Prevention Ordinance to increase the current established two foot freeboard requirement regarding base flood elevation for new structures developed within the Flood Hazard Area. This effort will also address any necessary updates required by the National Flood Insurance Program (NFIP).	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.2	PP	<ul style="list-style-type: none"> <li>Hyde County Administration</li> <li>Hyde County Board of Commissioners</li> </ul>	Staff Time	General Fund	3 to 5 years	In Progress – Carry Forward	Hyde County will continue to monitor the County's needs regarding required finished floor elevation. As flooding events occur, the County will assess current standards and adjust as necessary.
H2	Promote the availability of flood insurance available through the National Flood Insurance Program (NFIP) using the following means: <ul style="list-style-type: none"> <li>Post on county website</li> <li>Provide information on building permit applications</li> <li>Make available at county library</li> </ul>	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County continues to promote the availability of federally subsidized flood insurance available to all County residents. Particular attention is given to those citizens that are not located within the defined special flood hazard area but are still potentially subject to flood damage.
H3	Continue to maintain, operate, and carry out all activities outlined within the Swan Quarter Watershed Project Operation and Maintenance Checklist. This effort includes ensuring functionality of the Swan Quarter Dike.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.3	PP	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County continues to monitor the status of the Swan Quarter flood control system and associated maintenance protocols. This will continue through implementation of this plan.
H4	Continue to maintain and map GIS-based data related to floodplain management and mitigation. These efforts will involve maintaining the most recent Flood Insurance Rate Maps (FIRMS), as well as GIS locations for each property either acquired or mitigated under through current and past Mitigation Grant Projects.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	4.2	PIO	Hyde County Administration	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	Hyde County will develop a GIS database, to work in concert with the information provided in this plan, to be utilized for guidance regarding development policy and regulation.
H5	Make a variety of materials related to flood insurance, flood protection, floodplain management, increased cost of compliance coverage, information on floodplains, and listings of qualified contractors familiar with floodproofing and elevation techniques, available through various methods including: <ul style="list-style-type: none"> <li>Placing materials in the county library</li> <li>Disseminating information to local contractors</li> </ul>	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	The Hyde County Building Inspections Department continues to maintain materials associated with floodplain protection that are available to County residents.
H6	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLP) from future flooding events. The county will continue maintaining a list of RLPs, and on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The priority will be for the elevation of structures.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	SP	Hyde County Administration	Staff Time	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Hyde County continues to utilize funding to address the treatment of repetitive loss properties through both annual funding cycles, as well as through post disaster funding.
H7	Review the vulnerability of all critical facilities identified in this plan as a component of annual county Emergency Operations Plan updates. This effort will involve an assessment of whether facilities are readily accessible before, during, or after a natural hazard event has transpired. The county will also consider all information and data outlined in this plan when making determinations on the location of all future critical facilities.	Hyde County	All Hazards	Medium	4.1	ES	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Hyde County Administration</li> </ul>	Staff Time	General Fund	1 to 3 years	Ongoing – Carry Forward	Hyde County reviews the effectiveness and security of County shelter facilities on an annual basis through the County's annual review of its Emergency Operations Plan, as well as the annual 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
H8	Continue to participate in and support the Disaster Assistance Working Group (DAWG). This effort includes maintaining a mutual aid agreement with DAWG, which makes all available Hyde County resources available to participating counties in the event of a disaster. Coordination of all county resources in concert with DAWG will be handled through the group's E-Plan web based portal. All resources are updated as a component of the NC State Resource Management System.	Hyde County	All Hazards	High	3.2	ES	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Disaster Assistance Working Group</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County continues to support the efforts of the Disaster Assistance Working Group and the group's efforts to further emergency service effectiveness throughout the region.
H9	Continue to support the efforts of Tideland Electric and NCDOT in maintaining the county's right-of-ways and utility easements. This effort involves the trimming and pruning of trees that pose an imminent threat to the county's limited infrastructure system. Maintaining clear access into and out of the county, as well as protection of the county's electrical and communications networks, is critical to effective response during natural hazard events.	Hyde County	Flood, Hurricane & Tropical Storm, Severe Winter Storm, Earthquake, Wildfire, Dam & Levee Failure, Severe Weather, Tornado	High	1.1	P	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Electric Service Providers</li> </ul>	Staff Time	General Fund, Electric Service Providers	2020-2025	In Progress – Carry Forward	Hyde County continues to work closely with all utility providers to ensure that right of ways and utility easements are properly maintained in an effort to minimize damage associated with natural hazard events.
H10	Maintain an informational booth at both the Engelhard Seafood Festival and the Ocracoke Festival in an effort to inform and educate citizens about county efforts to increase public safety and mitigate private property losses.	Hyde County	All Hazards	High	4.2	PIO	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Hyde County Administration</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	Hyde County continues to utilize these two events for the dissemination of information associated with emergency services. This effort may be impacted on Ocracoke due to the effects of Hurricane Dorian on the community.
H11	Continue to work closely with NCDPS, NCDOT, the American Red Cross, and DAWG in addressing emergency evacuation and sheltering needs throughout the county. Due to limited resources and high vulnerability, Hyde County must often rely on resources available throughout the region. This effort is bolstered by the regional coordination efforts available through DAWG.	Hyde County	All Hazards	High	4.1	ES	Hyde County Emergency Services	Staff Time	General Fund, American Red Cross	2020-2025	In Progress – Carry Forward	Hyde County continues to work closely with the American Red Cross to address the issue of shelter openings and evacuation. These two processes must be closely coordinated.
H12	Continue to participate in the Community Rating System (CRS) made available through the NFIP Program. This effort will involve continuing to provide detailed information regarding properties located within flood hazard areas as outlined under CRS Manual Section 322.a through 322.g.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PP	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County will continue to maintain its current Community Rating System Program. The County's current rating will be reviewed and improved when feasible through the County's required five-year audit.
H13	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.	Hyde County	All Hazards	Medium	1.1	ES	Hyde County Emergency Services	To Be Determined	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Hyde County will continue to look for opportunities to establish permanent pad mount generators in an effort to ensure a redundant power supply at shelter facilities.
H14	Develop a Comprehensive Water Management Plan to monitor the County's water supply and impose water restriction measures as deemed necessary during extreme drought conditions.	Hyde County	Drought, Extreme Heat	High	1.1	NRP	<ul style="list-style-type: none"> <li>Hyde County Soil &amp; Water</li> <li>Hyde County Administration</li> </ul>	Staff Time	General Fund	2020-2025	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
H15	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"> <li>• Upgrade Fairfield Drainage District #17</li> <li>• Improve Mattamuskeet Association Flood Protection System</li> <li>• Install water pumps for two drainage ditches</li> <li>• Enlarge/replace culverts in Swan Quarter</li> <li>• Install water pump on Landing Road</li> <li>• Contract for large scale stream snagging/clearing</li> </ul>	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	Hyde County Administration	To Be Determined	General Fund, NCDPS	5 years	New	N/A
H16	Work to implement all recommendations outlined within the Hurricane Matthew Resilient Redevelopment Plan.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	P	Hyde County Administration	To Be Determined	General Fund, NCDPS, NCDOT, NCDEQ	5 years	New	N/A
H17	Hyde County will continue to work diligently on efforts to address the recovery of the Village of Ocracoke from the impacts of Hurricane Dorian. The County will exhaust all resources available to carry this effort out.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	Hyde County Administration	To Be Determined	General Fund, NCDPS, NCDOT, NCDEQ	5 years	New	N/A

SECTION 7: MITIGATION ACTION PLANS

Table 7.3 – Mitigation Action Plan, Martin 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
M1	Continue to develop a county-wide Geographic Information System (GIS). This system will include a comprehensive land use inventory that will be used for improving upon future hazard mitigation vulnerability analysis.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	Medium	4.2	PP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	Martin County will work to address this system as the County's GIS and planning capabilities continue to expand through the implementation of this plan.
M2	Consider applying for participation in the National Flood Insurance Program Community Rating System Program.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.1	P	<ul style="list-style-type: none"> <li>• Martin County Emergency Management</li> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	Martin County, as well as each participating municipal jurisdiction, will consider joining the Community Rating System program through implementation of this plan
M3	Monitor development rates and issues over the next five years. If the county feels that it is the appropriate time to establish either limited or county-wide zoning regulations, then this effort will be initiated.	Martin Co.	All Hazards	Low	1.3	PP	<ul style="list-style-type: none"> <li>• Martin County Board of Commissioners</li> <li>• Martin County Administration</li> </ul>	\$70,000	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Started – Carry Forward	Martin County continues to consider the development of comprehensive land use regulations. The County will continue to monitor this issue closely through implementation of this plan.
M4	Annually assess the need for the establishment of subdivision regulations. If the county determines that regulations are necessary to address increased development pressure, then this effort will be initiated.	Martin Co.	All Hazards	Low	1.3	PP	<ul style="list-style-type: none"> <li>• Martin County Board of Commissioners</li> <li>• Martin County Administration</li> </ul>	\$15,000	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Started – Carry Forward	Martin County continues to consider the development of comprehensive land use regulations. The County will continue to monitor this issue closely through implementation of this plan.
M5	Continue to monitor Flood Damage Prevention Ordinances and update as deemed necessary due to local conditions or as directed by FEMA and/or NCEM. Additionally, the county will consider increasing the freeboard requirement.	Martin Co., Bear Grass, Hamilton, Hassell, Jamesville, Oak City, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	PP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Martin County will review the County's Flood Damage Prevention Regulations annually to address any necessary changes. These efforts will also assess the need for increasing the County's finished floor requirement.
M6	Work in conjunction with the Regional HMPC on dealing with county drainage issues. This effort will involve an inventory of stormwater "hot spots." Following identification of drainage concerns, the county will work to address each issue on a case-by-case basis.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	3.2	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Northeastern NC Regional HMPC</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	Not Started – Carry Forward	Martin County will continue to work with the HMPC, as well as NCDOT, to address localized flooding issues.
M7	Continue to maintain a post-disaster debris management contract with a qualified service provider. The county will review this contract on an annual basis.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Severe Winter Storm, Earthquake, Wildfire, Dam & Levee Failure, Severe Weather, Tornado	High	2.2	ES	<ul style="list-style-type: none"> <li>• Martin County Board of Commissioners</li> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Martin County will continue to review annually the County's Post Disaster Debris Management Contract. The terms and provider will be reviewed and changes made when deemed necessary.

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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
M8	Work closely with county Emergency Management and the Regional HMPC to ensure that adequate evacuation procedures are in place. This effort will involve the establishment of a public outreach campaign to ensure that the public is aware of the proper procedures.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Earthquake, Wildfire, Dam & Levee Failure, Tornado	High	4.1	PIO	<ul style="list-style-type: none"> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	1 year	Not Started – Carry Forward	Martin County will establish a dialogue with the regional partners in an effort to improve upon evacuation and emergency notification protocols.
M9	Maintain information on flood damage protection techniques for dissemination to citizens and property owners. Additionally, provide guidance to individuals looking for options relating to the elevation or retrofitting of homes. Make these materials available at the local library.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>• Martin County Building Inspections</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	The Martin County Planning and Inspection Department works closely with property owners and builders to retrofit homes in an effort to minimize future flood damages.
M10	Work closely on addressing mitigation needs, including the identification of structural mitigation projects and the establishment of new mitigation policies and initiatives.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	High	2.2	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	Not Started – Carry Forward	Martin County will continue to identify projects that may be eligible for funding through either annual or post disaster mitigation funding.
M11	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation (addressed above), mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Martin County, as well as participating municipal jurisdictions, will continue to maintain a listing of vulnerable and/or repetitive loss properties and work to identify treatment options as funding becomes available.
M12	Work to implement all strategies and recommendations outlined within the Martin County Hurricane Matthew Resilient Redevelopment Plan.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.1	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ, FEMA	5 years	New	N/A
M13	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.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	Medium	4.1	ES	<ul style="list-style-type: none"> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2 to 3 years	New	N/A
M14	Work to improve the emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	Medium	4.2	PIO	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS	2 to 3 years	New	N/A
M15	Continue to monitor water resources in an effort to mitigate the impacts of drought conditions. These efforts will include maintaining a local water shortage ordinance. This ordinance will be activated in coordination with all utility providers as the need arises.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Extreme Heat, Drought	High	1.1	NRP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	New	N/A

**SECTION 7: MITIGATION ACTION PLANS**

**Table 7.4 – Mitigation Action Plan, Tyrrell 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	2020 Status	Status Comments/Explanation
T1	Make information available regarding floodplain protection and hazards at the county administrative building, and in the building inspections office. The county will aim to make this information available through the local library and real estate agencies, as well as the Town municipal building.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Building Inspections</li> <li>• Municipal Administration</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Tyrrell County continues to provide this information to interested parties and employs a certified floodplain manager to assist citizens with construction in the SFHA.
T2	Maintain a policy of keeping branches and limbs from encroaching upon the right-of-way and power lines. The Town will assist in this effort through ensuring that this issue is properly addressed by utility providers.	Columbia	Flood, Hurricane & Tropical Storm, Severe Winter Storm, Earthquake, Wildfire, Severe Weather, Tornado	High	1.1	P	<ul style="list-style-type: none"> <li>• Columbia Administration</li> <li>• Electric Service Providers</li> </ul>	Staff Time	General Fund, Electric Service Providers	2020-2025	Not Started – Carry Forward	The Town will coordinate with utility providers to minimize the impacts of natural hazard events on Town-wide infrastructure systems.
T3	Monitor the county’s equipment and facility needs with respect to mitigation and emergency management. Following a natural disaster, the county will utilize potential Hazard Mitigation Grant Funds to acquire any identified needs.	Tyrrell Co., Columbia	All Hazards	High	1.2	ES	<ul style="list-style-type: none"> <li>• Tyrrell County Emergency Management</li> <li>• Tyrrell County Board of Commissioners</li> <li>• Municipal Administration</li> </ul>	Staff Time	General Fund, NCDPS	1 year	Not Started – Carry Forward	As Tyrrell County identifies either facility and/or equipment needs, the County will work to identify funding opportunities to address the respective need. Columbia will monitor its equipment and facilities.
T4	Mail a floodplain protection informational flyer to all county and town property owners a minimum of two times over the next five years. This effort will ensure that this critical information is being disseminated to a broad base of the population.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Building Inspections</li> <li>• Municipal Administration</li> </ul>	\$4,000	General Fund	1 year	Not Started – Carry Forward	Tyrrell County will undertake this effort, which will be integral to the County securing participation in the Community Rating System Program.
T5	Advertise the availability of federal flood insurance offered through the National Flood Insurance Program once annually in the local newspapers. Additionally, the county will assist property owners in acquiring this insurance.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.1	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Municipal Administration</li> </ul>	\$4,000	General Fund	2 years	Not Started – Carry Forward	Tyrrell County continues to promote the availability of federally subsidized flood insurance available to all County residents. Particular attention is given to those citizens that are not located within the defined special flood hazard area but are still potentially subject to flood damage.
T6	Develop a county website and include information pertinent to emergency preparedness, response, and mitigation. Information will be made available focused on expanding the county’s mitigation effectiveness.	Tyrrell Co., Columbia	All Hazards	High	4.1	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	\$4,500	General Fund	1 to 2 years	Not Started – Carry Forward	Tyrrell County will develop this page in an effort to prepare for application into the Community Rating System Program.
T7	Consider applying for participation in the National Flood Insurance (NFIP) Community Rating System Program.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.2	P	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Building Inspections</li> <li>• Municipal Administration</li> </ul>	\$8,500	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Tyrrell County, as well as the Town of Columbia, will consider joining the Community Rating System program through implementation of this plan
T8	Establish a long-range plan in conjunction with the US Army Corps of Engineers to clean out the arterial canals located throughout the county.	Tyrrell Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.3	NRP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• US Army Corps of Engineers</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ	2 to 3 years	In Progress – Carry Forward	Tyrrell County has been dealing with this issue for many years. The County will continue to seek out a long-term sustainable solution to this issue.
T9	Work towards a long-term solution to the flooding and drainage issues impacting the Alligator and Goat Neck communities within the county.	Tyrrell Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.3	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Public Services</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ	2 to 3 years	In Progress – Carry Forward	Tyrrell County has been dealing with this issue for many years. The County will continue to seek out a long-term sustainable solution to this issue.

**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	2020 Status	Status Comments/Explanation
T10	Work to relocate all County service facilities to a site outside the flood hazard area.	Tyrrell Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	3.1	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Board of Commissioners</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA, USDA Loan Program	5 years	Not Started – Carry Forward	Through implementation of this plan, Tyrrell County will identify vulnerable County facilities and identify potential funding, as well as relocation sites for the respective facilities.
T11	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. The following provides a summary of mitigation target areas established following Hurricane Matthew in 2016: <ul style="list-style-type: none"> <li>• Alligator Community</li> <li>• Albemarle Sound Area</li> <li>• Town of Columbia</li> </ul>	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ, NCDOT	5 years	New	N/A
T12	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"> <li>• Drainage system – Grendle Hill Canal</li> <li>• Drainage system – Alligator Canal</li> <li>• Drainage system – South Fork Creek Canal</li> <li>• Drainage system – Rider Creek Canal</li> </ul>	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ, NCDOT	5 years	New	N/A
T13	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation, mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2020-2025	New	N/A
T14	Work to implement all strategies and recommendations outlined within the County's Hurricane Matthew Resilient Redevelopment Plan.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.1	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA, NCDEQ	5 years	New	N/A
T15	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.	Tyrrell Co., Columbia	All Hazards	Medium	4.1	ES	<ul style="list-style-type: none"> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2 to 3 years	New	N/A

SECTION 7: MITIGATION ACTION PLANS

Table 7.5 – Mitigation Action Plan, Washington 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
W1	Continue to seek funding for assistance in constructing a new dedicated EOC. The county's existing facility is adequate; however, there is a need for a new and dedicated facility.	Washington Co., Creswell, Plymouth, Roper	All Hazards	Low	2.1	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Board of Commissioners</li> <li>Municipal Administrations</li> </ul>	To be Determined	General Fund, NCDPS, FEMA	5 years	Not Started – Carry Forward	Washington County has been working towards establishing a new EOC for many years. The County will continue to look for opportunities to move forward with this project.
W2	Continue to seek grant funding that will enable the removal of all critical infrastructure from the floodplain. This effort is currently underway; however, there is more to be accomplished. This effort will require assistance from the county Emergency Management Department.	Washington Co., Plymouth	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	3.1	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Board of Commissioners</li> <li>Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA	5 years	Not Started – Carry Forward	Washington County has been working towards addressing this issue for many years and has not been able to move forward. The County will continue to look for opportunities to move forward with this project.
W3	Monitor all land development codes, including the county and town Flood Damage Prevention Ordinances, on an annual basis to ensure that they are up-to-date and address current issues and concerns. This review will also be conducted following substantial natural hazard events.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.3	P	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Inspections</li> <li>Washington County Board of Commissioners</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Washington County continues to closely monitor the impacts that natural hazards have on the County's built environment. These factors will be incorporated into decisions regarding amendment to the County's land development regulations.
W4	Through implementation of this plan, consider increasing the County's required freeboard within the county's FDPO.	Washington Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	PP	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Inspections</li> <li>Washington County Board of Commissioners</li> </ul>	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Washington County will review the County's minimal design standards within the defined special flood hazard area to ensure that those standards are adequate to address the potential impacts of recently occurring flooding events.
W5	Continue to work towards the development of a system to provide on-line offerings of permits, inspections, and taxes. This effort will streamline operations and provide for a more efficient flow of information.	Washington Co.	All Hazards	High	3.1	PP	<ul style="list-style-type: none"> <li>Washington County Inspections</li> </ul>	\$20,000	General Fund	2 years	Not Started – Carry Forward	Washington County has not yet initiated this process but will do so through implementation of this plan. This effort will also impact all participating municipal jurisdictions.
W6	The Washington County Inspections office will aim to acquire a new permitting program that will be helpful in tracking floodplain development activity.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure, Severe Weather	High	3.1	PP	<ul style="list-style-type: none"> <li>Washington County Inspections</li> <li>Municipal Administrations</li> </ul>	\$20,000	General Fund	2 years	Not Started – Carry Forward	Washington County has not yet initiated this process but will do so through implementation of this plan. This effort will also impact all participating municipal jurisdictions.
W7	Mail a notice once annually to all property owners whose land is located within a special flood hazard area. The notice should clearly state that the recipient's property is susceptible to flooding and provide information pertinent to emergency evacuation and post-disaster recovery. Additionally, the county will notify all property owners once annually via mail, either through individual mailers or utility bill inserts, of the hazards associated with flooding and other hazards resulting from severe weather events.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	SP	<ul style="list-style-type: none"> <li>Washington County Inspections</li> <li>Municipal Administrations</li> </ul>	\$4,500	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	This effort is currently underway and relates to the County's ongoing Community Rating System Program. These efforts will continue through implementation of his plan.

**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
W8	Maintain a map information service involving the following: <ul style="list-style-type: none"> <li>• 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.</li> <li>• Provide information regarding the flood insurance purchase requirement.</li> <li>• Maintain historical <b>and</b> current FIRMs.</li> <li>• Locally advertise once annually in the local newspaper.</li> <li>• Provide information to inquirers about local floodplain management requirements.</li> </ul>	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PIO	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Washington County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	Washington County provides this service on a daily basis to property owners, builders, as well as contractors and will continue to do so through implementation of this plan.
W9	Work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The county will provide these agencies with brochures documenting the concerns relating to development located within flood-prone areas and ways that homeowners may make their homes more disaster-resistant to strong winds, lightning, and heavy rains.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.1	PIO	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, Municipal Administrations	2020-2025	In Progress – Carry Forward	This effort is integral to the County's Community Rating System Program and will continue through implementation of this plan. Maintaining a high CRS rating is a high priority for the County.
W10	Make information regarding hazards and development regulations within floodplains available through the following for: <ul style="list-style-type: none"> <li>• Ensure that the local library maintains information relating to flooding and flood protection.</li> <li>• Provide a link on county/town websites to FEMA resources addressing flooding and flood protection.</li> <li>• Maintain information pertinent to local development conditions and make this information readily available to the public, including being posted at the local library.</li> </ul>	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PIO	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Washington County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	This effort is integral to the County's Community Rating System Program and will continue through implementation of this plan. Maintaining a high CRS rating is a high priority for the County.
W11	Provide comprehensive services regarding planning and development activities within the defined SFHA and issues relating to the construction of disaster-resistant structures. These services will include: <ul style="list-style-type: none"> <li>• Provide site-specific flood and flood related information on an as-needed basis.</li> <li>• Maintain a list of contractors with experience in floodproofing and retrofit techniques.</li> <li>• Provide information on methods of windproofing construction methods for new and renovated structures.</li> <li>• Maintain materials providing an overview of how to select a qualified contractor.</li> <li>• Make site visits upon request to review occurrences of flooding, drainage problems, and sewer problems. If applicable, the inspector should provide one-on-one advice to the property owner.</li> <li>• Provide advice and assistance regarding CRS Activity 530 (Flood Protection).</li> <li>• Advertise the availability of this service in the local newspaper once annually.</li> <li>• Maintain a log of all individuals assisted through this service, including all site visits.</li> </ul>	Washington Co, Creswell, Plymouth, Roper	All Hazards	High	1.2	PP	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Washington County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	The Washington County Inspections Department provides comprehensive services regarding development and the retrofitting of homes associated with floodplain development.
W12	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 Planning and Building Inspections Department.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.2	PIO	<ul style="list-style-type: none"> <li>• Washington County Tax Office</li> <li>• Washington County Inspections</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Washington County has not initiated this effort but will do so through the implementation of this plan based on the impacts of Hurricanes Matthew and Florence.

**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
W13	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation, mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	SP	<ul style="list-style-type: none"> <li>Washington County Administration</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCPDS, FEMA	2020-2025	In Progress – Carry Forward	Washington County, as well as participating municipal jurisdictions, will continue to maintain a listing of vulnerable and/or repetitive loss properties and work to identify treatment options as funding becomes available.
W14	Work to implement all strategies and recommendations outlined within the Washington County Hurricane Matthew Resilient Redevelopment Plan.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	3.1	SP	<ul style="list-style-type: none"> <li>Washington County Administrations</li> <li>Municipal Administrations</li> </ul>	To be Determined	General Fund, NCPDS, NCDEQ, FEMA	5 years	New	N/A
W15	Promote and encourage the training of Community Emergency Response Teams (CERT) throughout the county.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	4.2	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Community Emergency Response Teams</li> <li>Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	1 to 3 years	New	N/A
W16	Work to develop continuity of operations plans (COOP) for county/town departments, assisted living facilities, long-term care facilities, day care centers, etc.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	3.1	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	1 to 3 years	New	N/A
W17	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.	Washington Co., Creswell, Plymouth, Roper	All Hazards	Medium	1.2	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Administration</li> <li>Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2 to 3 years	New	N/A
W18	Maintain a contract with a qualified post-disaster recovery service provider. This contract will include the provision of essential services and equipment, including generators, and will include documentation required for reimbursement from FEMA/NCEM.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	3.2	NRP	<ul style="list-style-type: none"> <li>Washington County Administration</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	New	N/A
W19	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 all participating municipalities to ensure that all jurisdictions continue to be educated and prepared for activation of the EOP in the event of a disaster event.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	4.2	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	New	N/A

## 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 2017 Northeastern NC 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**

<b>Jurisdiction</b>	<b>Integration of 2015 plan</b>	<b>Intended integration of this plan update</b>
Bertie County	Bertie County has utilized the current Northeastern NC RHMP to assess the impacts of natural disasters that continue to impact the County and Region. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Askeville	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Aulander	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Colerain	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Kelford	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Lewiston-Woodville	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Powellsville	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Roxobel	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Windsor	As noted above, these efforts have included all the County’s municipal jurisdictions. The plan has been instrumental in establishing the County’s current five-foot freeboard elevation requirement.	Bertie County, as well as participating municipalities, will continue to utilize the updated plan to assess and address future mitigation needs.
Hyde County	Hyde County continues to search for innovative solutions to flooding issues associated with the county’s low-lying geography. The County has diligently utilized the exiting plan to carry out extensive mitigation efforts, including annual mitigation funding.	The County will continue to monitor and implement the updated plan.
Martin County	Martin County worked closely with all participating jurisdictions to update the County’s Comprehensive Plan.	Martin County will continue to utilize the updated plan in relation to future decisions associated with land development policy and regulation.
Bear Grass	No integration occurred	Integration will be pursued as opportunities arise.

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Jurisdiction	Integration of 2015 plan	Intended integration of this plan update
Everetts	No integration occurred	Integration will be pursued as opportunities arise.
Hamilton	No integration occurred	Integration will be pursued as opportunities arise.
Hassell	No integration occurred	Integration will be pursued as opportunities arise.
Jamesville	No integration occurred	Integration will be pursued as opportunities arise.
Oak City	No integration occurred	Integration will be pursued as opportunities arise.
Parmelee	No integration occurred	Integration will be pursued as opportunities arise.
Robersonville	No integration occurred	Integration will be pursued as opportunities arise.
Williamston	No integration occurred	Integration will be pursued as opportunities arise.
Tyrrell County	Tyrrell County has utilized the current Northeastern NC RHMP to develop recommendations presented in the Hurricane Matthew Resiliency Redevelopment Plan. These efforts also apply to the Town of Columbia.	The County will continue to factor the plan into future capital improvement and land development policy considerations.
Columbia	Tyrrell County Has utilized the current Northeastern NC RHMP to develop recommendations presented in the Hurricane Matthew Resiliency Redevelopment Plan. These efforts also apply to the Town of Columbia.	The Town will continue to factor the plan into future capital improvement and land development policy considerations.
Washington County	Strategies defined within the plan were utilized in the implementation of the Town's CRS Program.	The County will continue to utilize the plan in this manner, as well as for guidance regarding capital expenditures that will involve projects outlined within this plan.
Creswell	Strategies defined within the plan were utilized in the implementation of the Town's CRS 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 within this plan.
Plymouth	Strategies defined within the plan were utilized in the implementation of the Town's CRS 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 within this plan.
Roper	Strategies defined within the plan were utilized in the implementation of the Town's CRS 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 within this plan.

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 reconvene the HMPC quarterly for regular reviews and plan maintenance. These meetings may be held in-person or via conference call or webinar. 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 2022, the next plan update for the Northeastern NC Region will be completed by 2027.

### 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.

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- ▶ 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

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**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.

U. S. Department of Homeland Security  
Region IV  
3005 Chamblee Tucker Road  
Atlanta, GA 30341



FEMA

April 13, 2021

Mr. Steve McGugan  
State Hazard Mitigation Officer  
Assistant Director / Mitigation Section Chief  
Division of Emergency Management  
NC Department of Public Safety  
200 Park Offices Drive  
Durham, NC 27713

Reference: Northeastern NC Regional Hazard Mitigation Plan

Dear Mr. McGugan:

We are pleased to inform you the updated Northeastern NC Regional Hazard Mitigation Plan is compliant with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000, as contained in 44 CFR 201.6. Effective April 13, 2021 the plan is approved for a period of five (5) years, to April 12, 2026.

This plan approval extends to the following participating jurisdictions that provided copies of their resolutions adopting the plan:

- Bertie County
- Town of Askewville
- Town of Aulander
- Town of Kelford
- Town of Lewiston-Woodville
- Town of Powellsville
- Town of Roxobel
- Town of Windsor
- Hyde County
- Town of Bear Grass
- Town of Hassell
- Town of Jamesville
- Town of Parmele
- Town of Robersonville
- Town of Williamston
- Tyrell County
- Town of Columbia
- Washington County
- Town of Creswell
- Town of Plymouth
- Town of Roper

The approved participating jurisdictions are hereby eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants of Northeastern NC Regional Hazard Mitigation Plan update for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years.

We also encourage each community to conduct a plan update process within one (1) year of being included in a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development.

When you prepare a comprehensive plan update, it must be resubmitted through the State as a “plan update” and is subject to a formal review and approval process by our office. If the plan is not updated prior to the required five (5) year update, please ensure that the draft update is submitted at least six (6) months prior to expiration of this plan.

The State and the participants in the Northeastern NC Regional Hazard Mitigation Plan should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Northeastern NC Regional have any questions or need any additional information, please do not hesitate to contact Celia A. Davis, of the Hazard Mitigation Assistance Branch, at (770) 220-5253, Dontrey L. Garnett, of the Hazard Mitigation Assistance Branch, at (770) 220-3145, or Edwardine S. Marrone, of my staff, at (404) 433-3968.

Sincerely,



Kristen M. Martenza, P.E., CFM  
Branch Chief  
Risk Analysis  
FEMA Region IV

U. S. Department of Homeland Security  
Region IV  
3005 Chamblee Tucker Road  
Atlanta, GA 30341



FEMA

May 13, 2021

Mr. Steve McGugan  
State Hazard Mitigation Officer  
Assistant Director / Mitigation Section Chief  
Division of Emergency Management  
NC Department of Public Safety  
200 Park Offices Drive  
Durham, NC 27713

Reference: Northeastern NC Regional Hazard Mitigation Plan

Dear Mr. McGugan:

This is a follow-up to our previous correspondence of April 13, 2021, in which we approved the Northeastern NC Regional Multi-Jurisdictional Hazard Mitigation Plan and all the participating communities that submitted their resolutions at the time of plan approval. We have recently received from your office the following resolutions for inclusion within this plan and subsequently have approved the communities under the approved Northeastern NC Regional Hazard Mitigation Plan effective May 13, 2021:

- Town of Everetts
- Martin County
- Town of Oak City

The approved participating communities are hereby eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

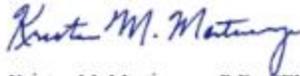
National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in Northeastern NC Regional Hazard Mitigation Plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development. When the Plan is amended or revised, the amendments and revisions should be incorporated into the next plan update. If the Plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

If you or the participants in Northeastern NC Regional Hazard Mitigation Plan have any further questions or need any additional information, please do not hesitate to contact Celicia A. Davis, of the Hazard Mitigation Assistance Branch, at (770) 220-5253, Dontrey L. Garnett, of the Hazard Mitigation Assistance Branch, at (770) 220-3145, or Edwardine S. Marrone, of my staff, at (404) 433-3968.

Sincerely,



Kristen M. Martenza, P.E., CFM  
Branch Chief  
Risk Analysis  
FEMA Region IV

U. S. Department of Homeland Security  
Region IV  
3005 Chamblee Tucker Road  
Atlanta, GA 30341



FEMA

June 21, 2021

Mr. Steve McGugan  
State Hazard Mitigation Officer  
Assistant Director / Mitigation Section Chief  
Division of Emergency Management  
NC Department of Public Safety  
200 Park Offices Drive  
Durham, NC 27713

Reference: Northeastern NC Regional Hazard Mitigation Plan

Dear Mr. McGugan:

This is a follow-up to our previous correspondence of April 13, 2021, in which we approved the Northeastern NC Regional Multi-Jurisdictional Hazard Mitigation Plan and all the participating communities that submitted their resolutions at the time of plan approval. We have recently received from your office the following resolutions for inclusion within this plan and subsequently have approved the communities under the approved Northeastern NC Regional Hazard Mitigation Plan effective June 21, 2021:

- Town of Colerain
- Town of Hamilton

The approved participating communities are hereby eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in Northeastern NC Regional Hazard Mitigation Plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years.

We also encourage each community to conduct a plan update process within one (1) year of being included within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development. When the Plan is amended or revised, the amendments and revisions should be incorporated into the next plan update. If the Plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

If you or the participants in Northeastern NC Regional Hazard Mitigation Plan have any further questions or need any additional information please do not hesitate to contact Celicia Davis, of the Hazard Mitigation Assistance Branch, at (202) 997-7490, Carol Maldonado, of the Hazard Mitigation Assistance Branch, at (470) 307-6294, Hailey Peterson, of the Hazard Mitigation Assistance Branch, at (202) 655-8757, or Edwardine S. Marrone, of my staff, at (404) 433-3968.

Sincerely,



Kristen M. Martenza, P.E., CFM  
Branch Chief  
Risk Analysis  
FEMA Region IV

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, BERTIE COUNTY is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, BERTIE COUNTY desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the BERTIE COUNTY BOARD OF COMMISSIONERS to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the BERTIE COUNTY BOARD OF COMMISSIONERS to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting BERTIE COUNTY; and

**WHEREAS**, BERTIE COUNTY in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the BERTIE COUNTY BOARD OF COMMISSIONERS of BERTIE COUNTY, NC hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted this 19<sup>th</sup> day of October, 2020.



Ronald D. Wesson, Chairman  
Bertie County Board of Commissioners

Attest:



Juan Vaughan, II County Manager/Acting Clerk

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Askewville, NC is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town Council desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Town Council to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Town Council to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting Askewville, NC; and

**WHEREAS**, Askewville, NC, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Town Council of Askewville, NC hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted on July 6, 2020 by the Town Council of Askewville, NC.

  
Gloria M. Bryant, Mayor

Attested by

  
Cheryl P. White, Town Clerk



**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Town of Aulander is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Aulander desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Aulander Council to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Aulander Council to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Aulander; and

**WHEREAS**, the Town of Aulander, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Council of the Town of Aulander hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted this 13<sup>th</sup> day of July, 2020.

  
Larry Drew, Mayor

Attest:  
  
Renee' Draper, Town Clerk

RESOLUTION  
ADOPTING THE NORTHEASTERN NC REGIONAL  
HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within Town of Colerain are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the Town of Colerain desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the Town of Coleain has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the Board of Commissioners of Town of Colerain to fulfill this obligation in order that the Town of Colerain will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, be it resolved that the Board of Commissioners of the Town of Colerain hereby:

SECTION 9: PLAN ADOPTION

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan.
2. Vests Bertie County Emergency Management with the responsibility, authority, and the means to:
  - (a) Inform all concerned parties of this action.
  - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.
3. Appoints Bertie County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Town of Colerain Board of Commissioners for consideration.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the 14<sup>th</sup> day of June, 2020 <sup>21</sup>

Walter P. [Signature]  
Name, Mayor  
Board of Commissioners

Attest:

Cynthia Heath  
Name, Clerk  
Town of Colerain

Certified by: \_\_\_\_\_ (SEAL)

Date: June 14, 2021



RESOLUTION  
ADOPTING NORTHEASTERN NC REGIONAL  
HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within **Town of Kelford** are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the **Town of Kelford** desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and.

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the **Town of Kelford** has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

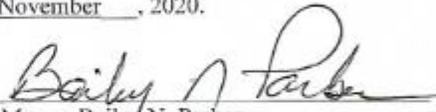
WHEREAS, it is the intent of the Board of Commissioners of **Town of Kelford** to fulfill this obligation in order that the **Town of Kelford** will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, be it resolved that the Board of Commissioners of **Town of Kelford** hereby:

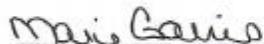
**SECTION 9: PLAN ADOPTION**

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan.
2. Vests **Bertie County** with the responsibility, authority, and the means to:
  - (a) Inform all concerned parties of this action.
  - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.
3. Appoints **Bertie County** to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the **Town of Kelford** Board of Commissioners for consideration.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the 23 day of November, 2020.

  
Mayor, Bailey N. Parker  
Town of Kelford Board of Commissioners

Attest:

  
Marie Garriss, Town Clerk  
Town of Kelford Board of Commissioners

Certified by: Town of Kelford  
Marie Garriss (SEAL)

Date: 11-23-20



**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Lewiston Woodville is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Lewiston Woodville desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Lewiston Woodville Town Council to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Lewiston Woodville Town Council to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Lewiston Woodville.

**WHEREAS**, the Town of Lewiston Woodville, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Town Council of Lewiston Woodville hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

James Pugh  
James Pugh, Mayor  
August 3, 2020

**TOWN OF POWELLSVILLE**  
106 E MAIN STREET  
P. O BOX 22  
POWELLSVILLE NC 27967  
*townofpowellsville@mchsi.com*

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, [TOWN OF POWELLSVILLE] is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the [TOWN OF POWELLSVILLE] desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the [TOWN OF POWELLSVILLE] to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the [TOWN OF POWELLSVILLE] to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the [TOWN OF POWELLSVILLE]; and

**WHEREAS**, the [TOWN OF POWELLSVILLE], in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

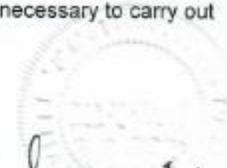
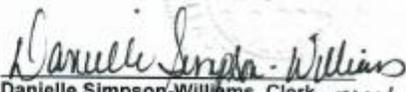
**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the [BOARD OF COMMISSIONERS] of the [TOWN OF POWELLSVILLE] hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

ATTEST:

 07-28-2020  
James L. Peele, Mayor

  
  
Danielle Simpson-Williams, Clerk 7/28/2020

TOWN OF ROXOBEL  
P O BOX 37  
ROXOBEL, NC 27872  
June 25, 2020

RESOLUTION ADOPTING THE NORTHEASTERN NC  
REGION HAZARD MITIGATION PLAN

WHEREAS, the Town of Roxobel is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

WHEREAS, the Town of Roxobel desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

WHEREAS it is the intent of the Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

WHEREAS, it is also the intent of the Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Roxobel; and

WHEREAS, The Town of Roxobel, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials:

WHEREAS, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

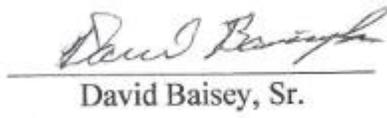
NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of the Town of Roxobel hereby:

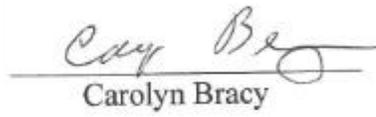
1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

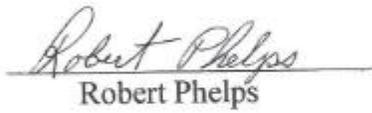
SECTION 9: PLAN ADOPTION

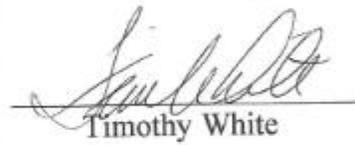
  
Mayor

  
Clerk

  
David Baisey, Sr.

  
Carolyn Bracy

  
Robert Phelps

  
Timothy White

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, the Town of Windsor is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Windsor desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Mayor and Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Mayor and Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Windsor; and

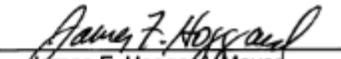
**WHEREAS**, the Town of Windsor, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Mayor and Board of Commissioners of the Town of Windsor hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted this 9<sup>th</sup> day of July, 2020

  
James F. Hoggard, Mayor

  
L. Allen Castelloe, Town Clerk

## COUNTY OF HYDE

Board of Commissioners

Earl Pugh, Jr., Chairman  
Thomas Pahl, Vice-chair  
Benjamin Simmons, III  
Shannon Swindell  
James Topping

30 Oyster Creek Road  
P.O. Box 188  
Swan Quarter, NC 27885



Kris Cahoon Noble,  
County Manager

Franz Holscher,  
County Attorney

Lois Stotesberry, CMC, NCCCC

### RESOLUTION ADOPTING THE NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN

**WHEREAS**, Hyde County is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Hyde County desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Hyde County Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Hyde County Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Hyde County; and

**WHEREAS**, the Hyde County, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Hyde County Board of Commissioners hereby:

Adopts the Northeastern NC Regional Hazard Mitigation Plan; and

Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

**SECTION 9: PLAN ADOPTION**

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This the 6<sup>th</sup> of July, 2020.

  
\_\_\_\_\_  
Earl Pugh Jr., Chairman Hyde County Board of Commissioners

ATTEST:   
\_\_\_\_\_  
Donnie Shumate, Assistant Clerk to the Board



BOARD OF COMMISSIONERS

TOMMY BOWEN, CHAIRMAN  
DEMPSEY BOND, JR., VICE CHAIRMAN  
ELMO "BUTCH" LILLEY  
RONNIE SMITH  
JOE R. AYERS



DAVID B. BONE  
COUNTY MANAGER

JESSICA GODARD  
CLERK TO THE BOARD

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Martin County is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, Martin County desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Martin County Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Martin County Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting Martin County; and

**WHEREAS**, Martin County, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Martin County Board of Commissioners hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted this 4<sup>th</sup> day of November, 2020.



*Tommy Bowen*  
Tommy Bowen, Chairman  
*Jessica Godard*  
Jessica Godard, NCCCC  
Clerk to the Board

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, the Town of Bear Grass is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Bear Grass desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Town of Bear Grass to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Town of Bear Grass to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Bear Grass; and

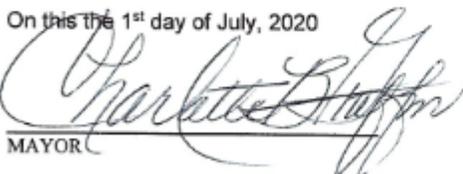
**WHEREAS**, the Town of Bear Grass, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Board of Commissioners of the Town of Bear Grass hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

On this the 1<sup>st</sup> day of July, 2020

  
MAYOR

  
CLERK

RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Everetts is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

WHEREAS, the Town of Everetts desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

WHEREAS, it is the intent of the Town of Everetts to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

WHEREAS, it is also the intent of the Town of Everetts to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Everetts; and

WHEREAS, the Town of Everetts, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multijurisdictional hazard mitigation plan with input from the appropriate local and state officials;

WHEREAS, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of the Town of Everetts hereby:

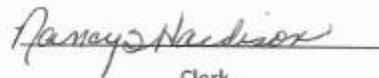
1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

On this the 6<sup>th</sup> day of May, 2021



Mayor

Mayor Pro-Tem



Clerk

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, The Town of Hamilton is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Hamilton desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Hamilton Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

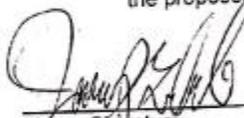
**WHEREAS**, it is also the intent of the Town of Hamilton Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Hamilton, and

**WHEREAS**, the Town of Hamilton, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

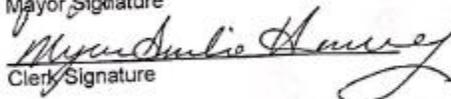
**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Board of Commissioners of the Town of Hamilton hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

  
\_\_\_\_\_  
Mayor Signature

10/02/2020  
Date

  
\_\_\_\_\_  
Clerk Signature

10/02/2020  
Date

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, HASSELL is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, THE TOWN OF HASSELL desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the HASSELL TOWN COUNCIL to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

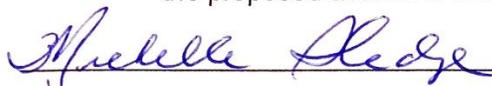
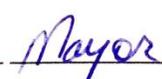
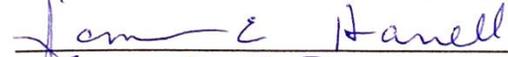
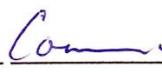
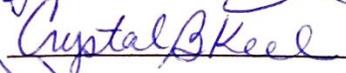
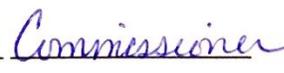
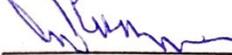
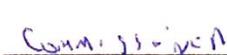
**WHEREAS**, it is also the intent of the HASSELL TOWN COUNCIL to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the HASSELL; and

**WHEREAS**, THE TOWN OF HASSELL, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that ON JANUARY 12, 2021 the TOWN COUNCIL of HASSELL hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, the Town of Jamesville is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Jamesville desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Jamesville Town Board to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Jamesville Town Board to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting Jamesville; and

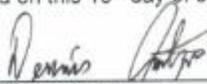
**WHEREAS**, the Town of Jamesville, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Town of Jamesville Board of Commissioners hereby:

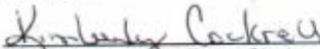
1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted on this 13<sup>th</sup> day of July, 2020.



Dennis Anton, Mayor

ATTEST:



Kimberly Cockrell, Town Clerk



RESOLUTION  
ADOPTING THE NORTHEASTERN NC REGIONAL  
HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within County/Town are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the County/Town desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and.

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the County/Town has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the Board of Commissioners of County/Town to fulfill this obligation in order that the County/Town will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, be it resolved that the Board of Commissioners of County/Town hereby:

SECTION 9: PLAN ADOPTION

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan.
2. Vests County/Town Agency with the responsibility, authority, and the means to:
  - (a) Inform all concerned parties of this action.
  - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.
3. Appoints County/Town Agency to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the County/Town Board of Commissioners for consideration.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the 18 day of Feb, 2021

William Otter, Mayor  
Name, Chair  
XXXXXX Board of Commissioners

Attest:  
Vonetta Porter  
Name, Clerk  
XXXXXXX Board of Commissioners

Certified by: \_\_\_\_\_ (SEAL)

Date: February 1, 2021



**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, The Town of Parmele is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Parmele desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Parmele; and

**WHEREAS**, the Town of Parmele, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Board of Commissioners of Town of Parmele hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

On this the 7<sup>th</sup> day of July, 2020

  
MAYOR

  
CLERK

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, ROBERSONVILLE is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the TOWN OF ROBERSONVILLE desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the ROBERSONVILLE TOWN COUNCIL to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the ROBERSONVILLE TOWN COUNCIL to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the TOWN OF ROBERSONVILLE; and

**WHEREAS**, the TOWN OF ROBERSONVILLE, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the TOWN COUNCIL of the TOWN OF ROBERSONVILLE hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted this 10th day of November, 2020.



Pina Brown, Mayor

Attest:



Allison Stalls, Town Clerk



**RESOLUTION 2020-201 ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Town of Williamston is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Town of Williamston desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Mayor and Town Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Mayor and Town Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Williamston; and

**WHEREAS**, the Town of Williamston, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Mayor and Town Board of Commissioners of Town of Williamston hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted this the 9th day of July, 2020 in Williamston, North Carolina.

Joyce Whichard-Brown, Mayor

ATTEST:

  
Town Clerk

**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Tyrrell County is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, Tyrrell County desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Tyrrell County Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Tyrrell County Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting Tyrrell County; and

**WHEREAS**, Tyrrell County, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

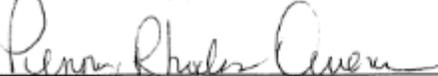
**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Board of County Commissioners of Tyrrell County hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

This the 21st day of July, 2020

  
\_\_\_\_\_  
Nathan T. Everett, Chairman

  
\_\_\_\_\_  
Attest, Clerk to the Board



**Town of Columbia**  
"A Heart's Delight" founded in 1793

103 Main Street • P.O. Box 361  
Columbia, NC 27925  
252.796.2781 (P) • 252.796.0082 (F)

RESOLUTION  
ADOPTING NORTHEASTERN NC REGIONAL  
HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within the Town of Columbia are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the Town are particularly vulnerable to extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the Town of Columbia desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and.

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the Town of Columbia has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management; and

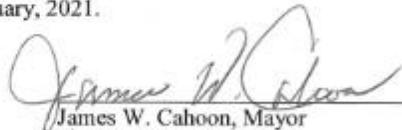
SECTION 9: PLAN ADOPTION

WHEREAS, it is the intent of the Board of Aldermen of the Town of Columbia to fulfill this obligation in order that the Town of Columbia will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, be it resolved that the Board of Aldermen of the Town of Columbia hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan.
2. Vests the Town of Columbia with the responsibility, authority, and the means to:
  - (a) Inform all concerned parties of this action.
  - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.
3. Appoints the Town Manager to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Town of Columbia Board of Aldermen for consideration.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Northeastern NC Regional Hazard Mitigation Plan.

Adopted this the 4<sup>th</sup> day of January, 2021.

  
James W. Cahoon, Mayor

Attest:

  
Rhett B. White, Clerk

Certified by:  (SEAL)

Date: 1/9/21

COUNTY OF WASHINGTON  
BOARD OF COMMISSIONERS

COMMISSIONERS:  
D. COLE PHELPS, CHAIR  
JENNIFER C. RIDDICK, VICE-CHAIR  
TRACEY A. JOHNSON  
WILLIAM "BILL" R. SEXTON, JR.  
JULIUS WALKER, JR.



ADMINISTRATION STAFF:  
CURTIS S. POTTER  
COUNTY MANAGER/ COUNTY ATTORNEY  
[cpotter@washcon.org](mailto:cpotter@washcon.org)

JULIE J. BENNETT, CMC, NCMC  
CLERK TO THE BOARD  
[jbennett@washcon.org](mailto:jbennett@washcon.org)

POST OFFICE BOX 1007  
PLYMOUTH, NORTH CAROLINA 27962  
OFFICE (252) 793-5823 FAX (252) 793-1183

**RESOLUTION**

**ADOPTING THE NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, WASHINGTON COUNTY is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, WASHINGTON COUNTY desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the WASHINGTON COUNTY; and

**WHEREAS**, WASHINGTON COUNTY in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**SECTION 9: PLAN ADOPTION**

NOW, THEREFORE, BE IT RESOLVED that the BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action within its sole discretion, as may be reasonably necessary to carry out the proposed actions of the Plan.

ADOPTED this 6 day of August 2020

  
D. Cole Phelps, Chair  
Washington County Board of Commissioners

ATTEST:   
Julie J. Bennett, M.C. NCMCC  
Clerk to the Board



**RESOLUTION ADOPTING THE  
NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN**

**WHEREAS**, Creswell is vulnerable to an array of natural hazards that can cause loss of life and damages to public and private property; and

**WHEREAS**, the Creswell desires to seek ways to mitigate situations that may aggravate such circumstances; and

**WHEREAS**, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

**WHEREAS**, it is the intent of the Creswell Town Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

**WHEREAS**, it is also the intent of the Creswell Town Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Creswell; and

**WHEREAS**, the Creswell, in coordination with other jurisdictions participating in the Northeastern NC Region, has participated in the planning process and prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have received the Northeastern NC Regional Hazard Mitigation Plan to review for legislative compliance and will approve the plan pending the completion of local adoption procedures;

**NOW, THEREFORE, BE IT RESOLVED** that the Creswell Town Board of Commissioners of Creswell hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

ADOPTED this the 13<sup>th</sup> day of July, 2020.

By: Edwin Blount  
Edwin Ray Blount, Mayor



ATTEST:  
Penny Chapman  
Penny Chapman, Town Clerk



## Town of Plymouth

124 EAST WATER - PLYMOUTH, NORTH CAROLINA 27962  
TELEPHONE: (252) 793-9101  
FAX: (252) 793-6738

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**A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF PLYMOUTH, NORTH CAROLINA,  
ADOPTING THE NORTHEASTERN NC REGIONAL  
HAZARD MITIGATION PLAN**

**RESOLUTION NO. 2021-02**

**WHEREAS**, the citizens and property within the Town of Plymouth, North Carolina, are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of Washington County, including Plymouth, are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

**WHEREAS**, the Town of Plymouth desires to seek ways to mitigate the impact of identified hazard risks; and,

**WHEREAS**, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and,

**WHEREAS**, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and,

**WHEREAS**, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and,

**WHEREAS**, the Town of Plymouth has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management; and,

**WHEREAS**, it is the intent of the Town Council of the Town of Plymouth to fulfill this obligation in order that the Town of Plymouth will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County.

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2021-02 Resolution – Adopting the Northeastern NC Regional Hazard Mitigation

**SECTION 9: PLAN ADOPTION**

**NOW, THEREFORE**, be it resolved this 8<sup>th</sup> day of March, 2021, that the Town Council of the Town of Plymouth, North Carolina, hereby:

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan.
2. Vests all Town of Plymouth staff with the responsibility, authority, and the means to:
  - (a) Inform all concerned parties of this action.
  - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.
3. Appoints the Town Manager or his designee to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Plymouth Town Council.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the 8<sup>th</sup> day of March, 2021.



Vershum "Shawn" Hawkins  
Mayor

ATTEST:



Dorenda Wallace  
Clerk

SEAL



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2021-02 Resolution – Adopting the Northeastern NC Regional Hazard Mitigation

RESOLUTION  
ADOPTING THE NORTHEASTERN NC REGIONAL  
HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within Town of Roper are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the Town of Roper desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the Town of Roper has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

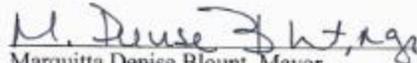
WHEREAS, it is the intent of the Board of Commissioners of Town of Roper to fulfill this obligation in order that the Town of Roper will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, be it resolved that the Board of Commissioners of Town of Roper hereby:

SECTION 9: PLAN ADOPTION

1. Adopts the Northeastern NC Regional Hazard Mitigation Plan.
2. Vests Town of Roper with the responsibility, authority, and the means to:
  - (a) Inform all concerned parties of this action.
  - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.
3. Appoints Town of Roper to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Town of Roper Board of Commissioners for consideration.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the 8<sup>th</sup> day of February 2020.

  
Marquitta Denise Blount, Mayor

Attest:  
  
Stacy Chesson, Clerk



Certified by: \_\_\_\_\_ (SEAL)

Date: \_\_\_\_\_

## Annex A Bertie County

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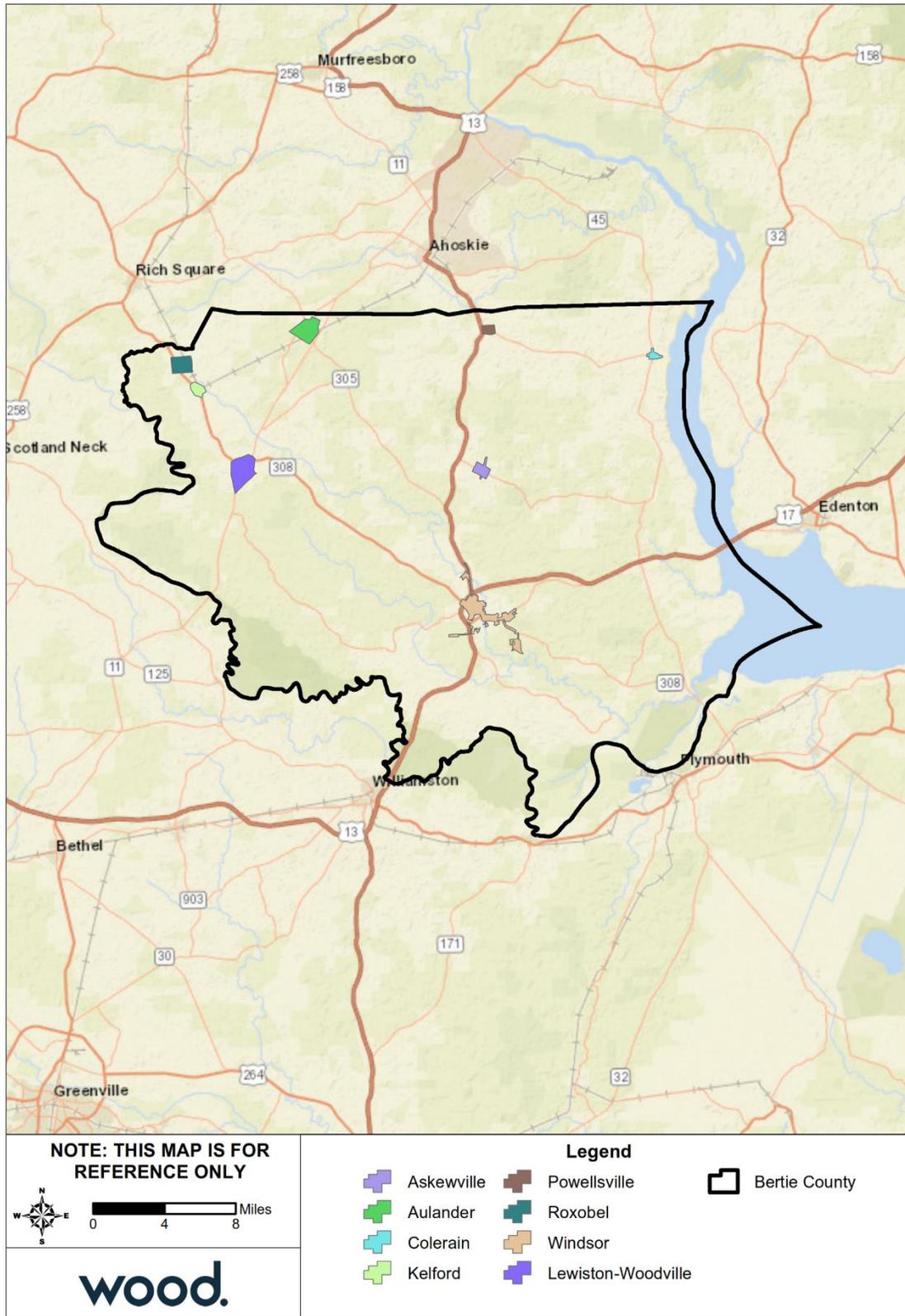
### A.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Bertie County and its participating incorporated areas, including information on population, asset exposure, housing, and economy.

#### Geography

Figure A.1 shows a base map of Bertie County and participating jurisdictions.

Figure A.1 – Jurisdictional Locations, Bertie County



## ANNEX A: BERTIE COUNTY

### Population and Demographics

Table A.1 provides population counts and growth estimates for Bertie County and participating jurisdictions as compared to the Region overall. Despite the fact that the Region overall is shrinking, several incorporated areas have experienced significant

Table A.2 provides demographic information for the County.

**Table A.1 – Population Counts, Bertie County, 2000-2017**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Askewville	180	241	224	33.9%	-7.1%	24.4%
Aulander	888	895	962	0.8%	7.5%	8.3%
Colerain	221	204	236	-7.7%	15.7%	6.8%
Kelford	245	251	379	2.4%	51.0%	54.7%
Lewiston-Woodville	613	549	575	-10.4%	4.7%	-6.2%
Powellsville	259	276	205	6.6%	-25.7%	-20.8%
Roxobel	263	240	306	-8.7%	27.5%	16.3%
Windsor	2,283	3,630	3,534	59.0%	-2.6%	54.8%
<b>Municipalities</b>	<b>4,952</b>	<b>6,286</b>	<b>6,421</b>	<b>26.9%</b>	<b>2.1%</b>	<b>29.7%</b>
Unincorporated Areas	14,821	14,996	13,492	1.2%	-10.0%	-8.9%
<b>Bertie County</b>	<b>19,773</b>	<b>21,282</b>	<b>19,913</b>	<b>7.6%</b>	<b>-6.4%</b>	<b>0.7%</b>
<b>Region Total</b>	<b>69,064</b>	<b>69,232</b>	<b>65,068</b>	<b>0.2%</b>	<b>-6.0%</b>	<b>-5.8%</b>

Source: US Census Bureau American Community Survey.

**Table A.2 – Racial Demographics, Bertie County, 2017**

Jurisdiction	Caucasian	African American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Askewville	93.8%	0.0%	0.0%	6.2%	0.0%	4.5%
Aulander	30.8%	62.0%	0.0%	7.2%	0.0%	10.5%
Colerain	92.8%	2.5%	0.0%	4.7%	0.0%	4.2%
Kelford	24.3%	74.4%	0.0%	0.0%	1.3%	0.0%
Lewiston-Woodville	12.7%	83.0%	0.9%	1.3%	2.1%	1.4%
Powellsville	47.8%	52.2%	0.0%	0.0%	0.0%	0.0%
Roxobel	36.3%	53.3%	1.0%	4.8%	4.6%	9.2%
Windsor	36.7%	57.8%	1.9%	1.6%	2.0%	3.0%
<b>Bertie County</b>	<b>35.3%</b>	<b>62.0%</b>	<b>0.6%</b>	<b>1.2%</b>	<b>0.9%</b>	<b>2.1%</b>

\*Other races include 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.

### Asset Inventory

The following tables summarize the asset inventory for Bertie County unincorporated areas and incorporated jurisdictions in order to estimate the total physical exposure to hazards in this area. The locations of critical facilities are shown in Figure A.2. 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
Bertie County	1,395	1	0	366	1	136	0	42	23	0	0	0	0	52	0	3	6	2,025
Town of Askewville	61	2	0	17	0	9	0	5	0	0	0	0	0	3	0	1	0	98
Town of Aulander	15	2	0	50	0	21	0	7	2	0	0	0	0	1	0	0	0	98
Town of Colerain	22	2	0	29	0	19	0	8	1	0	0	0	0	1	0	1	0	83
Town of Kelford	5	0	0	10	0	0	0	1	2	0	0	0	0	0	0	1	0	19
Town of Lewiston-Woodville	24	1	0	67	0	25	0	2	2	0	0	0	0	5	0	1	0	127
Town of Powellsville	2	0	0	12	0	1	0	2	1	0	0	0	0	1	0	1	0	20
Town of Roxobel	10	2	0	30	0	9	0	1	0	0	0	0	0	1	0	1	0	54
Town of Windsor	31	6	0	150	1	69	1	33	28	0	0	0	0	13	1	6	0	339
<b>Bertie County Total</b>	<b>1,565</b>	<b>16</b>	<b>0</b>	<b>731</b>	<b>2</b>	<b>289</b>	<b>1</b>	<b>101</b>	<b>59</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>1</b>	<b>15</b>	<b>6</b>	<b>2,863</b>

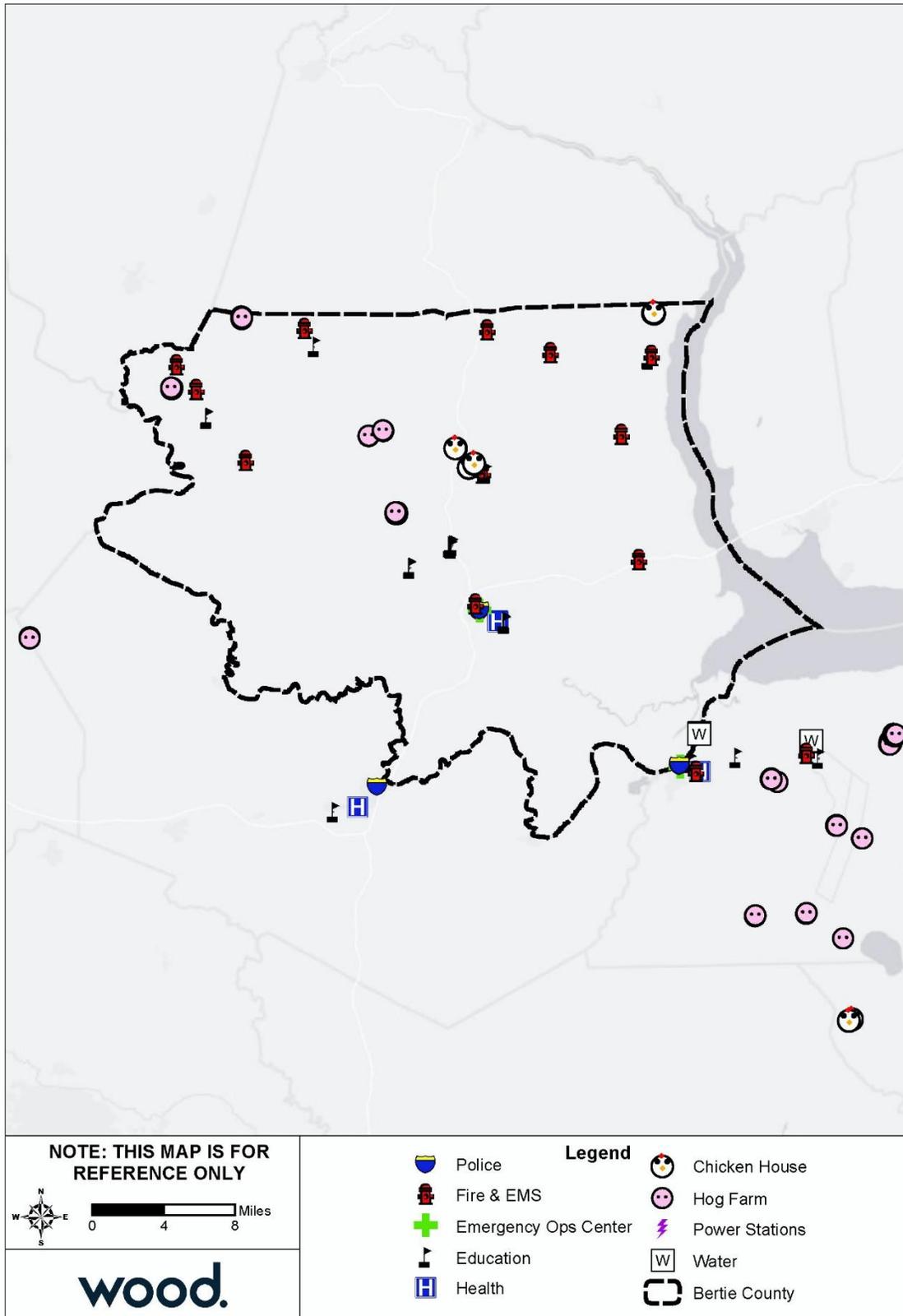
Source: NCEM Risk Management Tool

Table A.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Bertie County	0	1	1	5	0	1	0	8
Town of Askewville	0	0	0	1	0	0	0	1
Town of Aulander	0	0	0	1	0	0	0	1
Town of Colerain	1	0	0	1	0	0	0	2
Town of Kelford	-	-	-	-	-	-	-	-
Town of Lewiston-Woodville	-	-	-	-	-	-	-	-
Town of Powellsville	-	-	-	-	-	-	-	-
Town of Roxobel	-	-	-	-	-	-	-	-
Town of Windsor	0	4	0	3	0	0	0	7
<b>Bertie County</b>	<b>1</b>	<b>5</b>	<b>1</b>	<b>11</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>19</b>

Source: NCEM Risk Management Tool

Figure A.2 – Critical Facilities, Bertie County



Source: NCEM IRISK Database, GIS Analysis

## ANNEX A: BERTIE COUNTY

### Housing

The table below details key housing statistics for Bertie County. As a percent of growth from 2010 housing, Bertie County's housing stock has grown by less than one percent. The majority of occupied housing units are owner occupied throughout all of Bertie County and its incorporated areas.

**Table A.5 – Housing Statistics, Bertie County, 2010-2017**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Askewville	108	118	9.3%	91.5%	8.5%
Aulander	450	453	0.7%	74.2%	25.8%
Colerain	120	141	17.5%	71.6%	28.4%
Kelford	130	148	13.8%	79.7%	20.3%
Lewiston-Woodville	262	333	27.1%	68.8%	31.2%
Powellsville	150	112	-25.3%	76.8%	23.2%
Roxobel	128	161	25.8%	92.5%	7.5%
Windsor	1,193	1,194	0.1%	89.4%	10.6%
<b>Bertie County</b>	<b>9,822</b>	<b>9,853</b>	<b>0.3%</b>	<b>81.1%</b>	<b>18.9%</b>

Source: US Census Bureau American Community Survey.

### Economy

The following tables present key economic statistics for Bertie County. Over half the population is not in the labor force in the Towns of Kelford, Powellsville, Roxobel, and Windsor. The unemployment rate is above 10 percent in Aulander, Kelford, Roxobel, and the county overall.

**Table A.6 – Economic Indicators, Bertie County, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Askewville	102	50.0%	1.0%	49.0%	2.0%
Aulander	331	41.5%	9.4%	49.2%	18.4%
Colerain	106	55.0%	0.5%	44.5%	0.9%
Kelford	105	38.5%	6.9%	54.5%	15.2%
Lewiston-Woodville	326	68.6%	7.2%	24.2%	9.5%
Powellsville	65	33.1%	3.4%	63.5%	9.2%
Roxobel	127	42.1%	6.9%	51.0%	14.2%
Windsor	1,029	31.1%	2.5%	66.5%	7.4%
<b>Bertie County</b>	<b>8,367</b>	<b>43.8%</b>	<b>6.4%</b>	<b>49.8%</b>	<b>12.7%</b>

Source: US Census Bureau American Community Survey.

**Table A.7 – Employment by Industry, Bertie County, 2017**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Askewville	30.0%	6.0%	18.0%	28.0%	18.0%
Aulander	10.0%	35.2%	11.9%	13.3%	29.6%
Colerain	49.5%	13.3%	13.3%	21.0%	2.9%
Kelford	10.1%	25.8%	13.5%	14.6%	36.0%
Lewiston-Woodville	24.1%	17.6%	23.4%	7.1%	27.8%
Powellsville	28.8%	18.6%	25.4%	5.1%	22.0%
Roxobel	25.7%	19.3%	28.4%	9.2%	17.4%

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Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Windsor	24.9%	22.6%	20.7%	8.1%	23.8%
<b>Bertie County</b>	<b>23.7%</b>	<b>16.0%</b>	<b>18.6%</b>	<b>12.7%</b>	<b>29.0%</b>

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 by jurisdiction in Bertie County than for the Northeastern NC 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 Bertie County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, at nearly 30 percent, unincorporated Bertie County has the largest portion of land area within the mapped 1%-annual-chance floodplain. Conversely, the Towns of Colerain and Powelsville are entirely outside the SFHA.

**Table A.8 – Flood Zone Acreage by Jurisdiction, Bertie County**

Flood Zone	Acreage	Percent of Total
<b>Unincorporated Bertie County</b>		
Zone A	2,146.47	0.5%
Zone AE	138,759.37	29.6%
Zone X Shaded	4,636.86	1.0%
Zone X Unshaded	323,101.53	68.9%
<b>Total</b>	<b>468,644.23</b>	-
<b>Askeville</b>		
Zone AE	3.81	1.0%
Zone X Unshaded	375.00	99.0%
<b>Total</b>	<b>378.81</b>	-
<b>Aulander</b>		
Zone AE	139.74	14.8%
Zone X Shaded	38.76	4.1%
Zone X Unshaded	764.24	81.1%
<b>Total</b>	<b>942.73</b>	-
<b>Colerain</b>		
Zone X Unshaded	168.25	100.0%
<b>Total</b>	<b>168.25</b>	-
<b>Kelford</b>		
Zone AE	40.40	13.1%
Zone X Unshaded	268.25	86.9%
<b>Total</b>	<b>308.64</b>	-
<b>Lewiston-Woodville</b>		
Zone AE	54.97	4.4%
Zone X Shaded	14.81	1.2%
Zone X Unshaded	1,190.19	94.5%
<b>Total</b>	<b>1,259.97</b>	-

**ANNEX A: BERTIE COUNTY**

Flood Zone	Acreage	Percent of Total
<b>Powellsville</b>		
Zone X Unshaded	228.28	100.0%
<b>Total</b>	<b>228.28</b>	<b>-</b>
<b>Roxobel</b>		
Zone AE	10.59	1.6%
Zone X Shaded	1.14	0.2%
Zone X Unshaded	655.76	98.2%
<b>Total</b>	<b>667.48</b>	<b>-</b>
<b>Windsor</b>		
Zone AE	408.14	22.6%
Zone X Shaded	177.64	9.9%
Zone X Unshaded	1,216.18	67.5%
<b>Total</b>	<b>1,801.96</b>	<b>-</b>
<b>Bertie County Total</b>		
Zone A	2,146.47	0.5%
Zone AE	139,417.01	29.4%
Zone X Shaded	4,869.20	1.0%
Zone X Unshaded	327,967.68	69.1%
<b>Total</b>	<b>474,400.36</b>	<b>-</b>

Source: FEMA Effective DFIRM; U.S. Census Bureau

Figure A.3 through Figure A.9 reflect the effective mapped flood hazard zones for all jurisdictions in Bertie County with land in or near the SFHA, and Figure A.10 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

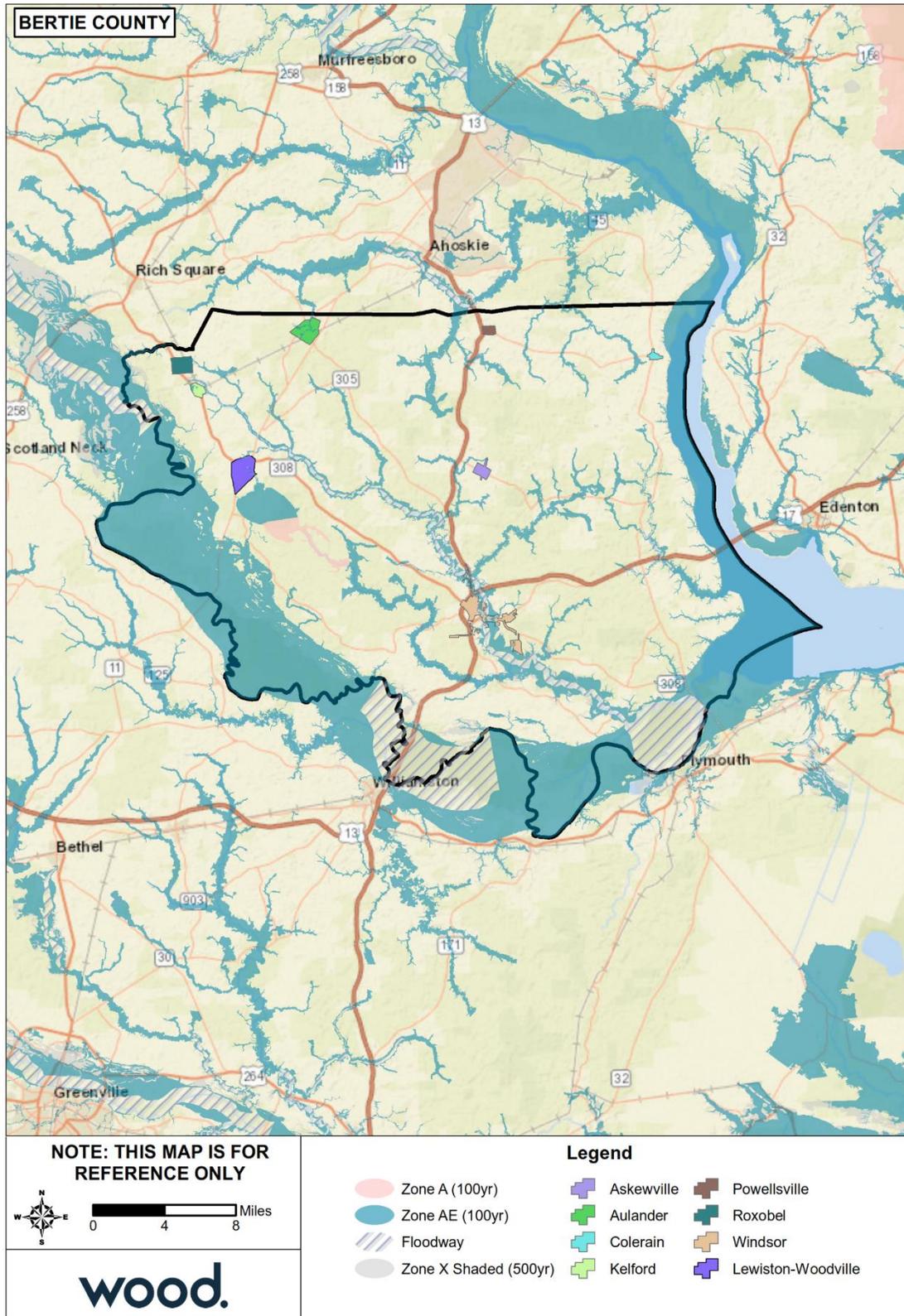
Table A.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Bertie County and incorporated jurisdictions.

**Table A.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction**

Sector	Event	Number of Buildings at Risk	Estimated Damages
<b>Bertie County Unincorporated Areas</b>			
Commercial Facilities	100 Year	5	\$8,914
Critical Manufacturing	100 Year	1	\$478
Food and Agriculture	100 Year	2	\$1,721
Transportation Systems	100 Year	1	\$742
<b>All Categories</b>	<b>100 Year</b>	<b>9</b>	<b>\$11,855</b>
<b>Town of Colerain</b>			
Commercial Facilities	100 Year	1	\$737
Critical Manufacturing	100 Year	1	\$516
<b>All Categories</b>	<b>100 Year</b>	<b>2</b>	<b>\$1,253</b>
<b>Town of Windsor</b>			
Commercial Facilities	100 Year	10	\$68,486
Critical Manufacturing	100 Year	3	\$19,296
Government Facilities	100 Year	1	\$5,654
Transportation Systems	100 Year	1	\$4,013
<b>All Categories</b>	<b>100 Year</b>	<b>15</b>	<b>\$97,449</b>

Source: NCEM Risk Management Tool

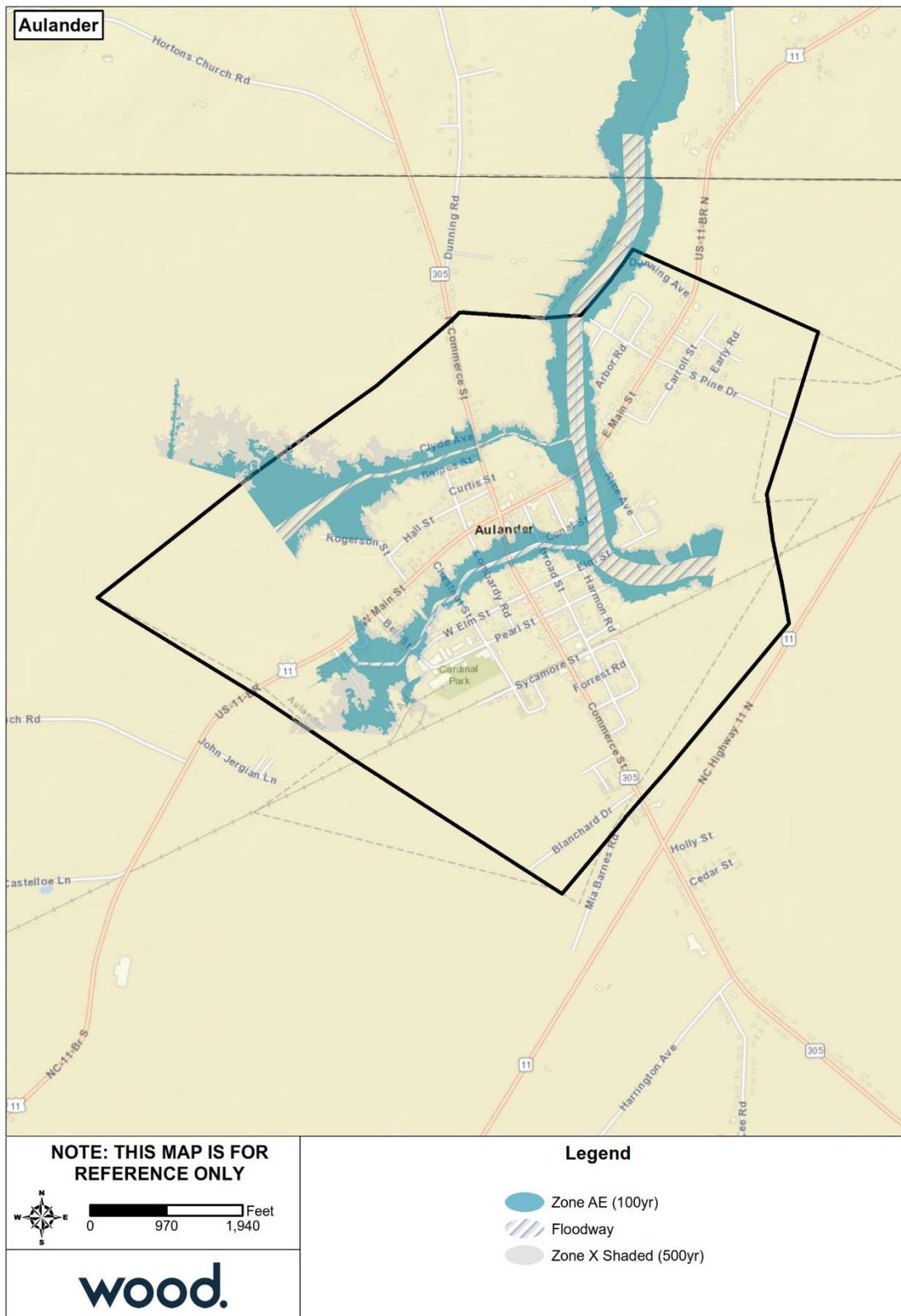
Figure A.3 – FEMA Flood Hazard Areas, Bertie County



Source: FEMA Effective DFIRM



Figure A.5 – FEMA Flood Hazard Areas, Town of Aulander



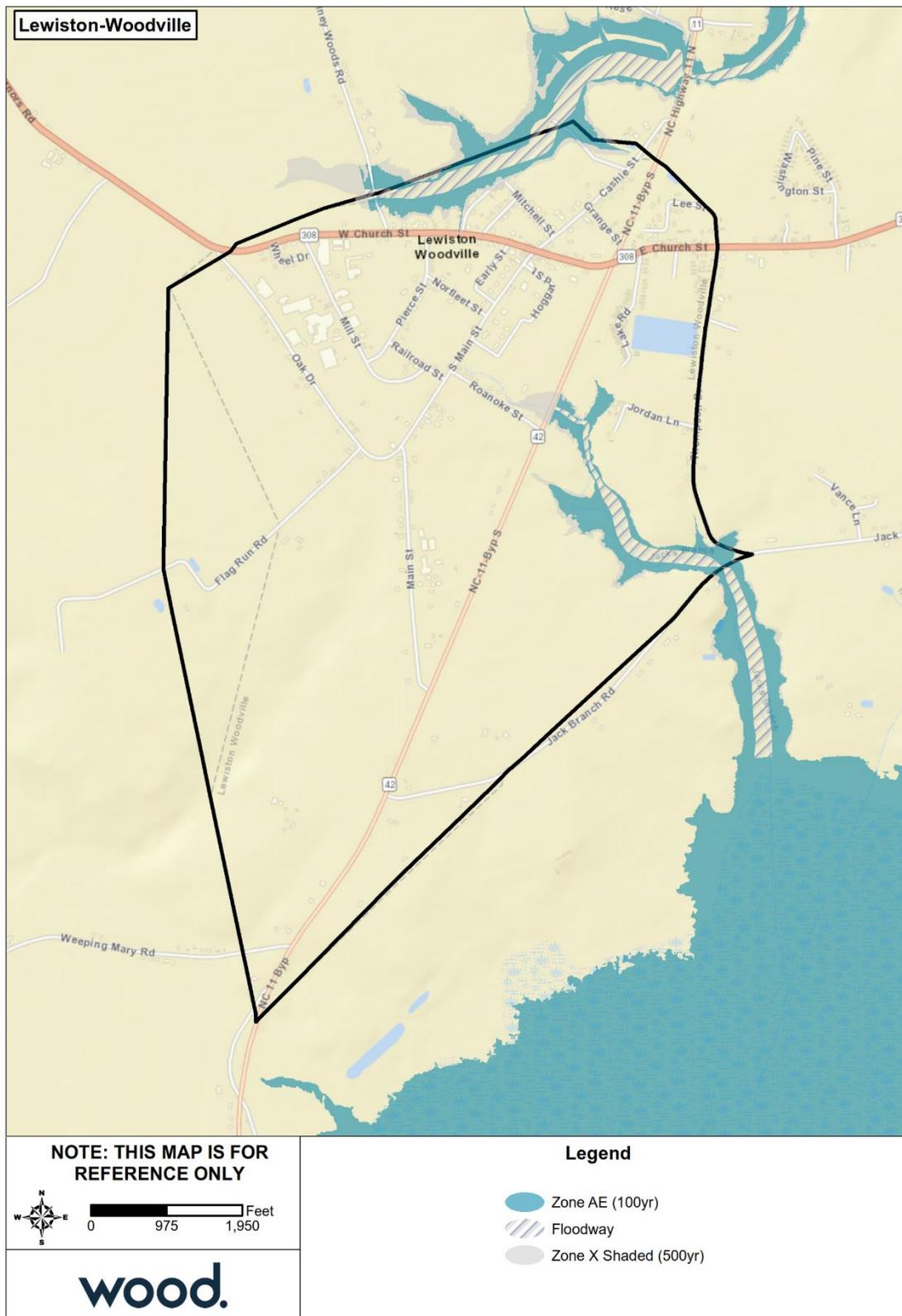
Source: FEMA Effective DFIRM

Figure A.6 – FEMA Flood Hazard Areas, Town of Kelford



Source: FEMA Effective DFIRM

Figure A.7 – FEMA Flood Hazard Areas, Town of Lewiston-Woodville



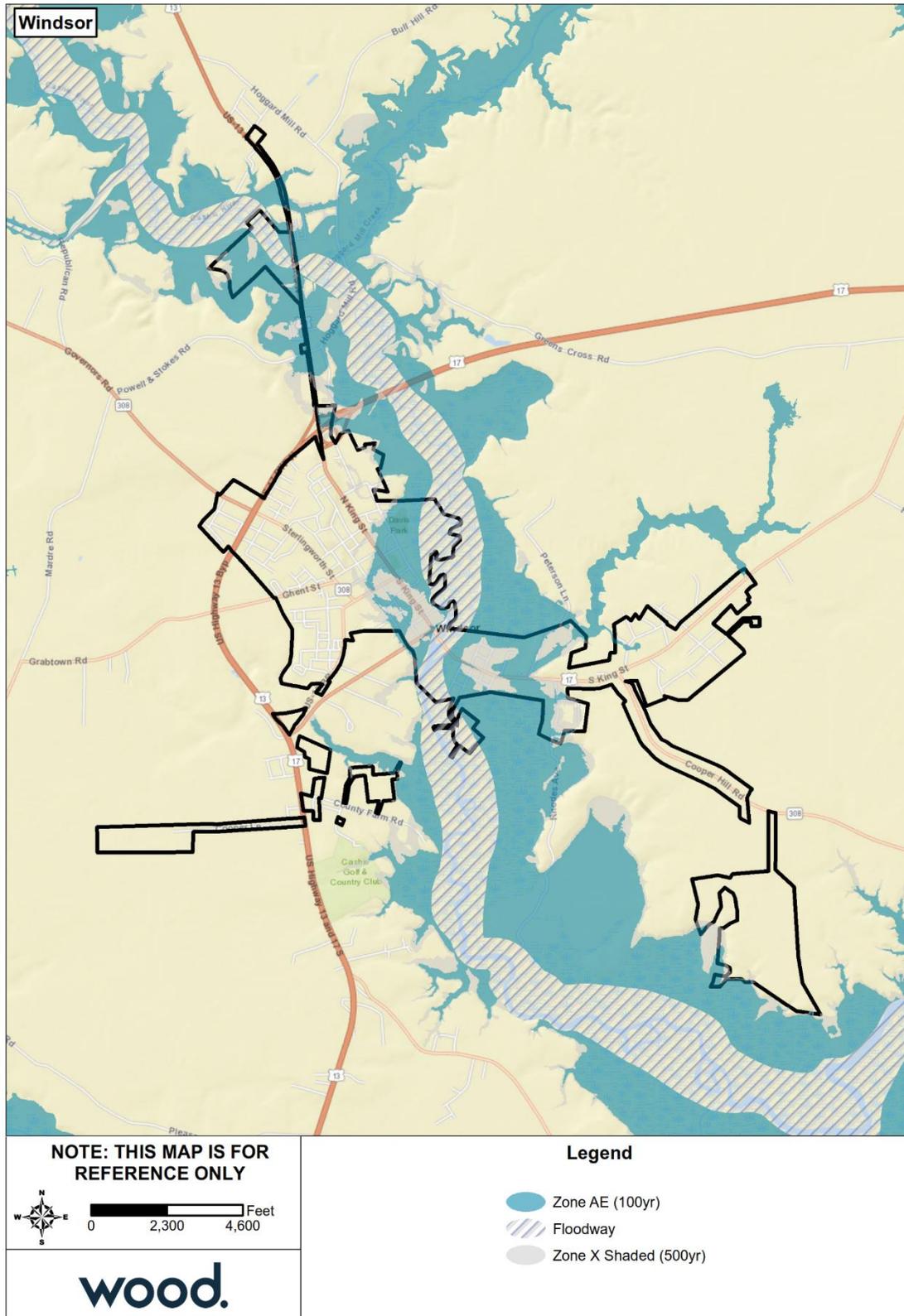
Source: FEMA Effective DFIRM

Figure A.8 – FEMA Flood Hazard Areas, Town of Roxobel



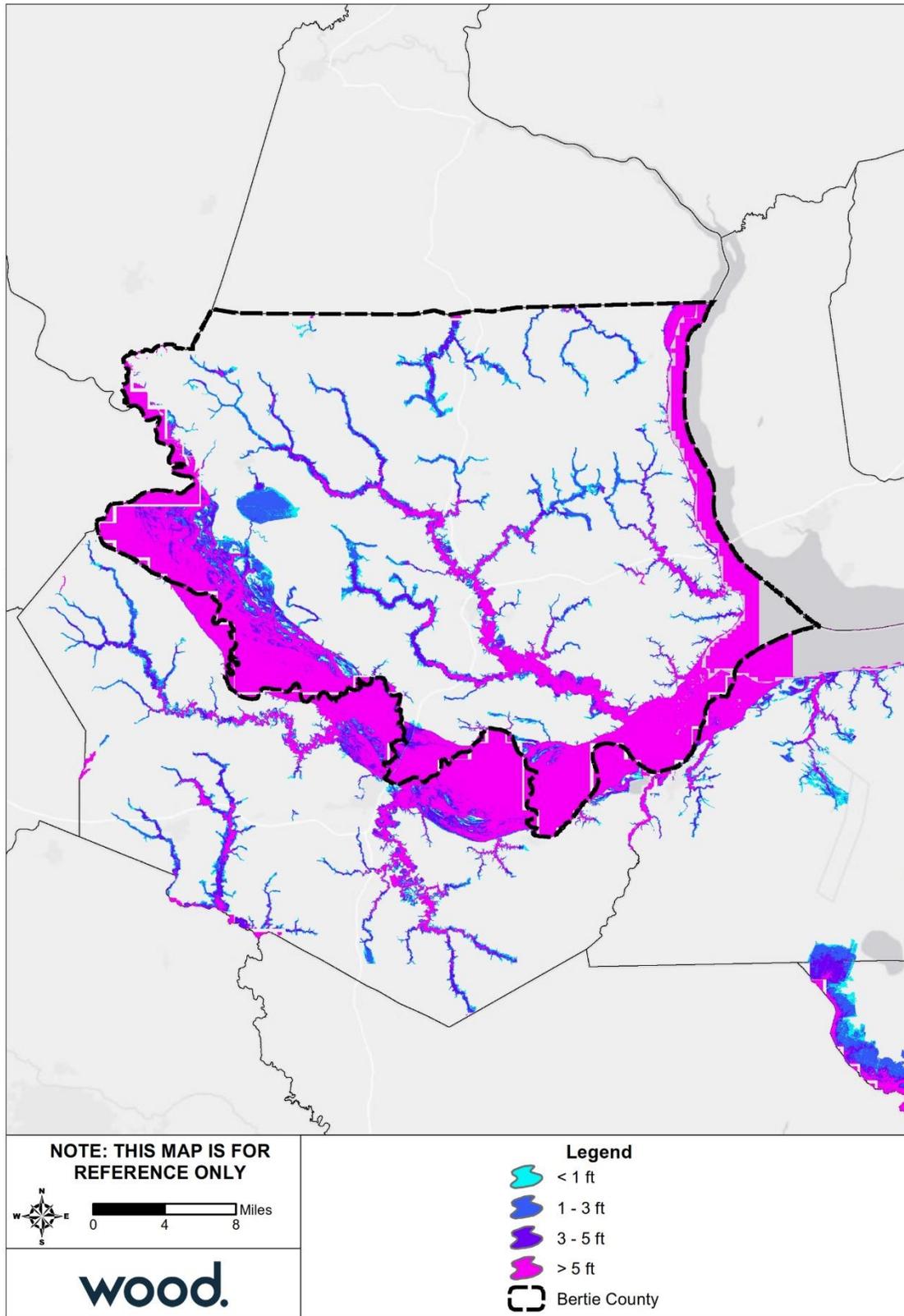
Source: FEMA Effective DFIRM

Figure A.9 – FEMA Flood Hazard Areas, Town of Windsor



Source: FEMA Effective DFIRM

Figure A.10 – Flood Depth, 1%-Annual-Chance Floodplain, Bertie County



Source: FEMA Effective DFIRM

**A.2.2 Wildfire**

Table A.10 summarizes the acreage in Bertie 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. Approximately 68 percent of Bertie County is not included in the WUI.

**Table A.10 – Wildland Urban Interface Acreage, Bertie County**

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	322,525.0	68.0%
	LT 1hs/40ac	77,320.0	16.3%
	1hs/40ac to 1hs/20ac	30,519.2	6.4%
	1hs/20ac to 1hs/10ac	24,003.2	5.1%
	1hs/10ac to 1hs/5ac	11,881.0	2.5%
	1hs/5ac to 1hs/2ac	5,134.6	1.1%
	1hs/2ac to 3hs/1ac	2,568.2	0.5%
	GT 3hs/1ac	64.0	0.0%
	<b>Total</b>	<b>474,015.4</b>	

Source: Southern Wildfire Risk Assessment

Figure A.11 depicts the WUI for Bertie 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.12 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure A.13 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

WUI areas exist throughout the county, with gaps on the southern and western edges of the county along the Roanoke River and its floodplain. Areas of moderate to high potential fire intensity also occur throughout the county, with the lowest potential intensity along the Roanoke River. However, burn probability is very low throughout the county with the exception of a small cluster of moderate burn probability northeast of Windsor.

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 Bertie County and participating jurisdictions.

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, Bertie County**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Bertie County Unincorporated Area</b>		
Commercial Facilities	153	\$50,444,664
Critical Manufacturing	32	\$4,905,095
Food and Agriculture	465	\$61,926,681
Government Facilities	27	\$25,657,228
Healthcare and Public Health	8	\$1,804,159
Transportation Systems	28	\$8,364,237
Water	6	\$45,276
<b>All Categories</b>	<b>719</b>	<b>\$153,147,340</b>
<b>Town of Askewville</b>		
Banking and Finance	2	\$311,204
Commercial Facilities	14	\$5,046,452
Critical Manufacturing	7	\$730,863
Emergency Services	1	\$346,355
Food and Agriculture	36	\$2,040,032
Government Facilities	4	\$2,668,160
Transportation Systems	3	\$522,938
<b>All Categories</b>	<b>67</b>	<b>\$11,666,004</b>
<b>Town of Aulander</b>		
Commercial Facilities	1	\$257,911
Critical Manufacturing	1	\$2,427,844
Food and Agriculture	2	\$72,685
<b>All Categories</b>	<b>4</b>	<b>\$2,758,440</b>
<b>Town of Colerain</b>		
Commercial Facilities	4	\$1,311,872
Critical Manufacturing	1	\$378,737
Emergency Services	1	\$257,839
Government Facilities	5	\$2,826,484
Healthcare and Public Health	1	\$144,335
Transportation Systems	1	\$382,891
<b>All Categories</b>	<b>13</b>	<b>\$5,302,158</b>
<b>Town of Colerain</b>		
Commercial Facilities	5	\$1,935,911
Critical Manufacturing	4	\$550,981
Food and Agriculture	3	\$159,486
Transportation Systems	1	\$669,570
<b>All Categories</b>	<b>13</b>	<b>\$3,315,948</b>
<b>Town of Powellville</b>		
Commercial Facilities	10	\$3,287,456
Critical Manufacturing	1	\$300,816
Emergency Services	1	\$557,303
Food and Agriculture	1	\$48,496
Healthcare and Public Health	1	\$113,443
<b>All Categories</b>	<b>14</b>	<b>\$4,307,514</b>
<b>Town of Windsor</b>		
Commercial Facilities	16	\$5,543,621

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Sector	Number of Buildings at Risk	Estimated Damages
Critical Manufacturing	5	\$1,468,584
Food and Agriculture	1	\$176,706
Government Facilities	10	\$4,547,073
Healthcare and Public Health	4	\$3,334,619
Transportation Systems	3	\$596,517
<b>All Categories</b>	<b>39</b>	<b>\$15,667,120</b>

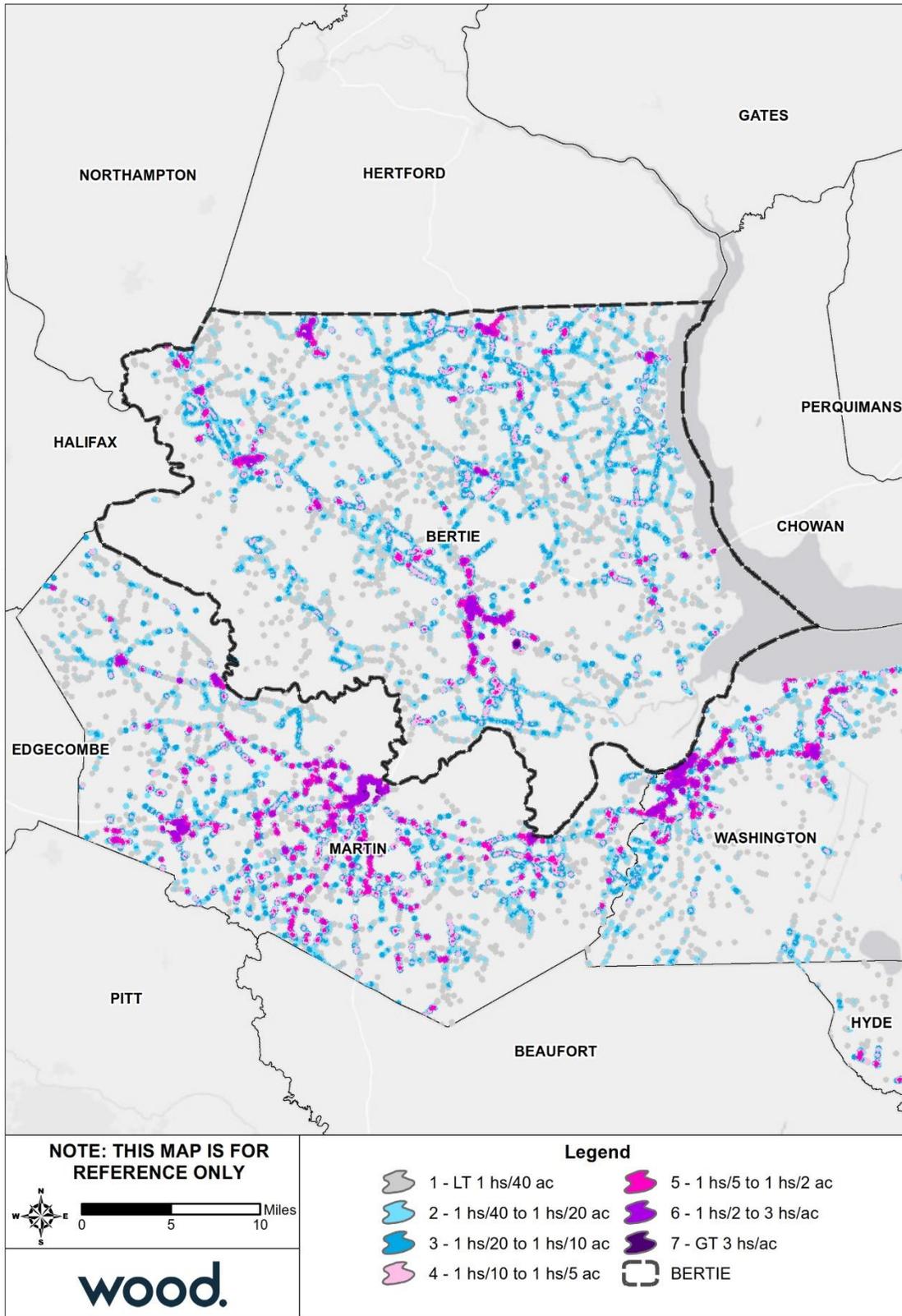
Source: NCEM Risk Management Tool

Table A.12 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Bertie County

Category	Number of Buildings at Risk	Estimated Damages
<b>Bertie County Unincorporated Area</b>		
Commercial	1	\$1,624,296
Government	4	\$19,435,689
Religious	1	\$5,704,401
<b>All Categories</b>	<b>6</b>	<b>\$26,764,386</b>
<b>Town of Askewville</b>		
Government	1	\$1,308,991
<b>All Categories</b>	<b>1</b>	<b>\$1,308,991</b>
<b>Town of Colerain</b>		
Government	1	\$2,130,968
<b>All Categories</b>	<b>1</b>	<b>\$2,130,968</b>
<b>Town of Windsor</b>		
Commercial	1	\$2,411,732
Government	1	\$2,975,975
<b>All Categories</b>	<b>2</b>	<b>\$5,387,707</b>

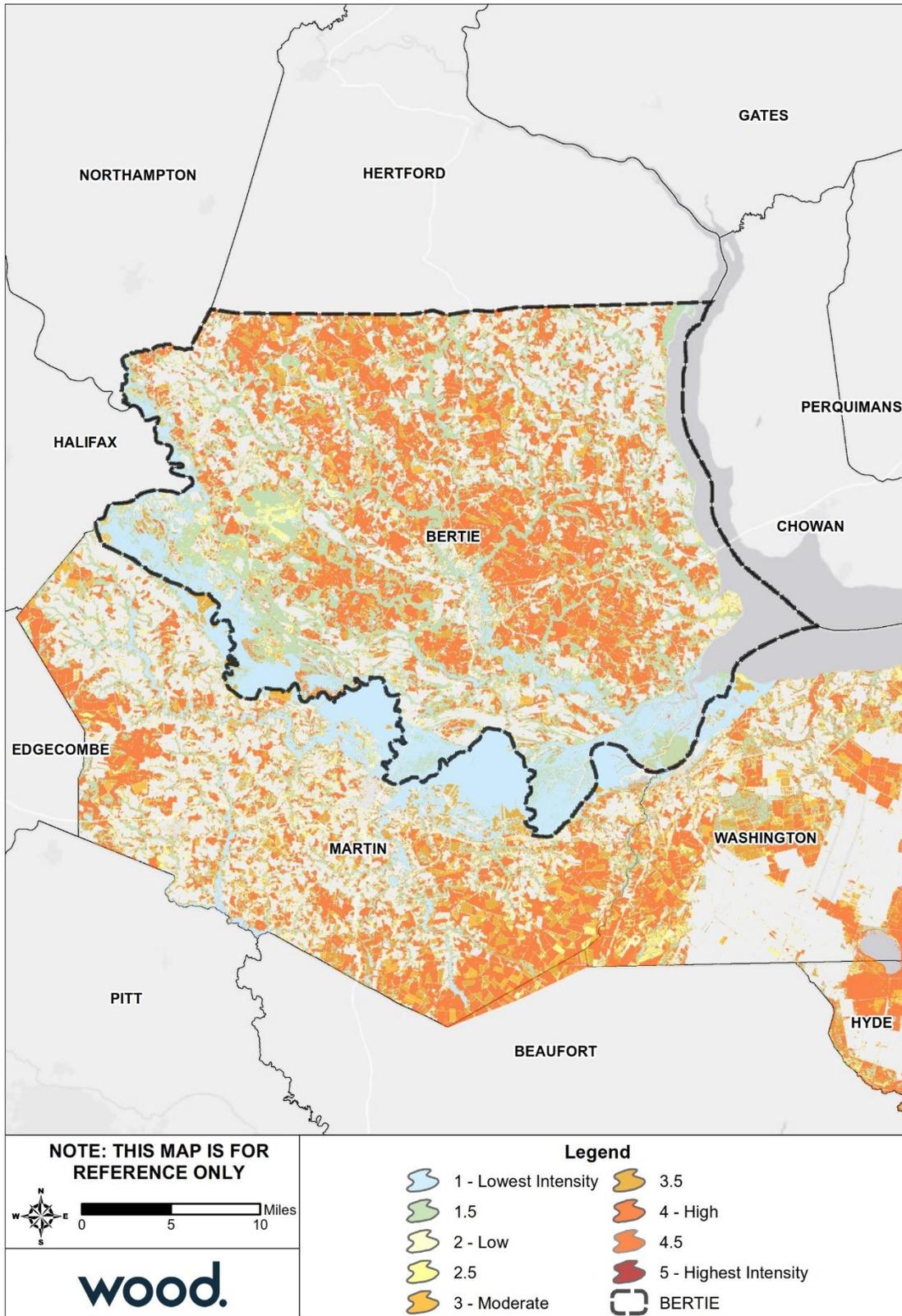
Source: NCEM Risk Management Tool

Figure A.11 – Wildland Urban Interface, Bertie County



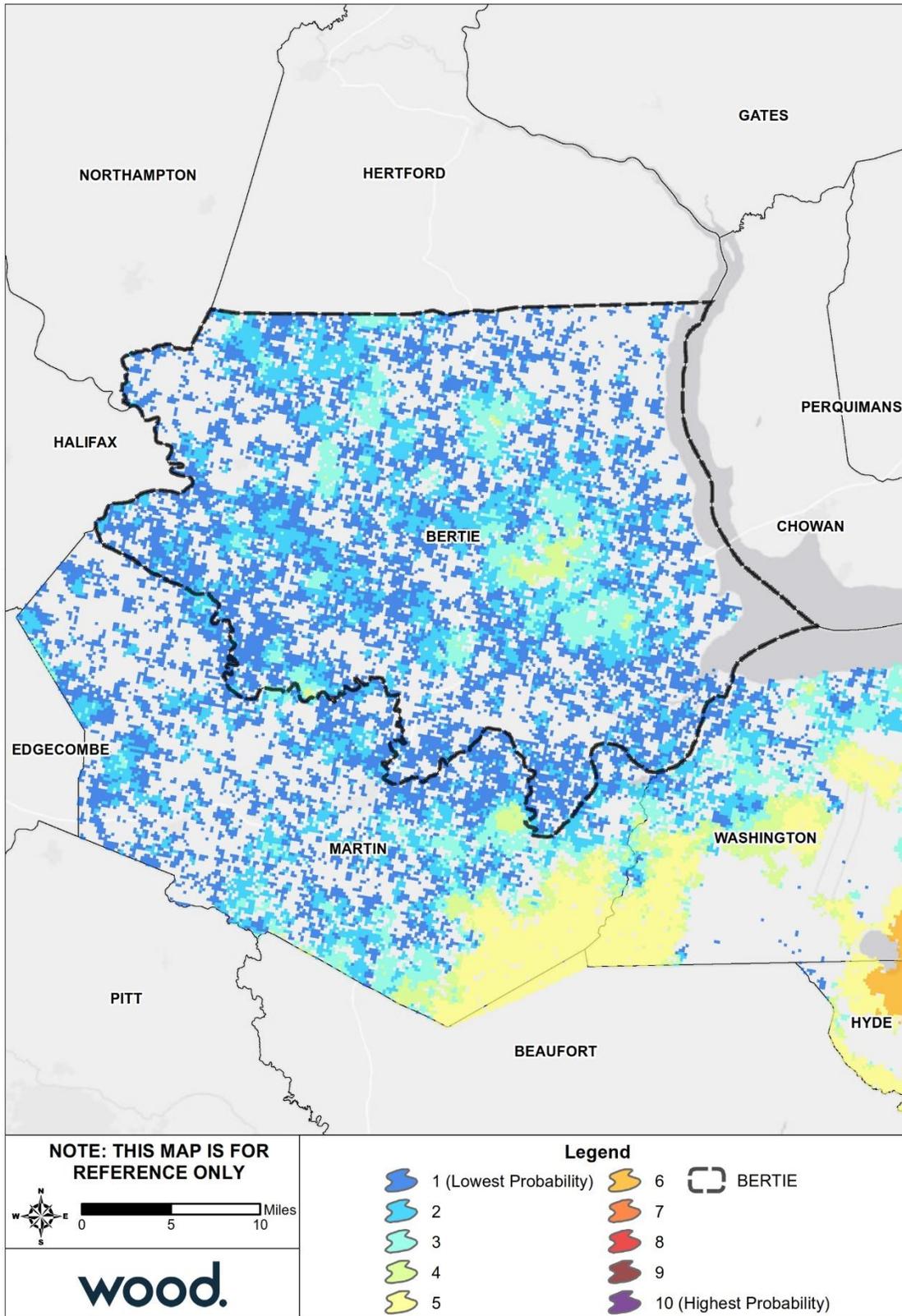
Source: Southern Wildfire Risk Assessment

Figure A.12 – Fire Intensity Scale, Bertie County



Source: Southern Wildfire Risk Assessment

Figure A.13 – Burn Probability, Bertie 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 Bertie 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, Bertie County has an overall capability rating of Moderate, however the County self-assessed its overall capability as High. Although some of the incorporated jurisdictions have lower capability, Bertie 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 A.13 below.

**Table A.13 – Capability Self-Assessment, Bertie 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**

The following tables reflect NFIP entry dates as well as policy and claims data for Bertie County and incorporated areas categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table A.14 – NFIP Program Entry Dates**

Community	Regular Program Entry
Bertie County (Unincorporated Area)	December 4, 1985
Town of Askewville	<i>Not Participating</i>
Town of Aulander	February 4, 2009
Town of Colerain	October 23, 2014
Town of Kelford	May 24, 2012
Town of Lewiston-Woodville	<i>Not Participating</i>
Town of Powellsville	<i>Not Participating</i>
Town of Roxobel	February 4, 2009
Town of Windsor	July 18, 1977

Source: FEMA Community Information System

**Table A.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
<b>Bertie County Unincorporated Area</b>					
Single Family	78	\$48,802	\$15,138,600	74	\$1,832,941.05
Non-Residential	10	\$9,405	\$925,000	12	\$577,342.39
<b>Total</b>	<b>88</b>	<b>\$58,207</b>	<b>\$16,063,600</b>	<b>86</b>	<b>\$2,410,283.44</b>
<b>Town of Aulander</b>					
Single Family	11	\$12,075	\$1,406,000	7	\$51,959.11

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Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Non-Residential	1	\$561	\$500,000	0	\$0.00
<b>Total</b>	<b>12</b>	<b>\$12,636</b>	<b>\$1,906,000</b>	<b>7</b>	<b>\$51,959.11</b>
<b>Town of Colerain</b>					
Single Family	2	\$915	\$700,000	0	\$0.00
<b>Total</b>	<b>2</b>	<b>\$915</b>	<b>\$700,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Kelford</b>					
Single Family	1	\$757	\$70,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$757</b>	<b>\$70,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Roxobel</b>					
Single Family	1	\$304	\$140,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$304</b>	<b>\$140,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Windsor</b>					
Single Family	62	\$38,125	\$10,356,700	169	\$5,255,677.31
2-4 Family	0	\$0	\$0	2	\$17,578.36
All Other Residential	1	\$988	\$600,000	1	\$4,440.81
Non-Residential	47	\$52,737	\$8,189,100	113	\$5,220,215.38
<b>Total</b>	<b>110</b>	<b>\$91,850</b>	<b>\$19,145,800</b>	<b>285</b>	<b>\$10,497,911.86</b>

Source: FEMA Community Information System, accessed February 2020

**Table A.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
<b>Bertie County Unincorporated Area</b>					
A01-30 & AE Zones	46	\$35,400	\$7,552,900	51	\$1,740,589.89
A Zones	0	\$0	\$0	4	\$50,455.18
B, C & X Zone					
Standard	11	\$10,336	\$2,262,200	10	\$345,944.98
Preferred	26	\$9,471	\$6,074,000	19	\$245,389.78
<b>Total</b>	<b>83</b>	<b>\$55,207</b>	<b>\$15,889,100</b>	<b>84</b>	<b>\$2,382,379.83</b>
<b>Town of Aulander</b>					
A01-30 & AE Zones	8	\$10,399	\$1,292,000	2	\$7,337.63
B, C & X Zone					
Standard	2	\$1,602	\$194,000	3	\$33,271.18
Preferred	2	\$635	\$420,000	0	\$0.00
<b>Total</b>	<b>12</b>	<b>\$12,636</b>	<b>\$1,906,000</b>	<b>5</b>	<b>\$40,608.81</b>
<b>Town of Colerain</b>					
A01-30 & AE Zones	1	\$500	\$350,000	0	\$0.00
B, C & X Zone					
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$415	\$350,000	0	\$0.00
<b>Total</b>	<b>2</b>	<b>\$915</b>	<b>\$700,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Kelford</b>					
A01-30 & AE Zones	1	\$757	\$70,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$757</b>	<b>\$70,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Roxobel</b>					
B, C & X Zone					
Preferred	1	\$304	\$140,000	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
<b>Total</b>	<b>1</b>	<b>\$304</b>	<b>\$140,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Windsor</b>					
A01-30 & AE Zones	68	\$53,139	\$10,637,400	219	\$7,969,654.33
A Zones	1	\$1,211	\$177,100	11	\$323,817.85
<b>B, C &amp; X Zone</b>					
Standard	16	\$25,449	\$2,854,500	30	\$1,047,607.08
Preferred	23	\$10,851	\$5,407,000	25	\$1,156,832.60
<b>Total</b>	<b>108</b>	<b>\$90,650</b>	<b>\$19,076,000</b>	<b>285</b>	<b>\$10,497,911.86</b>

Source: FEMA Community Information System, accessed February 2020

**Table A.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
<b>Bertie County Unincorporated Area</b>					
A01-30 & AE Zones	18	\$18,982	\$2,481,100	38	\$1,158,886.17
A Zones	0	\$0	\$0	4	\$50,455.18
<b>B, C &amp; X Zone</b>					
Standard	5	\$3,107	\$920,000	6	\$326,612.02
Preferred	18	\$5,543	\$3,514,000	15	\$213,523.05
<b>Total</b>	<b>41</b>	<b>\$27,632</b>	<b>\$6,915,100</b>	<b>63</b>	<b>\$1,749,476.42</b>
<b>Town of Colerain</b>					
A01-30 & AE Zones	0	\$0	\$0	0	\$0.00
<b>B, C &amp; X Zone</b>					
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$415	\$350,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$415</b>	<b>\$350,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Kelford</b>					
A01-30 & AE Zones	1	\$757	\$70,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$757</b>	<b>\$70,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Windsor</b>					
A01-30 & AE Zones	49	\$39,081	\$6,403,700	173	\$6,290,703.05
A Zones	0	\$0	\$0	6	\$297,783.65
<b>B, C &amp; X Zone</b>					
Standard	10	\$11,001	\$1,195,800	22	\$609,712.75
Preferred	17	\$5,320	\$2,947,000	18	\$838,034.90
<b>Total</b>	<b>76</b>	<b>\$55,402</b>	<b>\$10,546,500</b>	<b>219</b>	<b>\$8,036,234.35</b>

Source: FEMA Community Information System, accessed February 2020

Table A.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
<b>Bertie County Unincorporated Area</b>					
A01-30 & AE Zones	28	\$16,418	\$5,071,800	11	\$564,696.78
B, C & X Zone	14	\$11,157	\$3,902,200	8	\$51,199.69
Standard	6	\$7,229	\$1,342,200	4	\$19,332.96
Preferred	8	\$3,928	\$2,560,000	4	\$31,866.73
<b>Total</b>	<b>42</b>	<b>\$27,575</b>	<b>\$8,974,000</b>	<b>19</b>	<b>\$615,896.47</b>
<b>Town of Colerain</b>					
A01-30 & AE Zones	1	\$500	\$350,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$500</b>	<b>\$350,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Roxobel</b>					
A01-30 & AE Zones	1	\$304	\$140,000	0	\$0.00
<b>Total</b>	<b>1</b>	<b>\$304</b>	<b>\$140,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Windsor</b>					
A01-30 & AE Zones	19	\$14,058	\$4,233,700	46	\$1,678,951.28
A Zones	1	\$1,211	\$177,100	5	\$26,034.20
B, C & X Zone	12	\$19,979	\$4,118,700	15	\$756,692.03
Standard	6	\$14,448	\$1,658,700	8	\$437,894.33
Preferred	6	\$5,531	\$2,460,000	7	\$318,797.70
<b>Total</b>	<b>32</b>	<b>\$35,248</b>	<b>\$8,529,500</b>	<b>66</b>	<b>\$2,461,677.51</b>

Source: FEMA Community Information System, accessed February 2020

**A.4 MITIGATION STRATEGY**

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
B1	Revise/update regulatory maps upon completion of FIRM update.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PP	<ul style="list-style-type: none"> <li>Bertie County Board of Commissioners</li> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, FEMA (NFIP)	2020-2025	In Progress – Carry Forward	Bertie County will continue to monitor the status of the County’s FIRM Maps and as new maps are developed facilitate the public review process and adoption.
B2	Continue to develop a Geographic Information System (GIS) to map current land uses and to map proposed future land uses (CAMA Land Use Plan Update) as an aid in assessing community vulnerability.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	Medium	1.1	P	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Emergency Management</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Bertie County continues to establish additional insights and observations regarding the potential impacts of hazards throughout the County. Through implementation of this plan, the County will incorporate this information into County GIS system.
B3	Consider participating in the Community Rating System (CRS) to reduce flood insurance premiums for citizens.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.1	PP	<ul style="list-style-type: none"> <li>Bertie County Board of Commissioners</li> <li>Bertie County Planning Department</li> <li>Municipal Administrations</li> </ul>	\$10,000	General Fund, NCDPS	2 to 3 Years	Not Started – Carry Forward	Bertie County, as well as all participating jurisdictions, will consider joining the CRS program through implementation of this plan.
B4	Accomplish the following during the next CAMA Land Use Plan update: <ul style="list-style-type: none"> <li>Establish more specific growth guidelines and policies and specifically delineate sensitive environmental areas for protection;</li> <li>Adopt a more limited policy on the types of uses allowed within flood hazard areas;</li> <li>Adopt a policy to not extend public services and utilities into flood hazard or other environmentally sensitive areas to discourage growth.</li> </ul>	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	Medium	1.3	PP	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	\$45,000	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Started – Carry Forward	Bertie County will consider updating the County’s CAMA Land Use Plan through implementation of this plan. The County’s municipalities will be provided the option to participate in this effort.
B5	Consider adopting a zoning ordinance that: <ul style="list-style-type: none"> <li>Establishes zoning districts and sets standards for future development.</li> <li>Includes standards for clustering of residential lot development to help preserve flood hazard areas from development.</li> <li>Includes a flood hazard overlay zone to ensure that inappropriate development is adequately controlled.</li> </ul>	Bertie County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	PP	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Board of Commissioners</li> </ul>	\$75,000	General Fund	3 to 5 years	Not Started – Carry Forward	Bertie County will consider developing and adopting Countywide zoning regulations through implementation of this plan.
B6	Consider adopting subdivision regulations that include minimum standards for property divisions.	Bertie County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	PP	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Bertie County Board of Commissioners</li> </ul>	\$10,000	General Fund	3 to 5 years	Not Started – Carry Forward	Bertie County will consider revising its subdivision regulations through implementation of this plan.

ANNEX A: BERTIE 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
B7	Review and update the flood damage prevention ordinance to: <ul style="list-style-type: none"> <li>• Ensure maximum protection from flood hazard events.</li> <li>• Raise the minimum finished floor elevation to at least 2' above base flood elevation (BFE) to provide more flood protection for new or substantially improved structures.</li> <li>• Consider prohibiting any fill within the 100-year floodplain to discourage development.</li> <li>• Prohibit enclosures to the lower areas of elevated buildings, including breakaway walls.</li> <li>• Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain.</li> </ul>	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.2	PP	<ul style="list-style-type: none"> <li>• Bertie County Board of Commissioners</li> <li>• Bertie County Planning Department</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	1 to 3 Years	In Progress – Carry Forward	Bertie County will continue to monitor the County's Flood Damage Prevention Ordinance in regard to the potential impacts associated with flooding events. When necessary, the County will amend these regulations to mitigate the impacts of potential flooding events.
B8	Identify repetitive flood loss properties for acquisition and relocation. Seek Federal and State funding (voluntary program).	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	SP	<ul style="list-style-type: none"> <li>• Bertie County Administration</li> <li>• Bertie County Board of Commissioners</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	Carry Forward – In progress	Bertie County continues to diligently carry out active mitigation projects based on both annual funding, as well as post disaster mitigation funding associated with both Hurricanes Matthew and Florence. The County will continue these efforts through implementation of this plan.
B9	Establish a coordinating committee to ensure that all parties responsible for stormwater management within the county communicate to ensure maximum cooperation in developing and maintaining stormwater drainage systems.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.3	SP	<ul style="list-style-type: none"> <li>• Bertie County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	1 year	Not Started – Carry Forward	Bertie County will work to establish this working committee through implementation of this plan.
B10	Establish and maintain a coordinated debris inspection and removal program.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricanes & Tropical Storm, Severe Winter Storm, Extreme Heat, Earthquake, Wildfire, Dam & Levee Failure, Severe Weather, Tornado	High	2.2	ES	<ul style="list-style-type: none"> <li>• Bertie County Board of Commissioners</li> <li>• Bertie County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Bertie County will maintain a post disaster debris management contractor. The County will review this contract and update it annually prior to hurricane season.
B11	Review rebuilding activities in wake of recent hurricanes and flooding and establish policies/procedures for minimizing repetitive flood losses.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.1	P	<ul style="list-style-type: none"> <li>• Bertie County Administration</li> <li>• Bertie County Planning Department</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	Bertie County assesses the impacts of storms on the community as they occur. By documenting these impacts, the County, as well as participating jurisdictions, will utilize this information to make decisions regarding land development policy and regulation.

ANNEX A: BERTIE 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
B12	Advise/assist property owners in retrofitting homes and businesses.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>Bertie County Planning Department</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	The Bertie County Planning and Inspection Department works closely with property owners and builders to retrofit homes in an effort to minimize future flood damages.
B13	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.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	High	1.1	ES	<ul style="list-style-type: none"> <li>Bertie County Emergency Management</li> <li>American Red Cross</li> <li>Bertie County School System</li> <li>Municipal Administrations</li> </ul>	To Be Determined	General Fund, NCDPS	1 to 3 years	New	N/A
B14	Work to improve the emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	All Hazards	High	4.1	PIO	<ul style="list-style-type: none"> <li>Bertie County Emergency Management</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	New	N/A
B15	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation (addressed above), mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Bertie County, Askewville, Aulander, Colerain, Kelford, Lewiston- Woodville, Powellsville, Roxobel, Windsor	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	SP	<ul style="list-style-type: none"> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	To Be Determined	NCDPS, FEMA	2020-2025	New	N/A
B16	Work to implement all strategies and recommendations outlined within the Bertie County Hurricane Matthew Resilient Redevelopment Plan.	Bertie County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.1	SP	<ul style="list-style-type: none"> <li>Bertie County Administration</li> <li>Municipal Administrations</li> </ul>	To Be Determined	General Fund, NCDPS, FEMA	5 years	New	N/A

# Annex B Hyde County

## B.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Hyde County, including information on population, asset exposure, housing, and economy.

### Geography

Figure B.1 shows a base map of Hyde County.

### Population and Demographics

Table B.1 provides population counts and growth estimates for Hyde County as compared to the Region overall. Hyde County population is shrinking at a similar rate to the Region. Table B.2 provides demographic information for the County.

**Table B.1 – Population Counts, Hyde County, 2000-2017**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Hyde County	5,826	5,810	5,507	-0.3%	-5.2%	-5.5%
<b>Region Total</b>	<b>69,064</b>	<b>69,232</b>	<b>65,068</b>	<b>0.2%</b>	<b>-6.0%</b>	<b>-5.8%</b>

Source: US Census Bureau American Community Survey.

**Table B.2 – Racial Demographics, Hyde County, 2017**

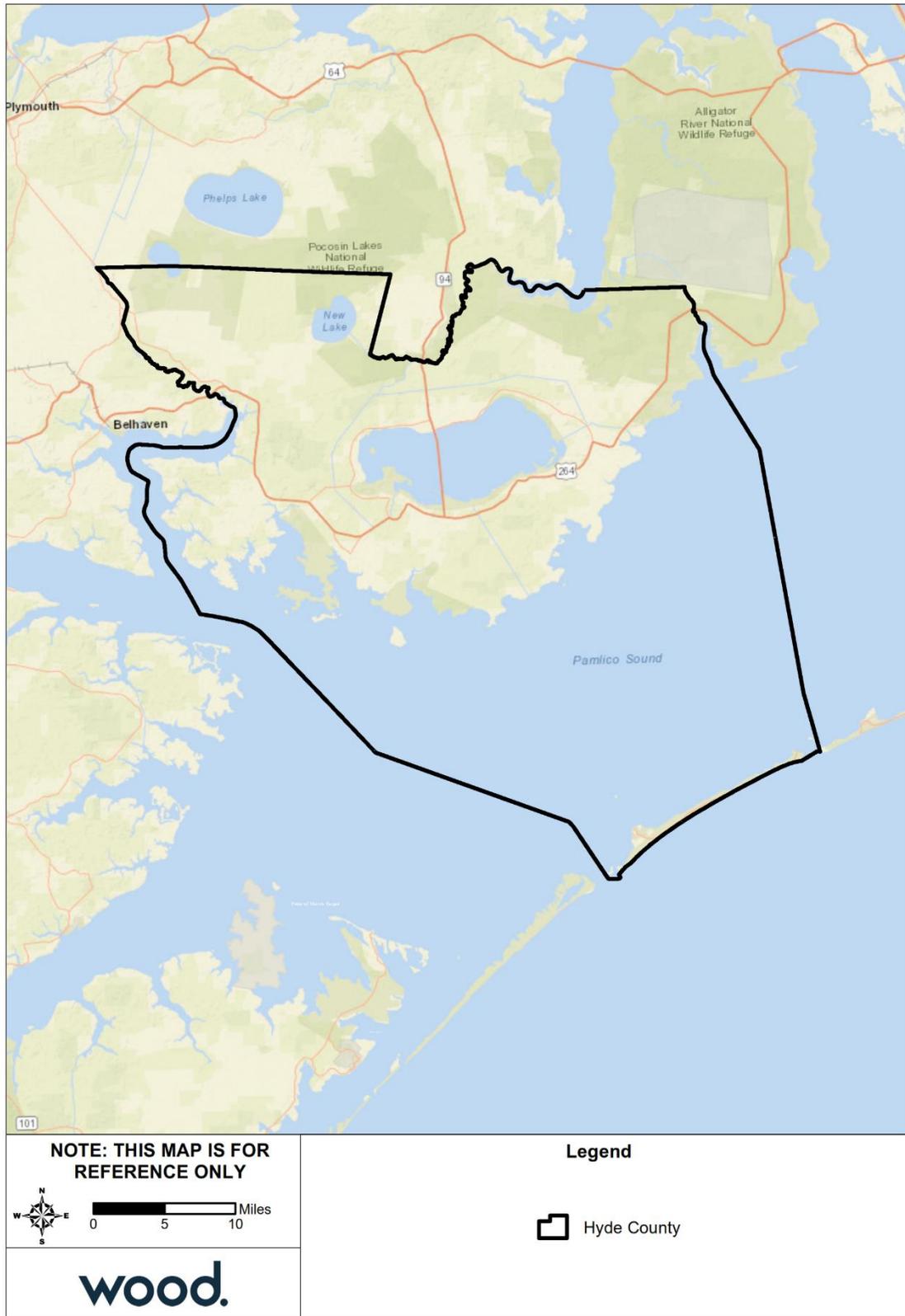
Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Hyde County	68.2%	30.7%	0.0%	0.1%	1.0%	8.4%

\*Other races include 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 B.1 – Location Map, Hyde County



### Future Growth and Development

This section provides an explanation of anticipated development trends in Hyde County. Evaluating future growth and development decisions in relation to known hazard areas can lead to better growth management and more effective risk reduction strategies.

Hyde County is a fairly large county and is home to the largest natural lake in the State of North Carolina. The presence of this lake provides a variety of opportunities with regard to active and passive recreation and serves as a significant economic engine for the County. There are no incorporated jurisdictions within Hyde County; however, there are four areas that are classified by the US Census Bureau as Census Designated Places (CDP), including Ocracoke, Swan Quarter, Engelhard, and Fairfield. Hyde County is extremely rural, but these four communities support nearly all retail and service-based businesses available to county residents. These areas are fairly isolated, so the presence of retail outlets and other nonresidential facilities is critical to the sustainability of the County's population base.

The largest community is the Village of Ocracoke. Development is fairly dense throughout Ocracoke, which experiences a substantial increase in population during summer months. Ocracoke is especially susceptible to the effects of hurricanes, tropical storms, and nor'easters and was severely impacted by Hurricane Dorian in 2019. The second largest community is Engelhard, followed by Swan Quarter which serves as the County seat. Hyde County's economy is largely based on either agriculture or fisheries. A majority of non-residential development outside of the four Census Designated Places provides support to these two industries.

### Hyde County CAMA Land Use Plan

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The Hyde County CAMA Core Land Use Plan was adopted by the Hyde County Board of Commissioners in January of 2008 and certified by the Coastal Resources Commission in March of 2008. The plan defines nine future land use districts including:

- ▶ Commercial
- ▶ Unbuildable Land
- ▶ Open Space/Vacant
- ▶ Industrial
- ▶ Office and Institutional
- ▶ Agriculture/Low Density Residential
- ▶ Residential
- ▶ Recreational
- ▶ Mixed Use

These districts are defined in detail under Section 6 Plan for the Future, pages 225-242, of the Hyde County CAMA Land Use Plan: <https://files.nc.gov/ncdeq/Coastal%20Management/documents/PDF/LUB/Plan.pdf>

Figure B.2 through Figure B.6 provides the delineation of each Future Land Use District for Hyde County overall and for key study areas throughout the County.

Figure B.2 – Hyde County Future Land Use

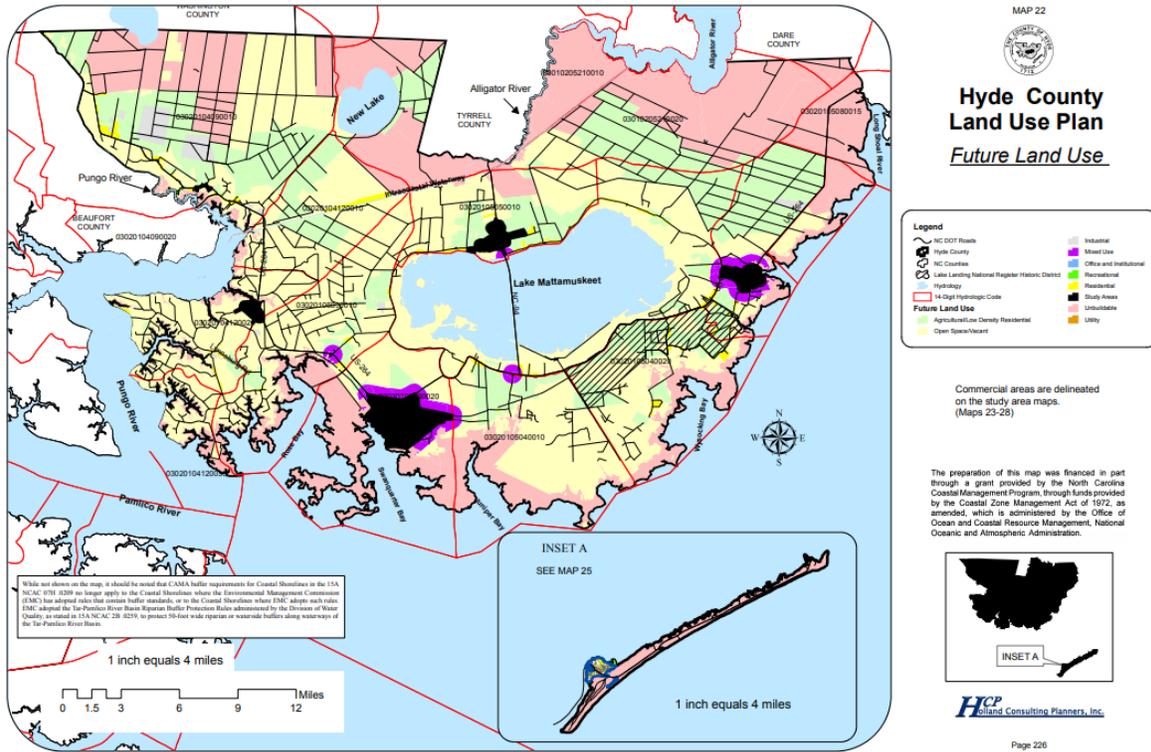


Figure B.3 – Hyde County Future Land Use, Engelhard Study Area

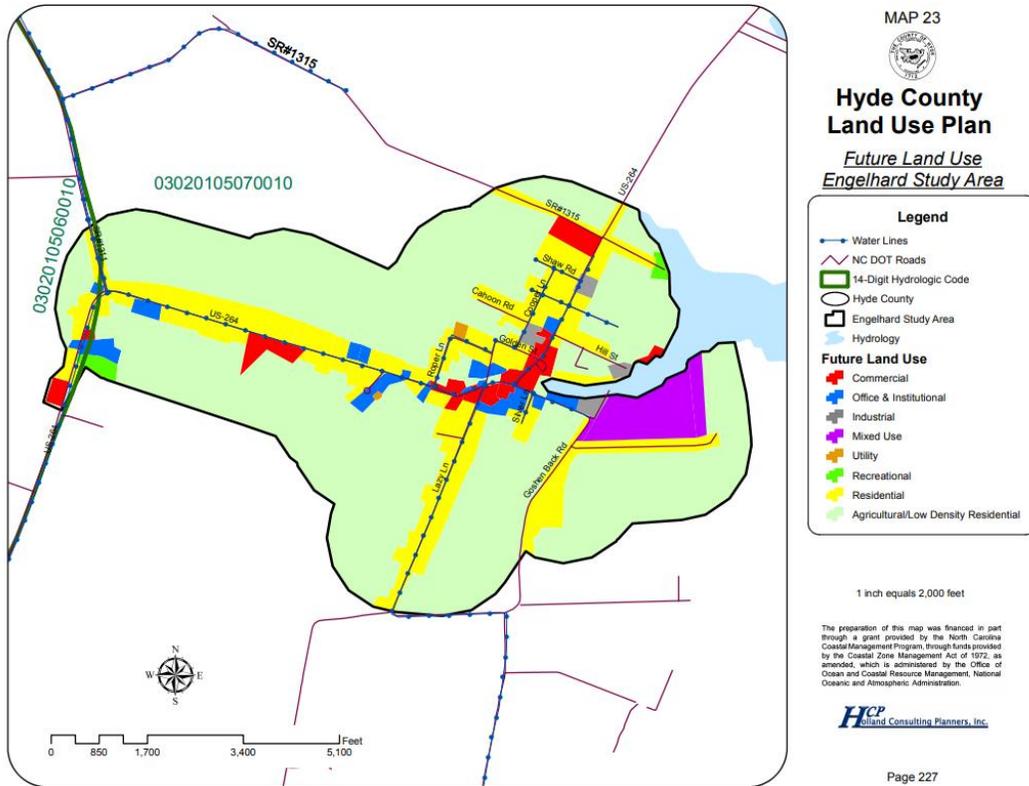


Figure B.4 – Hyde County Future Land Use, Fairfield Study Area

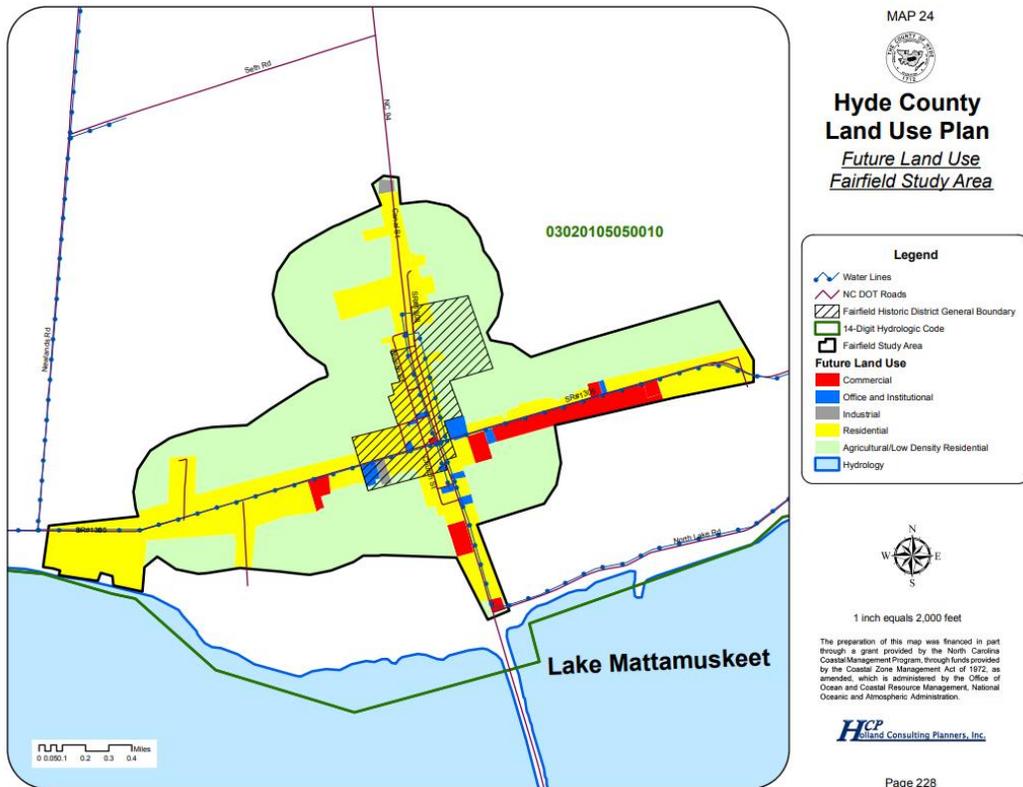


Figure B.5 – Hyde County Future Land Use, Ocracoke Island Study Area

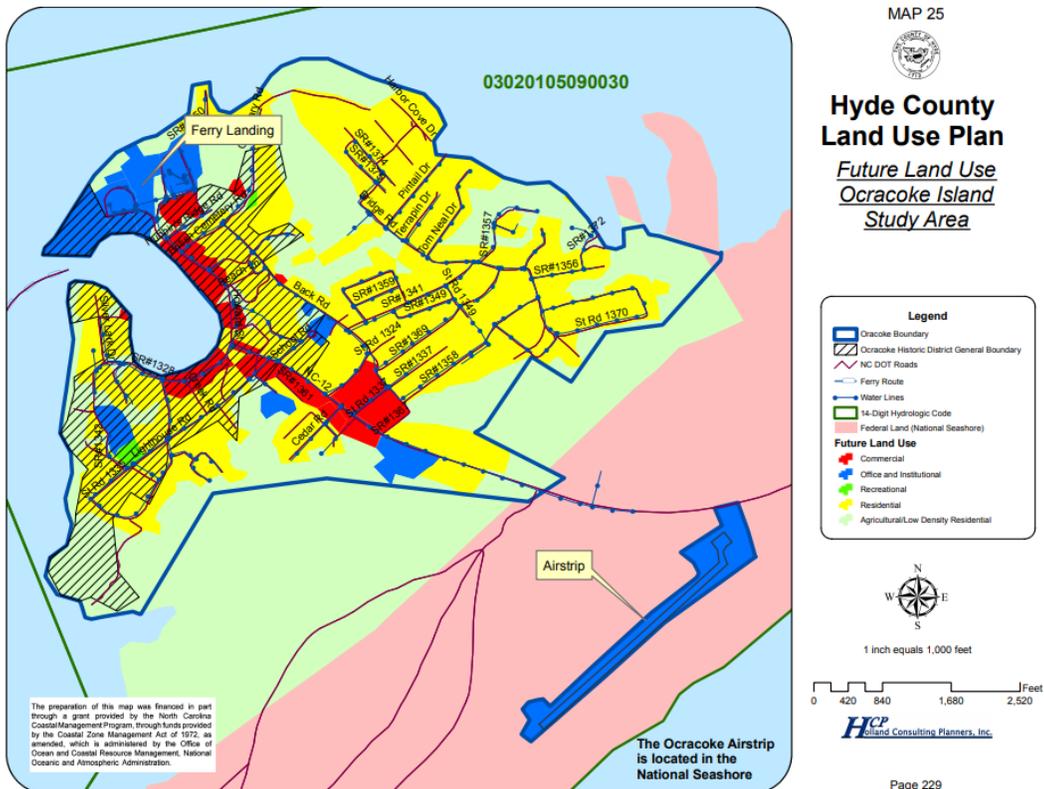
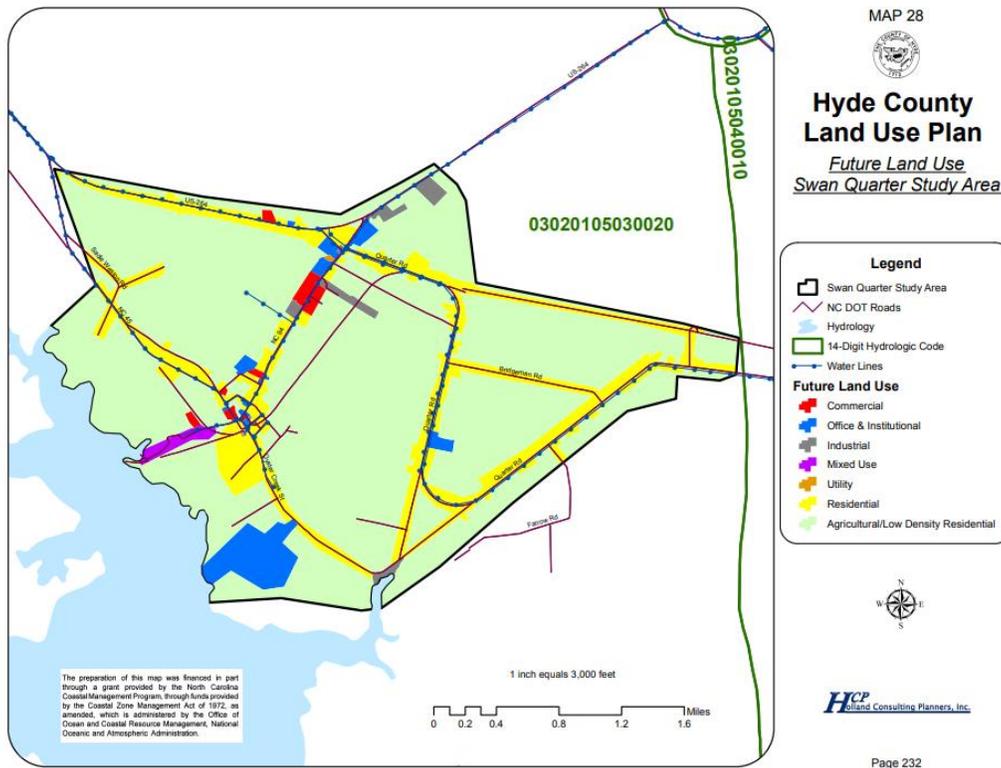


Figure B.6 – Hyde County Future Land Use, Swan Quarter Study Area



Asset Inventory

The following tables summarize the asset inventory for Hyde County unincorporated areas and incorporated jurisdictions in order to estimate the total physical exposure to hazards in this area. The locations of critical facilities are shown in Figure B.7. 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.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 & Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Hyde County	494	4	0	261	1	35	0	52	7	0	0	0	0	41	11	8	3	917

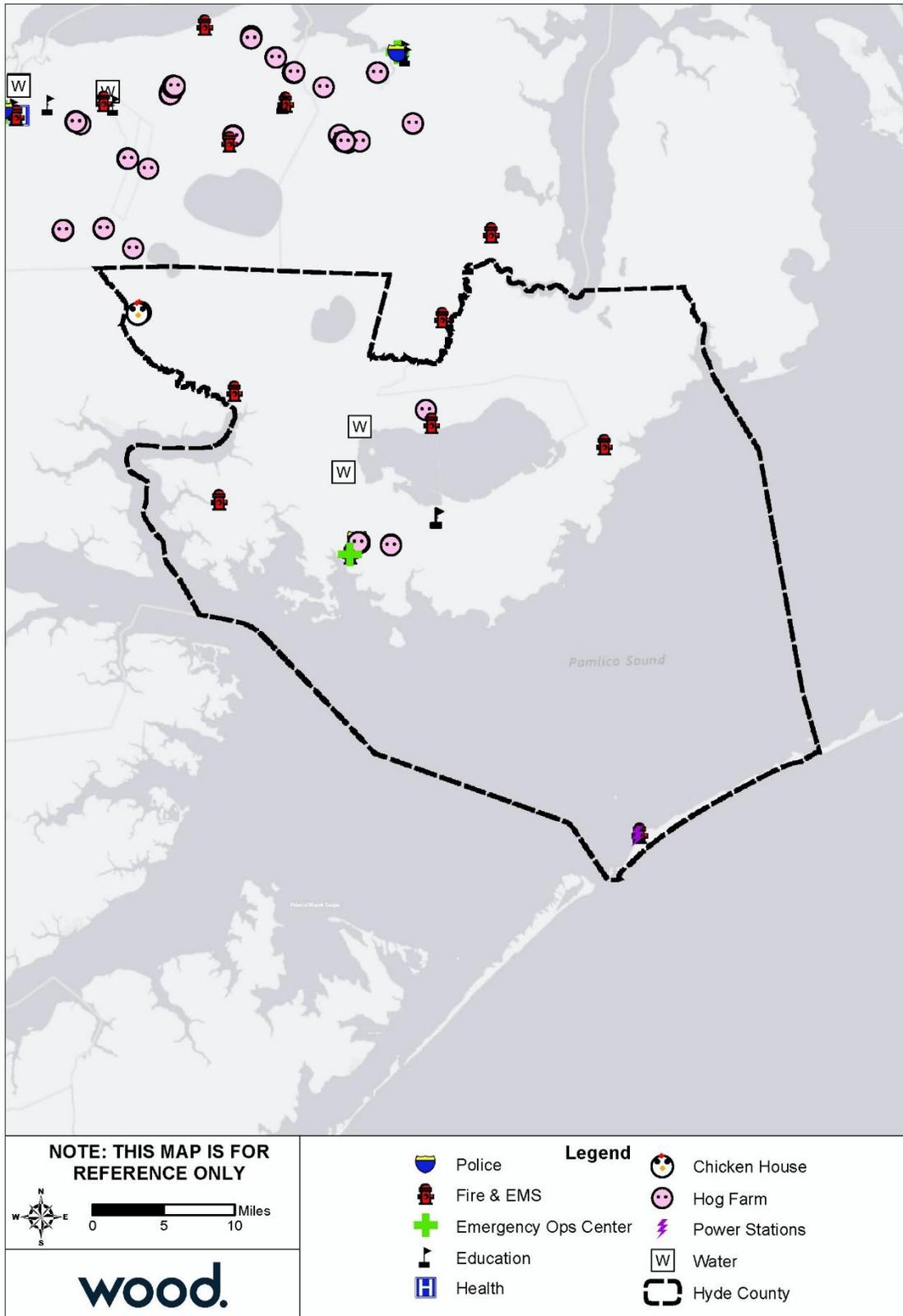
Source: NCEM Risk Management Tool

Table B.4 – High Potential Loss Facilities by Use

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Hyde County	1	3	0	5	3	0	2	14

Source: NCEM Risk Management Tool

Figure B.7 – Critical Facilities, Hyde County



Source: NCEM IRISK Database, GIS Analysis

## ANNEX B: HYDE COUNTY

### Housing

The table below details key housing statistics for Hyde County. As a percent of growth from 2010 housing, Hyde County's housing stock has declined by over 1 percent. Nearly half of all occupied housing units in Hyde County are renter-occupied.

**Table B.5 – Housing Statistics, Hyde County, 2010-2017**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Hyde County	3,347	3,311	-1.1%	55.4%	44.6%

Source: US Census Bureau American Community Survey.

### Economy

The following tables present key economic statistics for Hyde County. Nearly half of the population is not in the labor force, the unemployment rate is 11 percent.

**Table B.6 – Economic Indicators, Hyde County, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Hyde County	50.9%	45.3%	5.6%	49.1%	11.0%

Source: US Census Bureau American Community Survey.

**Table B.7 – Employment by Industry, Hyde County, 2017**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Hyde County	24.2%	14.2%	24.3%	22.0%	15.3%

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 in Hyde County than for the Northeastern NC Region as a whole. Risk and vulnerability findings are also presented here for those hazards that are spatially defined and have variations in risk which were not provided in the regional-level profiles in Section 4 of this plan. The hazards included in this section are flood and wildfire.

### B.2.1 Flood

Table B.8 details the acreage of Hyde County's total area by flood zone on the Effective DFIRM. Per this assessment, nearly 46 percent of Hyde County is within the SFHA.

**Table B.8 – Flood Zone Acreage by Jurisdiction, Hyde County**

Flood Zone	Acreage	Percent of Total (%)
Open Water	406,570.44	45.5%
Zone A	5,360.92	0.6%
Zone AE	374,945.77	41.9%
Zone VE	30,496.22	3.4%
Zone X Shaded	5,317.39	0.6%
Zone X Unshaded	71,216.76	8.0%
<b>Total</b>	<b>893,907.49</b>	<b>--</b>

Source: FEMA Effective DFIRM

## ANNEX B: HYDE COUNTY

Figure B.8 reflects the effective mapped flood hazard zones for all jurisdictions in Hyde County, and Figure B.9 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

Table B.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and event in Hyde County and incorporated jurisdictions. Table B.10 provides building counts and estimated damages for High Potential Loss Structures in the 1%-annual-chance floodplain.

**Table B.9 – Critical Facilities Exposed to Flooding by Event**

Sector	Event	Number of Buildings at Risk	Estimated Damages
Banking and Finance	100 Year	3	\$44,443
Commercial Facilities	100 Year	205	\$4,318,441
Critical Manufacturing	100 Year	27	\$521,119
Emergency Services	100 Year	4	\$98,845
Energy	100 Year	6	\$36,168
Food and Agriculture	100 Year	241	\$2,033,674
	Floodway	1	\$2,948
Government Facilities	100 Year	21	\$486,801
Healthcare and Public Health	100 Year	4	\$163,067
Transportation Systems	100 Year	25	\$845,915
<b>All Categories</b>	<b>100 Year</b>	<b>536</b>	<b>\$8,548,473</b>
	<b>Floodway</b>	<b>1</b>	<b>\$2,948</b>

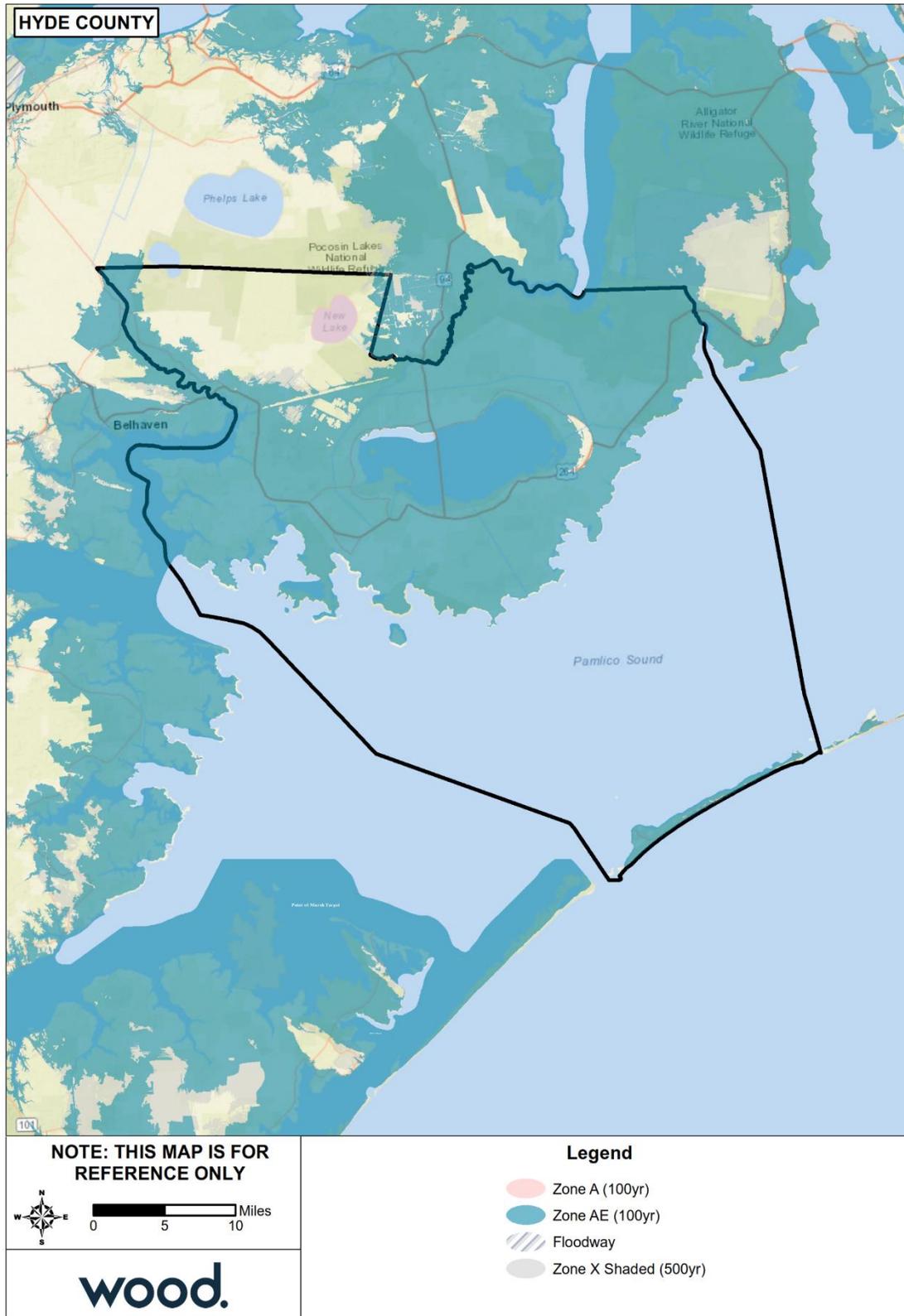
Source: NCEM Risk Management Tool

**Table B.10 – High Potential Loss Properties Exposed to Flooding by Event**

Sector	Event	Number of Buildings at Risk	Estimated Damages
Government	100 Year	1	\$130,316
Residential	100 Year	1	\$24,347
<b>All Categories</b>	<b>100 Year</b>	<b>2</b>	<b>\$154,663</b>

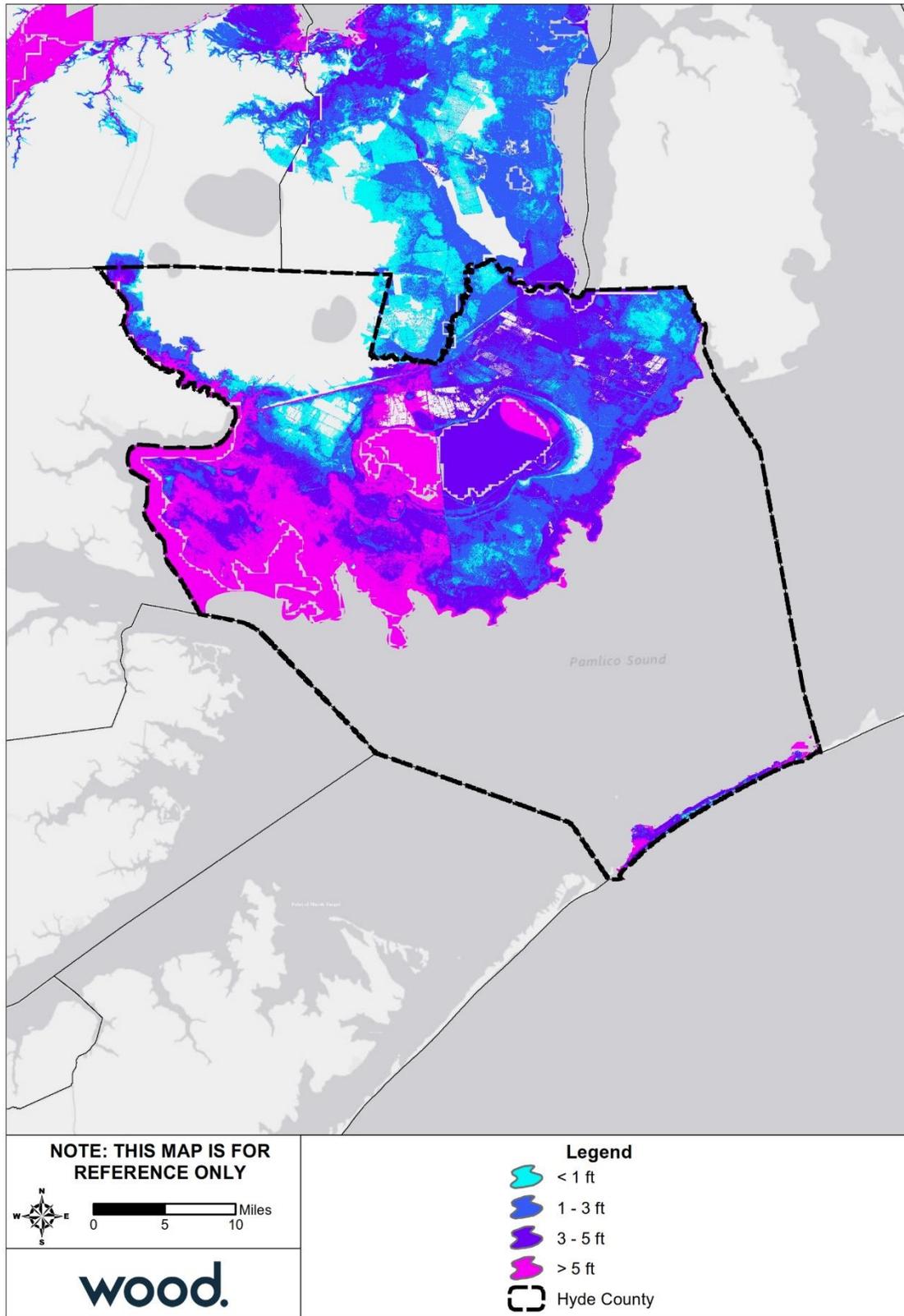
Source: NCEM Risk Management Tool

Figure B.8 – FEMA Flood Hazard Areas, Hyde County



Source: FEMA Effective DFIRM

Figure B.9 – Flood Depth, 1%-Annual-Chance Floodplain, Hyde County



Source: FEMA Effective DFIRM

**B.2.2 Wildfire**

Table B.11 summarizes the acreage in Hyde 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 96 percent of Hyde County is not included in the WUI.

**Table B.11 – Wildland Urban Interface Acreage, Hyde County**

Housing Density	Total Acreage	Percent of Total Acreage
<i>Not in WUI</i>	834,164.3	95.7%
LT 1hs/40ac	16,733.4	1.9%
1hs/40ac to 1hs/20ac	7,183.3	0.8%
1hs/20ac to 1hs/10ac	5,624.0	0.6%
1hs/10ac to 1hs/5ac	4,334.7	0.5%
1hs/5ac to 1hs/2ac	2,493.2	0.3%
1hs/2ac to 3hs/1ac	732.4	0.1%
GT 3hs/1ac	62.0	0.0%
<b>Total</b>	<b>871,327.4</b>	

Source: Southern Wildfire Risk Assessment

Figure B.10 depicts the WUI for Hyde County. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure B.11 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure B.12 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Potential fire intensity is high across much of Hyde County, especially along the Pamlico Sound and the county boundaries with Dare, Tyrrell, and Washington Counties. Burn probability is also moderate to high in these areas. However, WUI areas are very limited in Hyde County, and in general they correspond with lower fire intensity and burn probability. Therefore, exposure of buildings and people to severe wildfire impacts is minimal.

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 Hyde County and participating jurisdictions. 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, Hyde County**

Sector	Number of Buildings at Risk	Estimated Damages
Banking and Finance	2	\$804,004
Commercial Facilities	117	\$26,755,314
Critical Manufacturing	19	\$1,849,737
Emergency Services	5	\$1,450,342
Energy	3	\$588,329
Food and Agriculture	178	\$23,710,051
Government Facilities	14	\$5,994,480
Healthcare and Public Health	3	\$801,774
Transportation Systems	17	\$2,887,067
<b>All Categories</b>	<b>358</b>	<b>\$64,841,098</b>

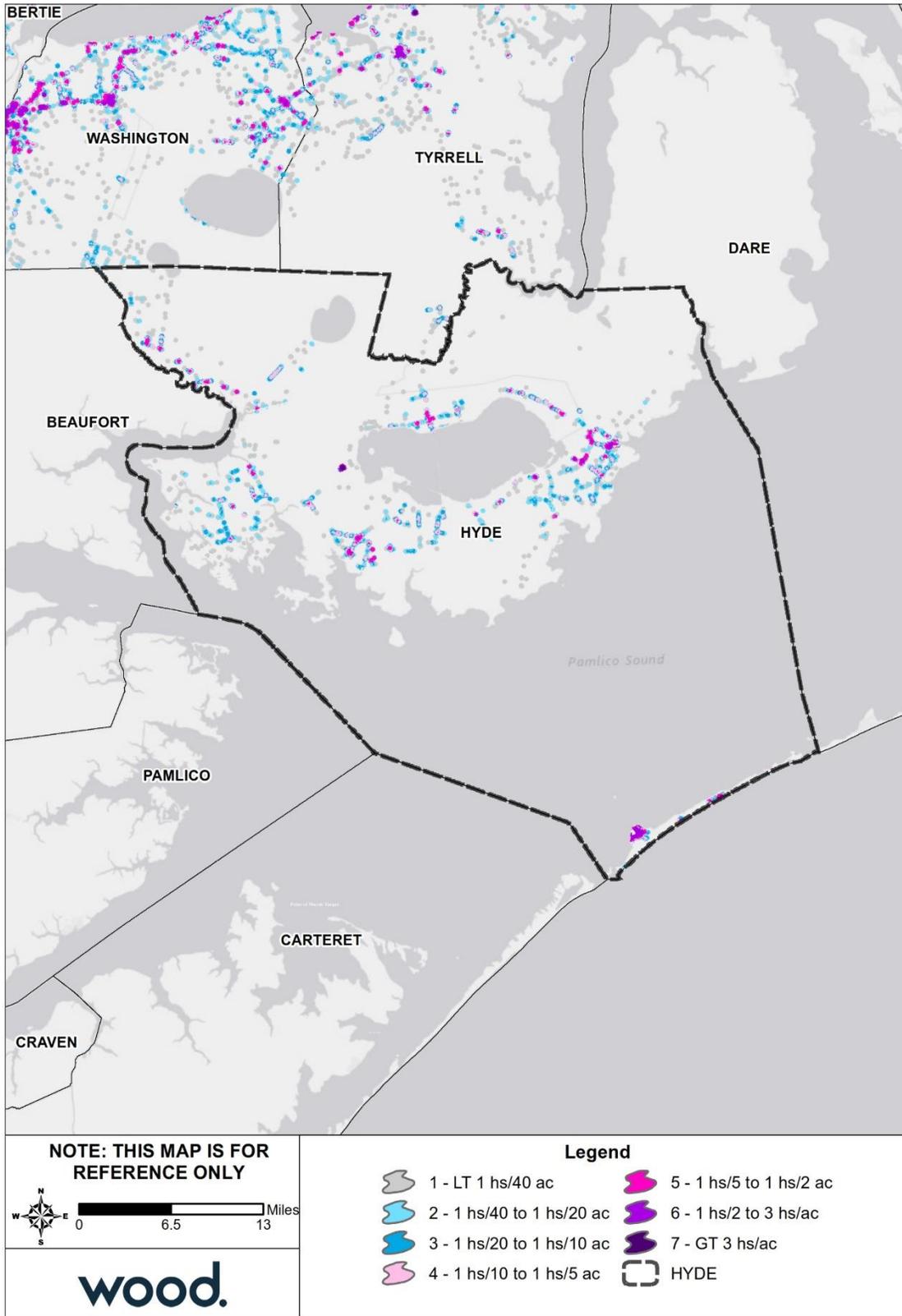
Source: NCEM Risk Management Tool

**Table B.13 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Hyde County**

Category	Number of Buildings at Risk	Estimated Damages
Residential	1	\$1,082,775
<b>All Categories</b>	<b>1</b>	<b>\$1,082,775</b>

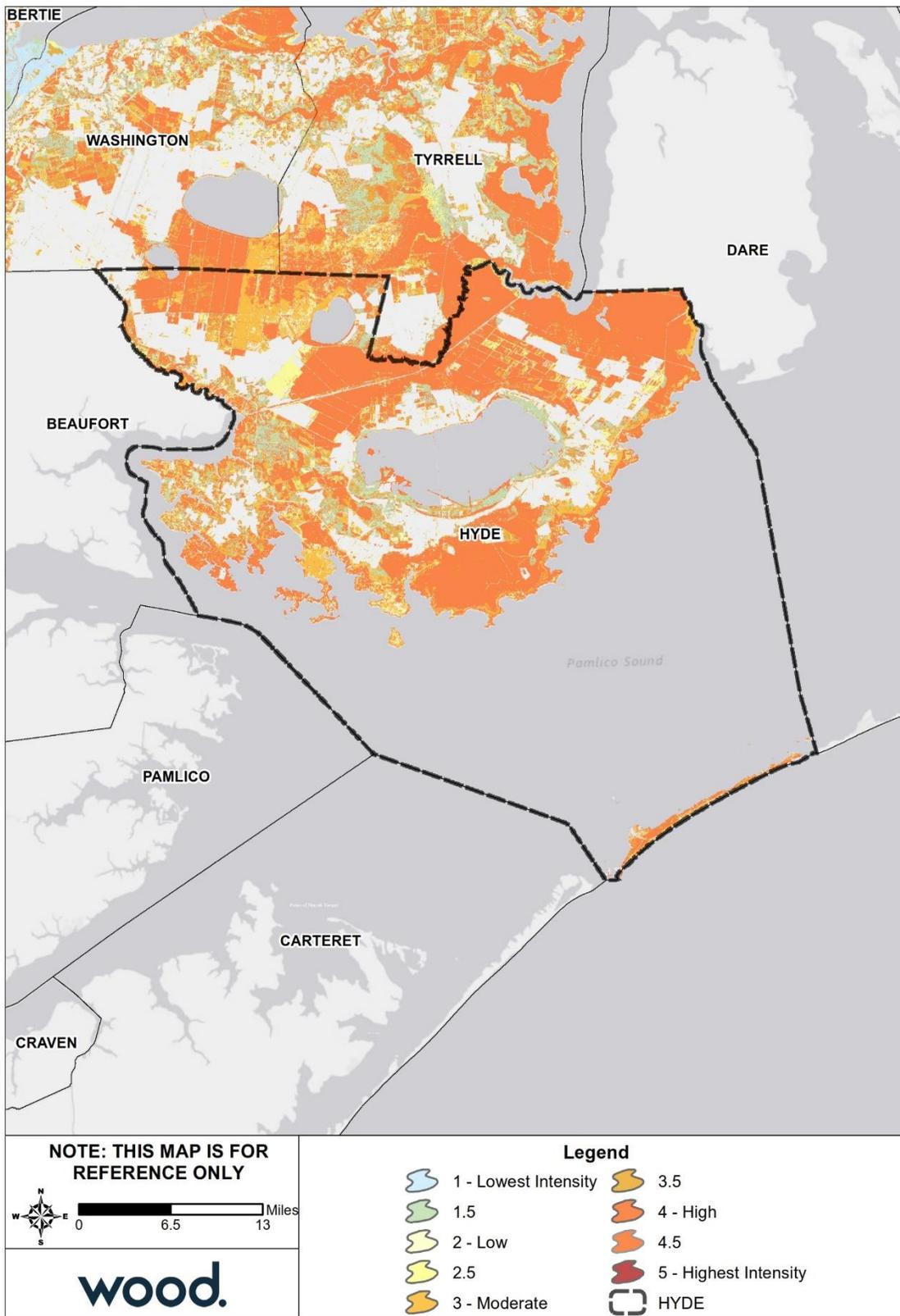
Source: NCEM Risk Management Tool

Figure B.10 – Wildland Urban Interface, Hyde County



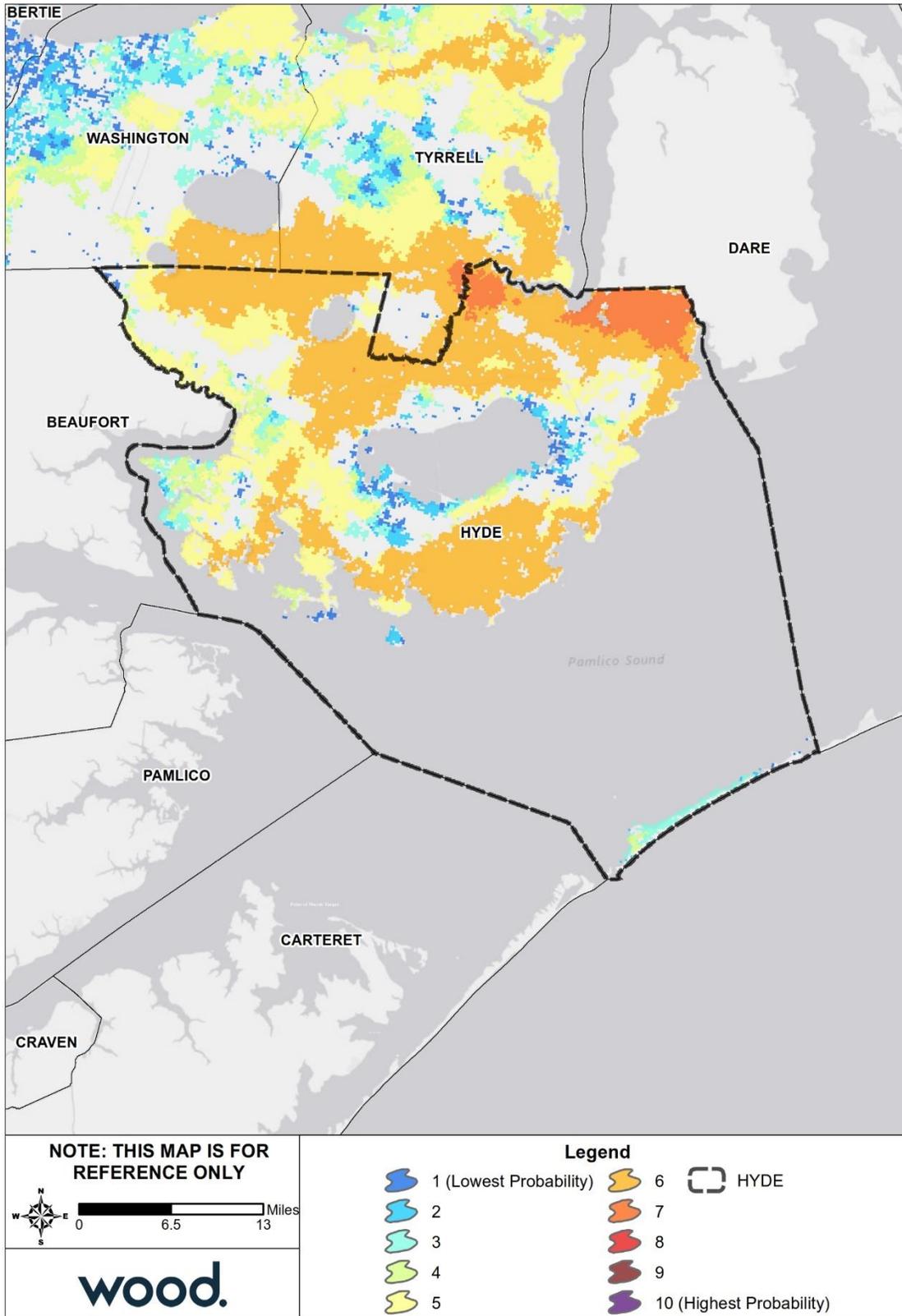
Source: Southern Wildfire Risk Assessment

Figure B.11 – Fire Intensity Scale, Hyde County



Source: Southern Wildfire Risk Assessment

Figure B.12 – Burn Probability, Hyde 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 Hyde 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, Hyde County has an overall capability rating of Moderate, however the County self-assessed its overall capability as High. The County’s Self-Assessment of key capability areas is summarized in Table B.14 below.

**Table B.14 – Capability Self-Assessment, Hyde 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**

Hyde County entered the NFIP on February 4, 1987. The following tables reflect NFIP entry dates as well as policy and claims data for Hyde County and incorporated areas categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table B.15 – NFIP Policy and Claims Data by Structure Type, Hyde County**

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Single Family	1,031	\$777,950	\$185,283,200	959	\$13,711,189.52
2-4 Family	29	\$27,218	\$5,592,300	7	\$227,006.14
All Other Residential	54	\$34,037	\$13,133,400	4	\$40,701.88
Non-Residential	155	\$456,384	\$47,726,900	170	\$5,280,336.48
<b>Total</b>	<b>1,269</b>	<b>\$1,295,589</b>	<b>\$251,735,800</b>	<b>1,140</b>	<b>\$19,259,234.02</b>

Source: FEMA Community Information System, accessed February 2020

**Table B.16 – NFIP Policy and Claims Data by Flood Zone, Hyde County**

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	1,244	\$1,281,248	\$248,964,900	1,049	\$18,221,463.82
A Zones	1	\$921	\$80,000	37	\$360,650.23
V01-30 & VE Zones	0	\$0	\$0	6	\$57,377.11
B, C & X Zone					
Standard	3	\$1,979	\$168,700	9	\$360,460.61
Preferred	5	\$1,841	\$1,545,000	0	\$0.00
<b>Total</b>	<b>1,253</b>	<b>\$1,285,989</b>	<b>\$250,758,600</b>	<b>1,101</b>	<b>\$18,999,951.77</b>

Source: FEMA Community Information System, accessed February 2020

Table B.17 – NFIP Policy and Claims Data Pre-FIRM, Hyde County

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	578	\$818,518	\$100,523,800	832	\$15,496,081.56
A Zones	1	\$921	\$80,000	37	\$360,650.23
V01-30 & VE Zones	0	\$0	\$0	6	\$57,377.11
B, C & X Zone	3	\$885	\$122,000	4	\$195,795.81
Standard	2	\$651	\$52,000	4	\$195,795.81
Preferred	1	\$234	\$70,000	0	\$0.00
<b>Total</b>	<b>582</b>	<b>\$820,324</b>	<b>\$100,725,800</b>	<b>879</b>	<b>\$16,109,904.71</b>

Source: FEMA Community Information System, accessed February 2020

Table B.18 – NFIP Policy and Claims Data Post-FIRM, Hyde County

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	666	\$462,730	\$148,441,100	215	\$2,716,739.48
B, C & X Zone	5	\$2,935	\$1,591,700	5	\$164,664.80
Standard	1	\$1,328	\$116,700	5	\$164,664.80
Preferred	4	\$1,607	\$1,475,000	0	\$0.00
<b>Total</b>	<b>671</b>	<b>\$465,665</b>	<b>\$150,032,800</b>	<b>220</b>	<b>\$2,881,404.28</b>

Source: FEMA Community Information System, accessed February 2020

**B.4 MITIGATION STRATEGY**

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
H1	Consider revising the county's Flood Damage Prevention Ordinance to increase the current established two foot freeboard requirement regarding base flood elevation for new structures developed within the Flood Hazard Area. This effort will also address any necessary updates required by the National Flood Insurance Program (NFIP).	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.2	PP	<ul style="list-style-type: none"> <li>Hyde County Administration</li> <li>Hyde County Board of Commissioners</li> </ul>	Staff Time	General Fund	3 to 5 years	In Progress – Carry Forward	Hyde County will continue to monitor the County's needs regarding required finished floor elevation. As flooding events occur, the County will assess current standards and adjust as necessary.
H2	Promote the availability of flood insurance available through the National Flood Insurance Program (NFIP) using the following means: <ul style="list-style-type: none"> <li>Post on county website</li> <li>Provide information on building permit applications</li> <li>Make available at county library</li> </ul>	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County continues to promote the availability of federally subsidized flood insurance available to all County residents. Particular attention is given to those citizens that are not located within the defined special flood hazard area but are still potentially subject to flood damage.
H3	Continue to maintain, operate, and carry out all activities outlined within the Swan Quarter Watershed Project Operation and Maintenance Checklist. This effort includes ensuring functionality of the Swan Quarter Dike.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.3	PP	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County continues to monitor the status of the Swan Quarter flood control system and associated maintenance protocols. This will continue through implementation of this plan.
H4	Continue to maintain and map GIS-based data related to floodplain management and mitigation. These efforts will involve maintaining the most recent Flood Insurance Rate Maps (FIRMS), as well as GIS locations for each property either acquired or mitigated under through current and past Mitigation Grant Projects.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	4.2	PIO	Hyde County Administration	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	Hyde County will develop a GIS database, to work in concert with the information provided in this plan, to be utilized for guidance regarding development policy and regulation.
H5	Make a variety of materials related to flood insurance, flood protection, floodplain management, increased cost of compliance coverage, information on floodplains, and listings of qualified contractors familiar with floodproofing and elevation techniques, available through various methods including: <ul style="list-style-type: none"> <li>Placing materials in the county library</li> <li>Disseminating information to local contractors</li> </ul>	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	The Hyde County Building Inspections Department continues to maintain materials associated with floodplain protection that are available to County residents.
H6	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLP) from future flooding events. The county will continue maintaining a list of RLPs, and on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The priority will be for the elevation of structures.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	SP	Hyde County Administration	Staff Time	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Hyde County continues to utilize funding to address the treatment of repetitive loss properties through both annual funding cycles, as well as through post disaster funding.
H7	Review the vulnerability of all critical facilities identified in this plan as a component of annual county Emergency Operations Plan updates. This effort will involve an assessment of whether facilities are readily accessible before, during, or after a natural hazard event has transpired. The county will also consider all information and data outlined in this plan when making determinations on the location of all future critical facilities.	Hyde County	All Hazards	Medium	4.1	ES	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Hyde County Administration</li> </ul>	Staff Time	General Fund	1 to 3 years	Ongoing – Carry Forward	Hyde County reviews the effectiveness and security of County shelter facilities on an annual basis through the County's annual review of its Emergency Operations Plan, as well as the annual tabletop exercise.

ANNEX B: HYDE 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
H8	Continue to participate in and support the Disaster Assistance Working Group (DAWG). This effort includes maintaining a mutual aid agreement with DAWG, which makes all available Hyde County resources available to participating counties in the event of a disaster. Coordination of all county resources in concert with DAWG will be handled through the group's E-Plan web based portal. All resources are updated as a component of the NC State Resource Management System.	Hyde County	All Hazards	High	3.2	ES	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Disaster Assistance Working Group</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County continues to support the efforts of the Disaster Assistance Working Group and the group's efforts to further emergency service effectiveness throughout the region.
H9	Continue to support the efforts of Tideland Electric and NCDOT in maintaining the county's right-of-way and utility easements. This effort involves the trimming and pruning of trees that pose an imminent threat to the county's limited infrastructure system. Maintaining clear access into and out of the county, as well as protection of the county's electrical and communications networks, is critical to effective response during natural hazard events.	Hyde County	Flood, Hurricane & Tropical Storm, Severe Winter Storm, Earthquake, Wildfire, Dam & Levee Failure, Severe Weather, Tornado	High	1.1	P	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Electric Service Providers</li> </ul>	Staff Time	General Fund, Electric Service Providers	2020-2025	In Progress – Carry Forward	Hyde County continues to work closely with all utility providers to ensure that right of ways and utility easements are properly maintained in an effort to minimize damage associated with natural hazard events.
H10	Maintain an informational booth at both the Engelhard Seafood Festival and the Ocracoke Festival in an effort to inform and educate citizens about county efforts to increase public safety and mitigate private property losses.	Hyde County	All Hazards	High	4.2	PIO	<ul style="list-style-type: none"> <li>Hyde County Emergency Services</li> <li>Hyde County Administration</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	Hyde County continues to utilize these two events for the dissemination of information associated with emergency services. This effort may be impacted on Ocracoke due to the effects of Hurricane Dorian on the community.
H11	Continue to work closely with NCDPS, NCDOT, the American Red Cross, and DAWG in addressing emergency evacuation and sheltering needs throughout the county. Due to limited resources and high vulnerability, Hyde County must often rely on resources available throughout the region. This effort is bolstered by the regional coordination efforts available through DAWG.	Hyde County	All Hazards	High	4.1	ES	Hyde County Emergency Services	Staff Time	General Fund, American Red Cross	2020-2025	In Progress – Carry Forward	Hyde County continues to work closely with the American Red Cross to address the issue of shelter openings and evacuation. These two processes must be closely coordinated.
H12	Continue to participate in the Community Rating System (CRS) made available through the NFIP Program. This effort will involve continuing to provide detailed information regarding properties located within flood hazard areas as outlined under CRS Manual Section 322.a through 322.g.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PP	Hyde County Administration	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Hyde County will continue to maintain its current Community Rating System Program. The County's current rating will be reviewed and improved when feasible through the County's required five-year audit.
H13	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.	Hyde County	All Hazards	Medium	1.1	ES	Hyde County Emergency Services	To Be Determined	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Hyde County will continue to look for opportunities to establish permanent pad mount generators in an effort to ensure a redundant power supply at shelter facilities.
H14	Develop a Comprehensive Water Management Plan to monitor the County's water supply and impose water restriction measures as deemed necessary during extreme drought conditions.	Hyde County	Drought, Extreme Heat	High	1.1	NRP	<ul style="list-style-type: none"> <li>Hyde County Soil &amp; Water</li> <li>Hyde County Administration</li> </ul>	Staff Time	General Fund	2020-2025	New	N/A

**ANNEX B: HYDE 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
H15	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"> <li>• Upgrade Fairfield Drainage District #17</li> <li>• Improve Mattamuskeet Association Flood Protection System</li> <li>• Install water pumps for two drainage ditches</li> <li>• Enlarge/replace culverts in Swan Quarter</li> <li>• Install water pump on Landing Road</li> <li>• Contract for large scale stream snagging/clearing</li> </ul>	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	Hyde County Administration	To Be Determined	General Fund, NCDPS	5 years	New	N/A
H16	Work to implement all recommendations outlined within the Hurricane Matthew Resilient Redevelopment Plan.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	P	Hyde County Administration	To Be Determined	General Fund, NCDPS, NCDOT, NCDEQ	5 years	New	N/A
H17	Hyde County will continue to work diligently on efforts to address the recovery of the Village of Ocracoke from the impacts of Hurricane Dorian. The County will exhaust all resources available to carry this effort out.	Hyde County	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	Hyde County Administration	To Be Determined	General Fund, NCDPS, NCDOT, NCDEQ	5 years	New	N/A

## Annex C Martin County

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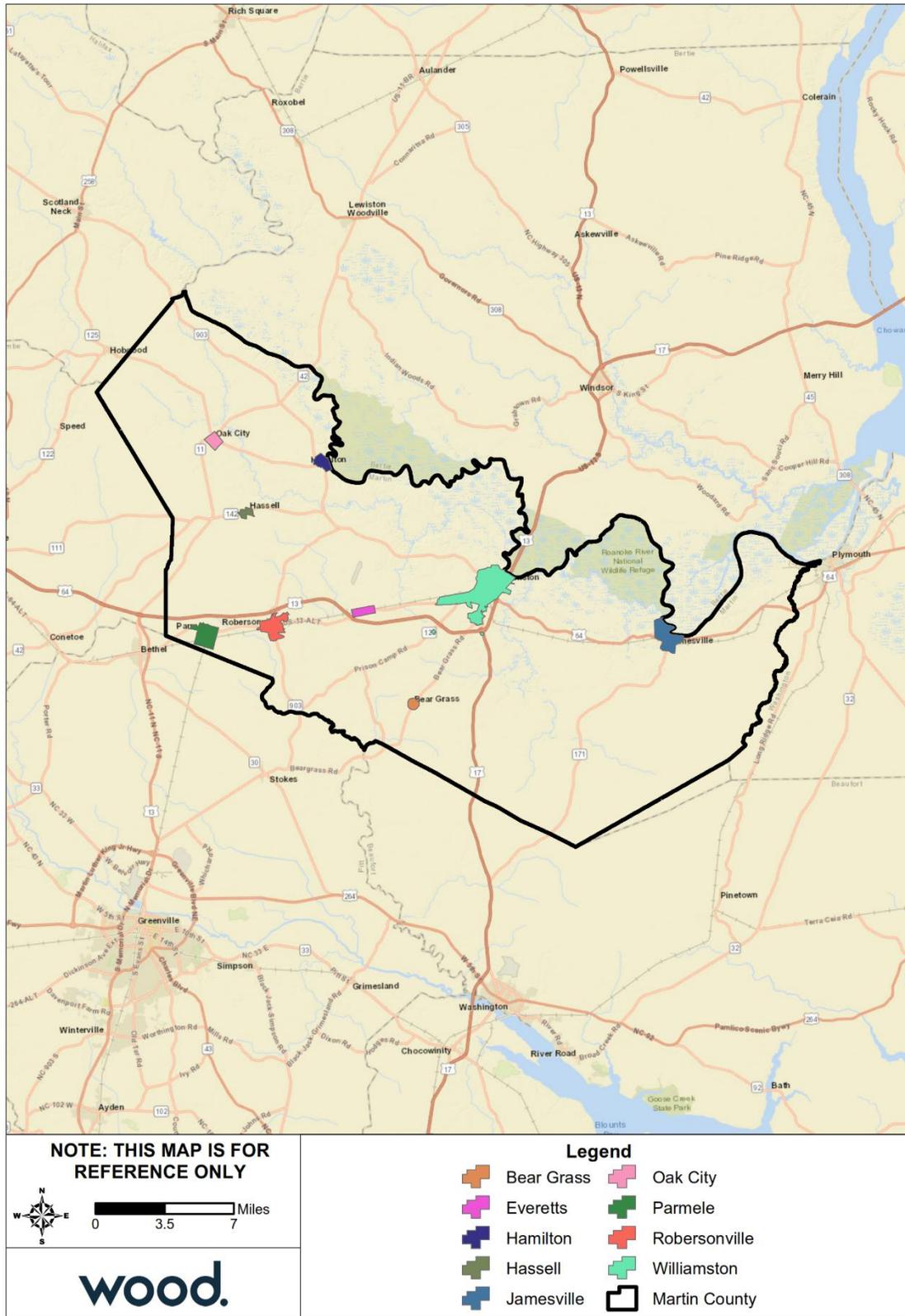
### C.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Martin County, including information on population, asset exposure, housing, and economy.

#### Geography

Figure C.1 shows a base map of Martin County and participating jurisdictions.

Figure C.1 – Jurisdictional Locations, Martin County



## ANNEX C: MARTIN COUNTY

### Population and Demographics

Table C.1 provides population counts and growth estimates for Martin County and participating jurisdictions as compared to the Region overall. The communities of Bear Grass, Hassell, Jamesville, and Parmele experienced small population increases, but the County overall experienced a population decrease at a rate similar to the Region. Table C.2 provides demographic information for the County. The populations of Everetts, Hamilton, Oak City, Parmele, Robersonville, and Williamston are primarily minority.

**Table C.1 – Population Counts, Martin County, 2000-2017**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Bear Grass	53	73	129	37.7%	76.7%	143.4%
Everetts	179	164	155	-8.4%	-5.5%	-13.4%
Hamilton	516	408	409	-20.9%	0.2%	-20.7%
Hassell	72	84	77	16.7%	-8.3%	6.9%
Jamesville	502	491	566	-2.2%	15.3%	12.7%
Oak City	339	317	292	-6.5%	7.9%	-13.8%
Parmele	290	278	321	-4.1%	15.5%	10.7%
Robersonville	1,731	1,488	1,588	-14.0%	6.7%	-8.3%
Williamston	5,843	5,511	5,398	-5.7%	-2.1%	-7.6%
<b>Municipalities</b>	<b>9,525</b>	<b>8,814</b>	<b>8,935</b>	<b>-7.5%</b>	<b>1.4%</b>	<b>-6.2%</b>
Unincorporated Areas	16,068	15,691	14,292	-2.3%	-8.9%	-11.1%
<b>Martin County</b>	<b>25,593</b>	<b>24,505</b>	<b>23,227</b>	<b>-4.3%</b>	<b>-5.2%</b>	<b>-9.2%</b>
<b>Region Total</b>	<b>69,064</b>	<b>69,232</b>	<b>65,068</b>	<b>0.2%</b>	<b>-6.0%</b>	<b>-5.8%</b>

Source: US Census Bureau American Community Survey.

**Table C.2 – Racial Demographics, Martin County, 2017**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Bear Grass	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Everetts	44.5%	55.5%	0.0%	0.0%	0.0%	0.0%
Hamilton	41.8%	51.8%	0.0%	0.0%	6.4%	7.3%
Hassell	64.0%	36.0%	0.0%	0.0%	0.0%	0.0%
Jamesville	60.1%	35.7%	0.0%	1.9%	2.3%	17.3%
Oak City	39.0%	61.0%	0.0%	0.0%	0.0%	3.4%
Parmele	10.6%	89.4%	0.0%	0.0%	0.0%	0.0%
Robersonville	28.2%	65.9%	0.0%	4.3%	1.6%	6.9%
Williamston	36.4%	57.3%	4.0%	1.0%	1.3%	2.2%
<b>Martin County</b>	<b>54.4%</b>	<b>41.9%</b>	<b>1.2%</b>	<b>1.3%</b>	<b>1.2%</b>	<b>3.7%</b>

\*Other races include 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.

### Asset Inventory

The following tables summarize the asset inventory for Martin 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 C.2. Critical facilities are a subset of identified assets from the Critical

## ANNEX C: MARTIN COUNTY

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 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
Martin County	2,600	1	0	388	0	255	0	49	12	0	0	0	0	80	0	0	7	3,392
Town of Bear Grass	1	0	0	2	0	0	0	12	0	0	0	0	0	3	0	0	0	18
Town of Everetts	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Town of Hamilton	0	1	0	31	0	2	0	9	1	0	0	0	0	3	0	0	1	48
Town of Hassell	6	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	11
Town of Jamesville	2	1	0	26	0	8	0	17	1	0	0	0	0	8	0	0	4	67
Town of Oak City	2	0	0	5	0	0	0	1	0	0	0	0	0	3	0	0	0	11
Town of Parmele	5	0	0	11	0	0	0	0	1	0	0	0	0	0	0	0	0	17
Town of Robersonville	5	2	0	57	0	28	0	3	0	0	0	0	0	20	0	0	0	115
Town of Williamston	197	11	0	450	0	115	0	127	54	0	0	0	0	81	1	0	6	1,042
<b>Martin County Total</b>	<b>224</b>	<b>15</b>	<b>0</b>	<b>584</b>	<b>0</b>	<b>153</b>	<b>0</b>	<b>169</b>	<b>61</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>118</b>	<b>1</b>	<b>0</b>	<b>11</b>	<b>1,336</b>

Source: NCEM Risk Management Tool

**Table C.4 – High Potential Loss Facilities by Use**

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Martin County	6	8	3	6	6	1	7	37
Town of Bear Grass	-	-	-	-	-	-	-	-
Town of Everetts	-	-	-	-	-	-	-	-
Town of Hamilton	0	0	0	0	0	0	1	1
Town of Hassell	-	-	-	-	-	-	-	-
Town of Jamesville	0	0	1	3	0	0	4	8
Town of Oak City	-	-	-	-	-	-	-	-
Town of Parmele	-	-	-	-	-	-	-	-
Town of Robersonville	0	0	1	0	0	0	0	1
Town of Williamston	3	20	3	15	1	0	3	45
<b>Martin County Total</b>	<b>9</b>	<b>28</b>	<b>8</b>	<b>24</b>	<b>7</b>	<b>1</b>	<b>15</b>	<b>92</b>

Source: NCEM Risk Management Tool

## ANNEX C: MARTIN COUNTY

### Housing

The table below details key housing statistics for Martin County. As a percent of growth from 2010 housing, Martin County's housing stock has decreased slightly due to decreases in Hassell, Oak City, and unincorporated areas. The majority of occupied housing units are owner-occupied throughout all of Martin County and its incorporated areas.

**Table C.5 – Housing Statistics, Martin County, 2010-2017**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Bear Grass	40	47	17.5%	95.7%	4.3%
Everetts	88	95	8.0%	80.0%	20.0%
Hamilton	224	219	2.2%	78.1%	21.9%
Hassell	40	21	-47.5%	52.4%	47.6%
Jamesville	256	263	2.7%	83.3%	16.7%
Oak City	188	178	-5.3%	73.6%	26.4%
Parmeles	145	157	8.3%	73.2%	26.8%
Robersonville	799	873	9.3%	80.2%	19.8%
Williamston	2,685	2,820	5.0%	79.1%	20.9%
<b>Martin County</b>	<b>11,704</b>	<b>11,610</b>	<b>-0.8%</b>	<b>82.9%</b>	<b>17.1%</b>

Source: US Census Bureau American Community Survey.

### Economy

The following tables present key economic statistics for Martin County. The unemployment rate is over 25 percent in the Towns of Everetts and Hamilton and over 10 percent in the Towns of Jamesville, Parmeles, and Williamston.

**Table C.6 – Economic Indicators, Martin County, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Bear Grass	36.5%	36.5%	0.0%	63.5%	0.0%
Everetts	63.7%	45.2%	18.5%	36.3%	29.1%
Hamilton	35.0%	26.2%	8.8%	65.0%	25.2%
Hassell	52.0%	48.0%	4.0%	48.0%	7.7%
Jamesville	52.9%	43.5%	9.4%	47.1%	17.8%
Oak City	56.1%	51.5%	4.6%	43.9%	8.2%
Parmeles	52.6%	43.7%	8.9%	47.4%	16.9%
Robersonville	49.5%	45.4%	4.1%	50.5%	8.3%
Williamston	55.9%	50.1%	5.8%	44.1%	10.4%
<b>Martin County</b>	<b>54.3%</b>	<b>49.0%</b>	<b>5.2%</b>	<b>45.7%</b>	<b>9.6%</b>

Source: US Census Bureau American Community Survey.

**Table C.7 – Employment by Industry, Martin County, 2017**

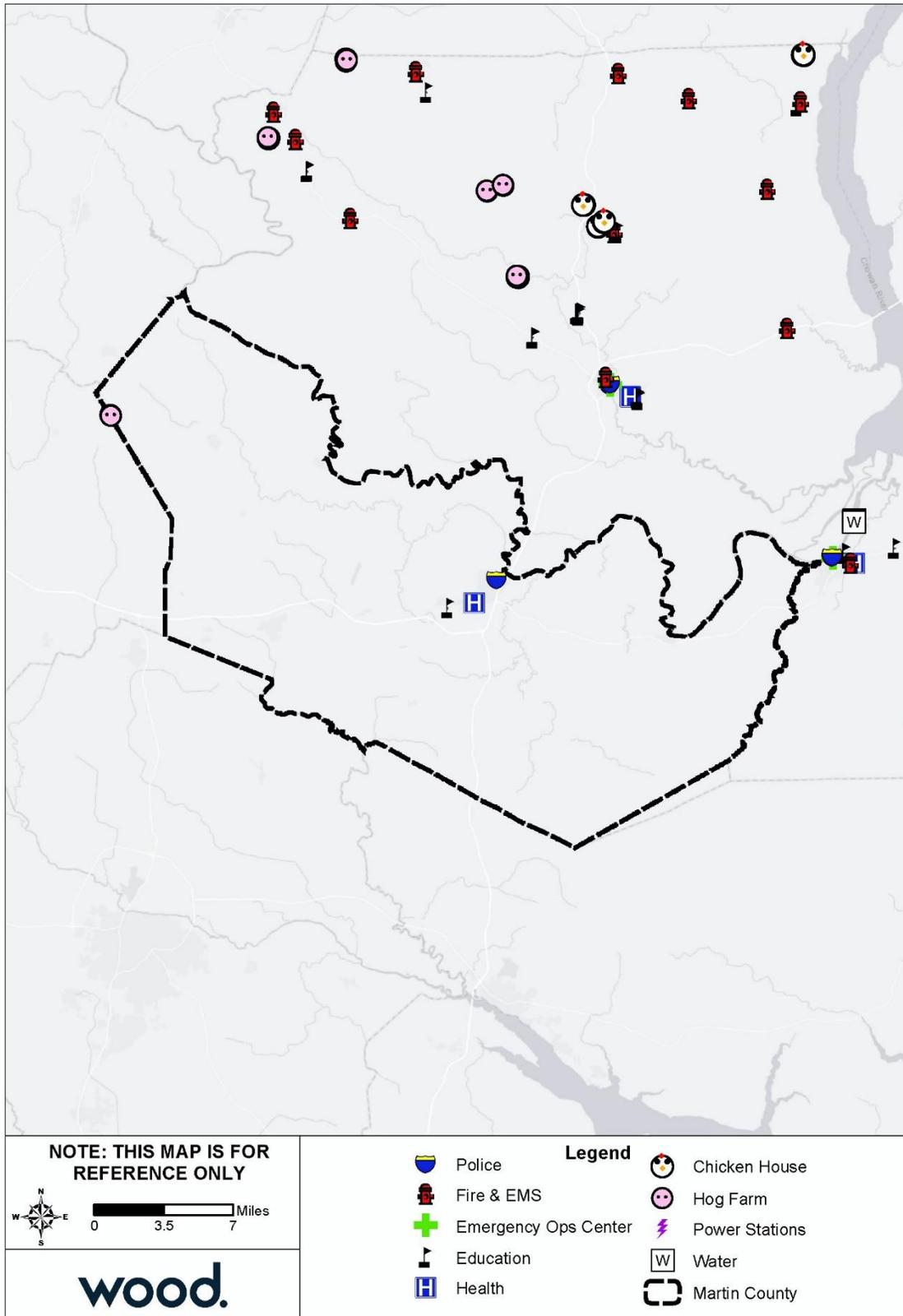
Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Bear Grass	48.4%	16.1%	35.5%	0.0%	0.0%
Everetts	14.3%	33.9%	19.6%	17.9%	14.3%
Hamilton	30.3%	12.4%	23.6%	7.9%	25.8%

## ANNEX C: MARTIN COUNTY

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Hassell	25.0%	8.3%	0.0%	0.0%	66.7%
Jamesville	21.1%	15.1%	22.7%	14.1%	27.0%
Oak City	20.7%	17.0%	17.0%	16.3%	28.9%
Parmele	5.5%	21.1%	26.6%	6.3%	40.6%
Robersonville	17.8%	27.0%	22.8%	5.4%	27.0%
Williamston	30.0%	28.2%	25.3%	1.5%	15.0%
<b>Martin County</b>	<b>28.3%</b>	<b>19.5%</b>	<b>23.7%</b>	<b>10.6%</b>	<b>17.9%</b>

Source: US Census Bureau American Community Survey.

Figure C.2 – Critical Facilities, Martin County



Source: NCEM IRISK Database, GIS Analysis

**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 Martin County than for the Northeastern NC 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 C.8 details the acreage of Martin County’s total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, at 27 percent, the Town of La Grange has the largest portion of its land area within the mapped 1%-annual-chance floodplain. Conversely, the Towns of Bear Grass, Everetts, Hassell, Oak City, Parmele, and Robersonville are entirely outside the SFHA. Overall, 21.7 percent of the county’s total land area falls within this floodplain.

**Table C.8 – Flood Zone Acreage by Jurisdiction, Martin County**

Flood Zone	Acreage	Percent of Total (%)
<b>Bear Grass</b>		
Zone X Unshaded	169.93	100.0%
<b>Total</b>	<b>169.93</b>	--
<b>Everetts</b>		
Zone X Unshaded	289.23	100.0%
<b>Total</b>	<b>289.23</b>	--
<b>Hamilton</b>		
Zone AE	16.70	5.3%
Zone X Unshaded	299.73	94.7%
<b>Total</b>	<b>316.43</b>	--
<b>Hassell</b>		
Zone X Unshaded	175.55	100.0%
<b>Total</b>	<b>175.55</b>	--
<b>Jamesville</b>		
Zone AE	243.46	27.1%
Zone X Shaded	34.14	3.8%
Zone X Unshaded	620.65	69.1%
<b>Total</b>	<b>293.74</b>	--
<b>La Grange</b>		
Zone AE	243.46	27.1%
Zone X Shaded	34.14	3.8%
Zone X Unshaded	620.65	69.1%
<b>Total</b>	<b>898.24</b>	--
<b>Oak City</b>		
Zone X Unshaded	293.74	100.0%
<b>Total</b>	<b>293.74</b>	--
<b>Parmele</b>		
Zone X Unshaded	759.36	100.0%
<b>Total</b>	<b>759.36</b>	--
<b>Robersonville</b>		
Zone X Unshaded	783.83	100.0%
<b>Total</b>	<b>783.83</b>	--

**ANNEX C: MARTIN COUNTY**

Flood Zone	Acreage	Percent of Total (%)
<b>Williamston</b>		
Zone AE	239.88	8.5%
Zone X Shaded	171.95	6.1%
Zone X Unshaded	2,397.47	85.3%
<b>Total</b>	<b>2,809.30</b>	<b>--</b>
<b>Unincorporated Martin County</b>		
Zone AE	62,985.33	22.0%
Zone X Shaded	1,631.17	0.6%
Zone X Unshaded	221,140.21	77.4%
<b>Total</b>	<b>285,756.70</b>	<b>--</b>
<b>Martin County Total</b>		
Zone AE	63,485.36	21.7%
Zone X Shaded	1,837.26	0.6%
Zone X Unshaded	226,929.68	77.6%
<b>Total</b>	<b>292,252.30</b>	<b>--</b>

Source: FEMA Effective DFIRM

Figure C.3 through Figure C.7 reflect the effective mapped flood hazard zones for all jurisdictions that have land in the Special Flood Hazard Area in Martin County, and Figure C.8 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

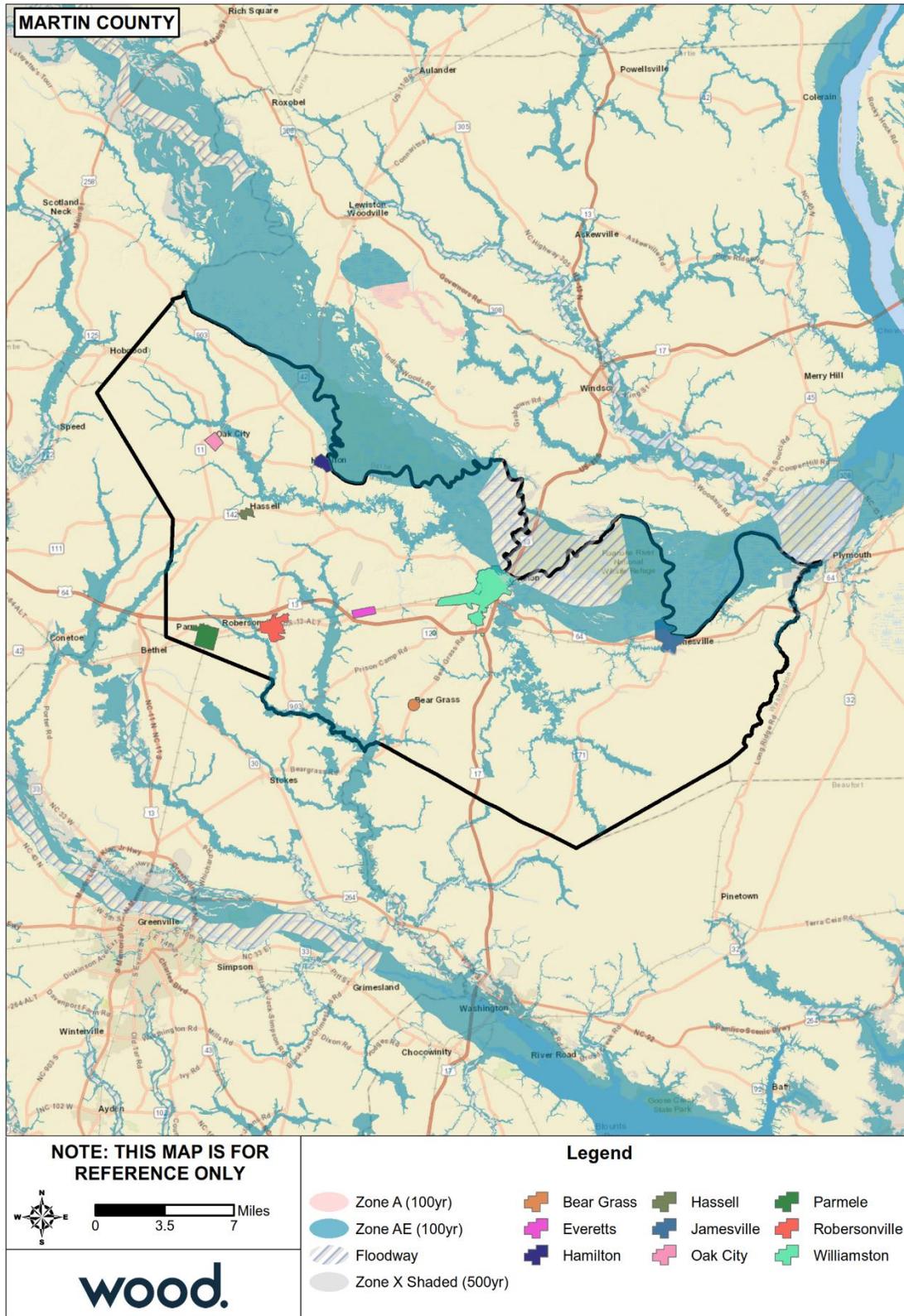
Table C.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector. There are no High Potential Loss Structures in the 1%-annual-chance floodplain.

**Table C.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction**

Sector	Event	Number of Buildings at Risk	Estimated Damages
<b>Martin County Unincorporated Area</b>			
Commercial Facilities	100 Year	1	\$16,804
Food and Agriculture	100 Year	14	\$93,296
<b>All Categories</b>	<b>100 Year</b>	<b>15</b>	<b>\$110,100</b>
<b>Town of Jamesville</b>			
Commercial Facilities	100 Year	2	\$44,017
<b>All Categories</b>	<b>100 Year</b>	<b>2</b>	<b>\$44,017</b>
<b>Town of Williamston</b>			
Commercial Facilities	100 Year	3	\$24,454
Food and Agriculture	100 Year	1	\$2,230
<b>All Categories</b>	<b>100 Year</b>	<b>4</b>	<b>\$26,684</b>

Source: NCEM Risk Management Tool

Figure C.3 – FEMA Flood Hazard Areas, Unincorporated Martin County



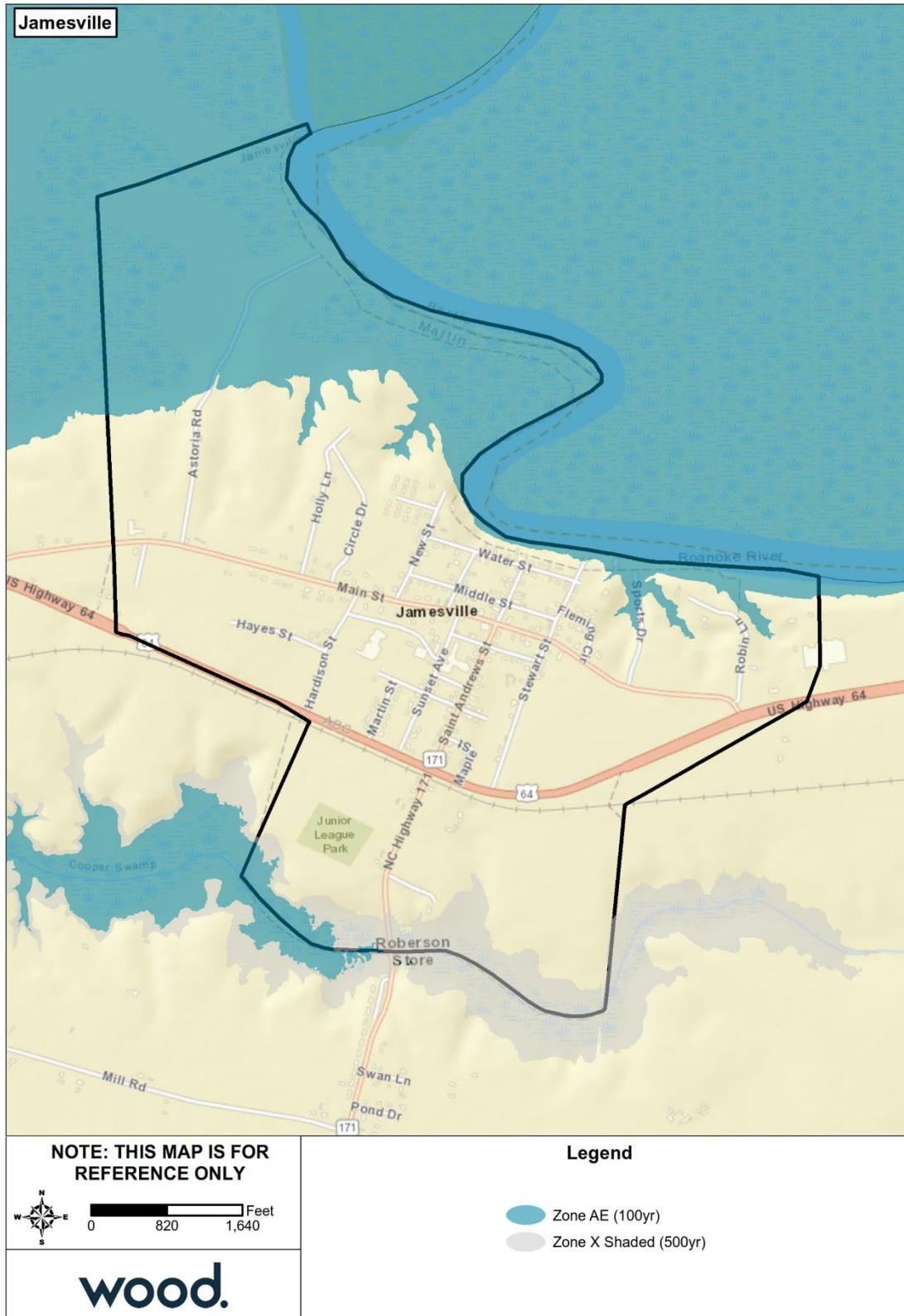
Source: FEMA Effective DFIRM

Figure C.4 – FEMA Flood Hazard Areas, Town of Hamilton



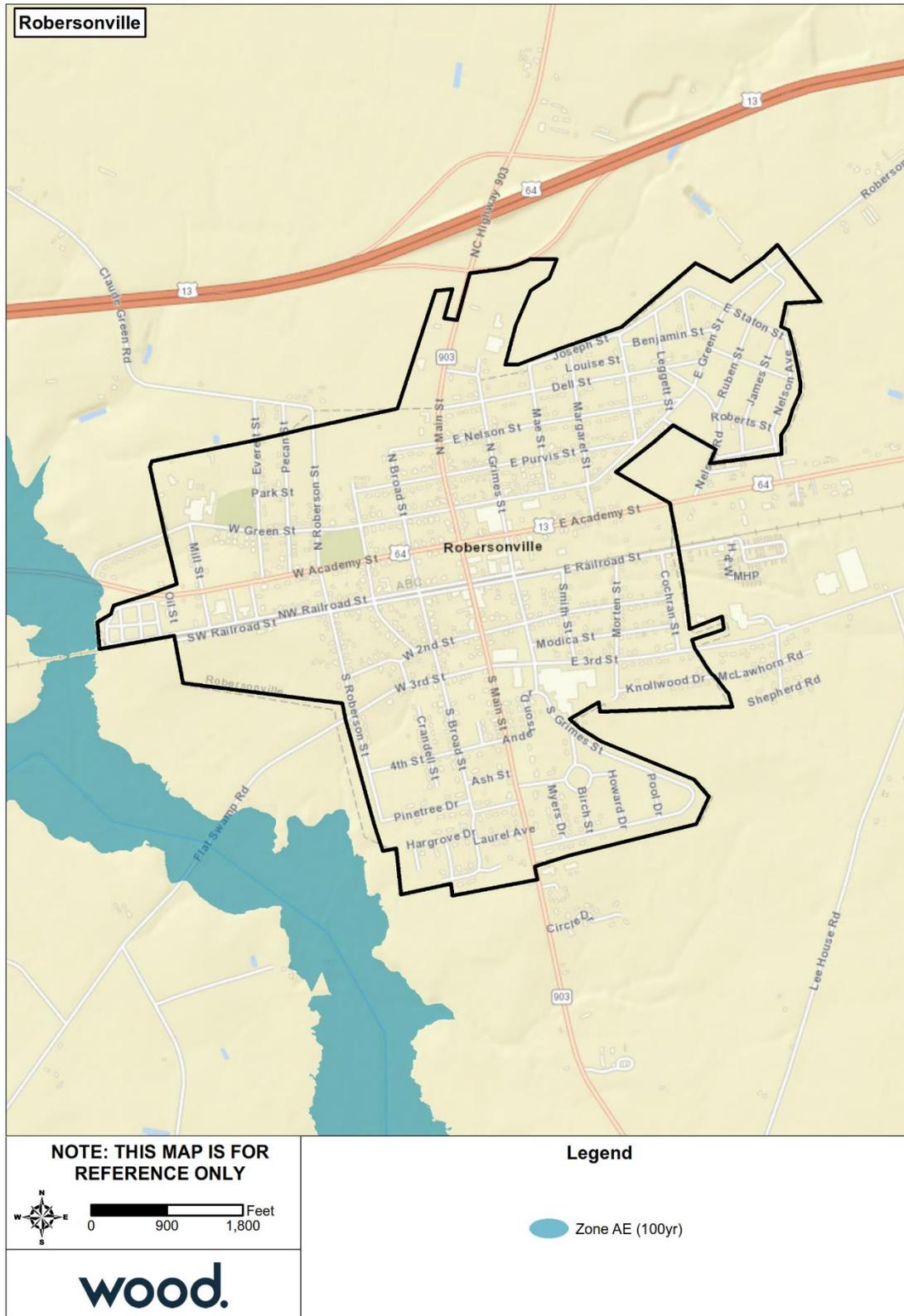
Source: FEMA Effective DFIRM

Figure C.5 – FEMA Flood Hazard Areas, Town of Jamesville



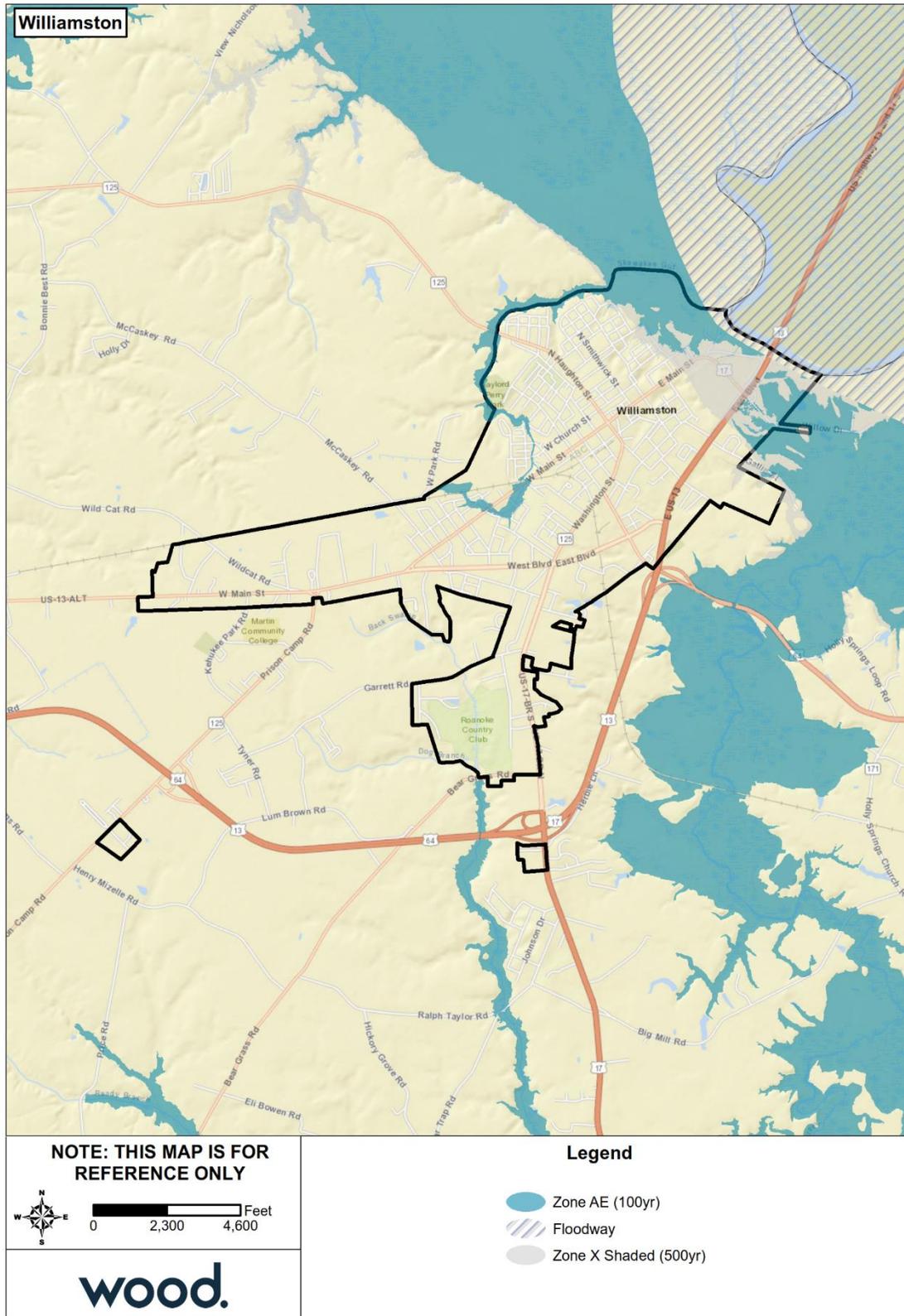
Source: FEMA Effective DFIRM

Figure C.6 – FEMA Flood Hazard Areas, Town of Robersonville



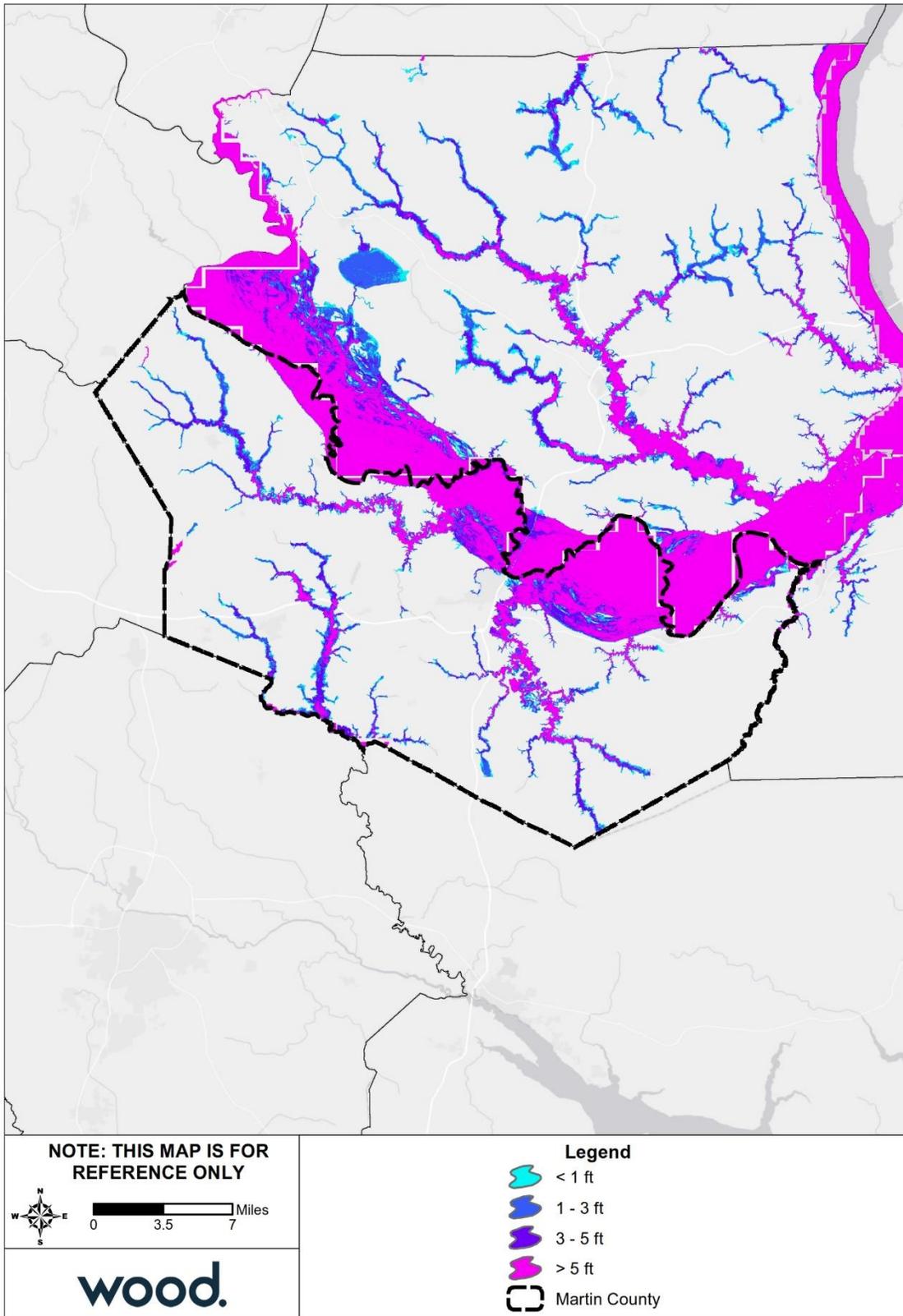
Source: FEMA Effective DFIRM

Figure C.7 – FEMA Flood Hazard Areas, Town of Williamston



Source: FEMA Effective DFIRM

Figure C.8 – Flood Depth, 1%-Annual-Chance Floodplain, Martin County



Source: FEMA Effective DFIRM

**C.2.2 Wildfire**

Table C.10 summarizes the acreage in Martin 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 Martin County is not included in the WUI.

**Table C.10 – Wildland Urban Interface Acreage, Martin County**

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	191,283.4	65.5%
	LT 1hs/40ac	42,266.1	14.5%
	1hs/40ac to 1hs/20ac	16,491.5	5.6%
	1hs/20ac to 1hs/10ac	15,882.3	5.4%
	1hs/10ac to 1hs/5ac	12,808.2	4.4%
	1hs/5ac to 1hs/2ac	9,825.0	3.4%
	1hs/2ac to 3hs/1ac	3,573.1	1.2%
	GT 3hs/1ac	37.6	0.0%
	<b>Total</b>	<b>292,167.1</b>	

Source: Southern Wildfire Risk Assessment

Figure C.9 depicts the WUI for Martin County. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure C.10 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure C.11 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 unincorporated areas of Martin County, particularly near the western border with Edgecombe County and the southeastern border with Beaufort and Washington Counties. WUI areas are spread throughout the county with more housing density around Williamston and the major roadways. Burn probability is low across most of the county, but there is a large area of moderate probability in the southeastern portion of the county as well as a cluster of moderate burn probability near Jamesville. Areas of the WUI that intersect with high fire intensity and moderate burn probability may be exposed to greater potential wildfire risk.

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 Martin 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, Martin County**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Martin County Unincorporated Area</b>		
Banking and Finance	1	\$316,373
Commercial Facilities	105	\$66,313,253
Critical Manufacturing	49	\$18,613,789
Food and Agriculture	459	\$19,073,504
Government Facilities	16	\$21,702,278
Healthcare and Public Health	6	\$6,774,059
Transportation Systems	17	\$6,541,765
<b>All Categories</b>	<b>653</b>	<b>\$139,335,021</b>

**ANNEX C: MARTIN COUNTY**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Town of Bear Grass</b>		
Commercial Facilities	2	\$321,595
Government Facilities	10	\$7,689,624
Transportation Systems	3	\$1,225,951
<b>All Categories</b>	<b>15</b>	<b>\$9,237,170</b>
<b>Town of Hassell</b>		
Food and Agriculture	1	\$42,815
<b>All Categories</b>	<b>1</b>	<b>\$42,815</b>
<b>Town of Jamesville</b>		
Commercial Facilities	5	\$1,967,207
Government Facilities	6	\$8,659,208
Healthcare and Public Health	1	\$649,763
Transportation Systems	1	\$507,297
Water	4	\$60,000,001
<b>All Categories</b>	<b>17</b>	<b>\$71,783,476</b>
<b>Town of Robersonville</b>		
Food and Agriculture	3	\$118,839
Transportation Systems	2	\$801,797
<b>All Categories</b>	<b>5</b>	<b>\$920,636</b>
<b>Town of Williamston</b>		
Commercial Facilities	41	\$22,701,085
Critical Manufacturing	18	\$9,974,669
Energy	1	\$500,000,000
Food and Agriculture	88	\$3,367,389
Government Facilities	51	\$101,398,722
Healthcare and Public Health	10	\$28,975,568
Transportation Systems	7	\$5,048,788
<b>All Categories</b>	<b>216</b>	<b>\$671,466,221</b>

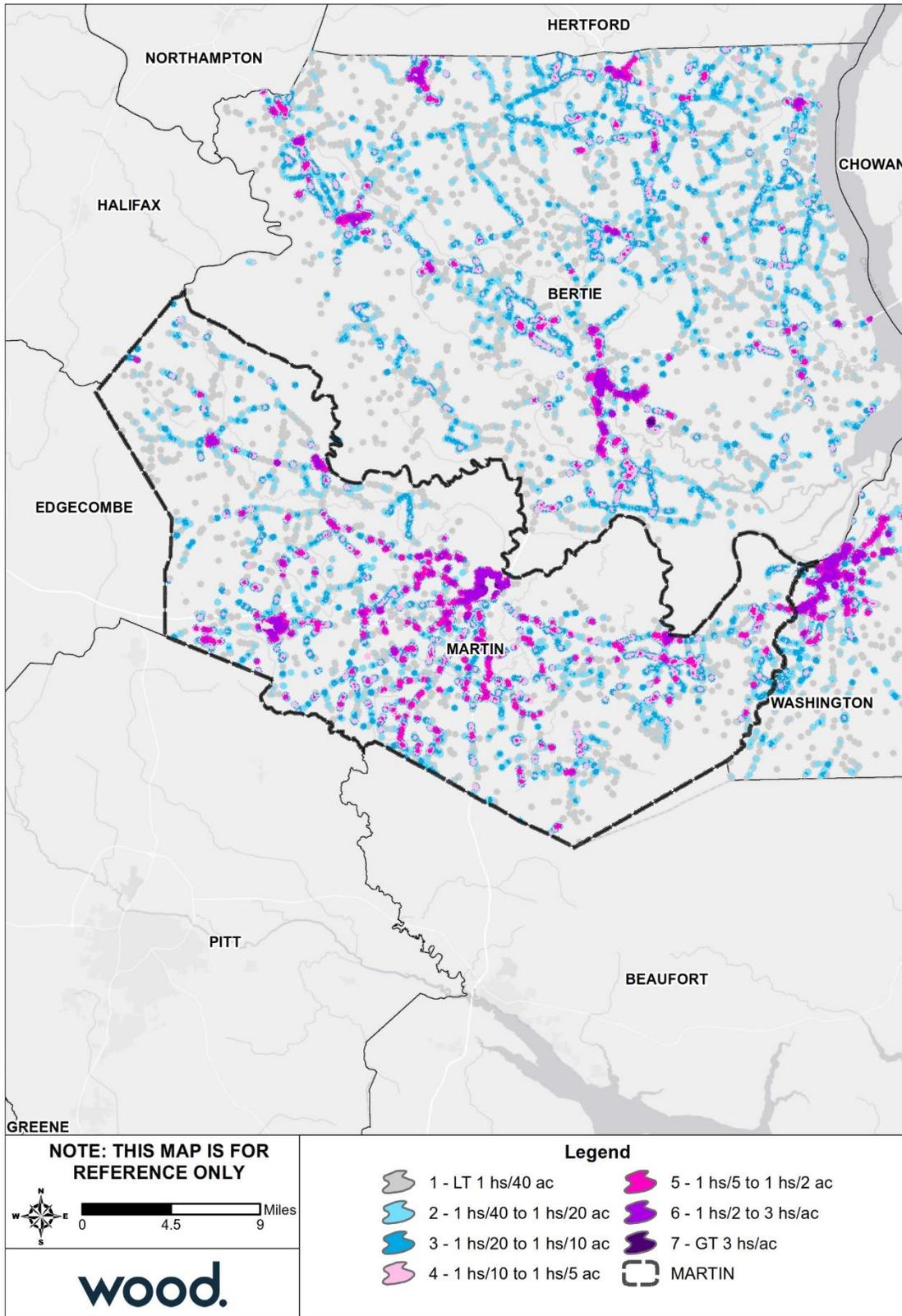
Source: NCEM Risk Management Tool

**Table C.12 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Martin County**

Category	Number of Buildings at Risk	Estimated Damages
<b>Martin County Unincorporated Area</b>		
Government	2	\$13,052,033
<b>All Categories</b>	<b>2</b>	<b>\$13,052,033</b>
<b>Town of Jamesville</b>		
Government	2	\$7,246,981
Utilities	4	\$60,000,001
<b>All Categories</b>	<b>6</b>	<b>\$67,246,982</b>
<b>Town of Williamston</b>		
Commercial	5	\$20,725,011
Government	10	\$73,907,306
Residential	1	\$2,957,365
Utilities	1	\$500,000,000
<b>All Categories</b>	<b>17</b>	<b>\$597,589,682</b>

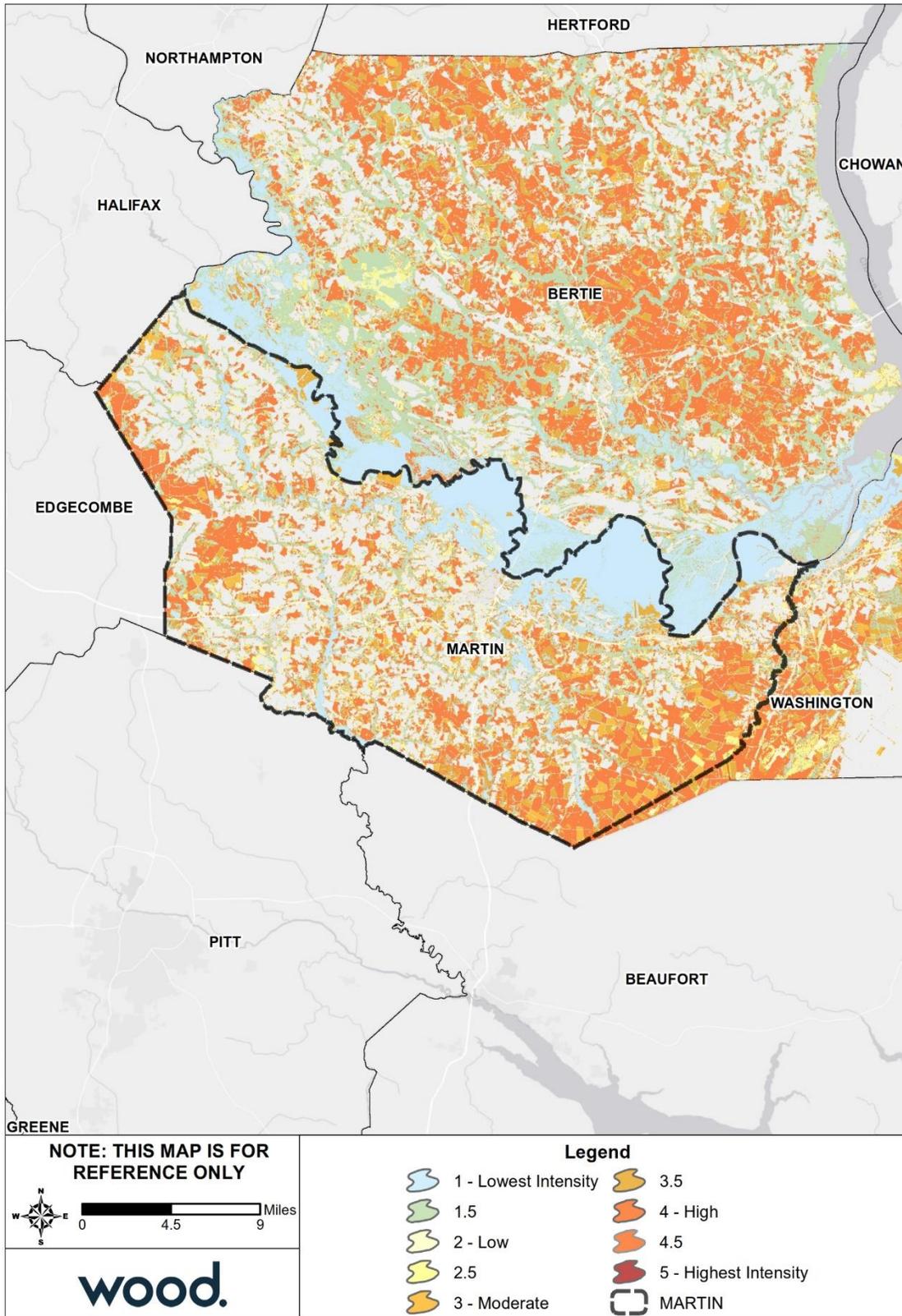
Source: NCEM Risk Management Tool

Figure C.9 – Wildland Urban Interface, Martin County



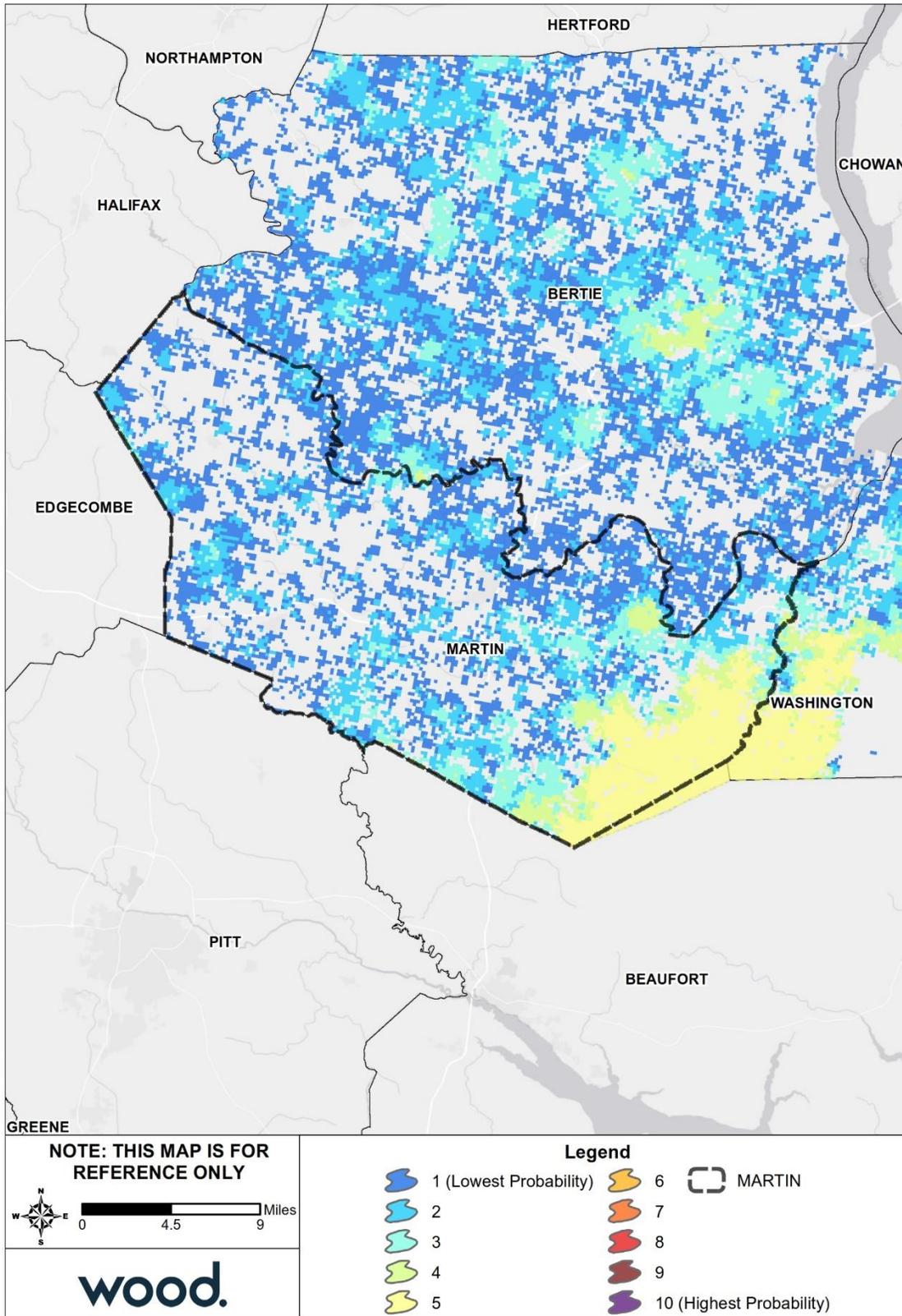
Source: Southern Wildfire Risk Assessment

Figure C.10 – Fire Intensity Scale, Martin County



Source: Southern Wildfire Risk Assessment

Figure C.11 – Burn Probability, Martin 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 Martin 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, Martin County has an overall capability rating of Moderate, however the County self-assessed its overall capability as High. Although the incorporated jurisdictions in Martin County self-reported as Moderate and Low capability, Martin 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, Martin 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 Martin County and incorporated categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table C.14 – NFIP Program Entry Dates**

Community	Regular Entry Date
Martin County (Unincorporated Area)	July 16, 1991
Town of Bear Grass	September 11, 2007
Town of Everetts	<i>Not Participating</i>
Town of Hamilton	January 1, 1987
Town of Hassell	October 12, 2007
Town of Jamesville	October 12, 2007
Town of Oak City	December 18, 2007
Town of Parmele	<i>Not Participating</i>
Town of Robersonville	July 1, 1987
Town of Williamston	August 19, 1987

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
<b>Martin County Unincorporated Area</b>					
Single Family	42	\$25,225	\$9,607,300	17	\$261,581.48
Non-Residential	1	\$2,212	\$115,600	4	\$20,897.23
<b>Total</b>	<b>43</b>	<b>\$27,437</b>	<b>\$9,722,900</b>	<b>21</b>	<b>\$282,478.71</b>

**ANNEX C: MARTIN COUNTY**

Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
<b>Town of Hamilton</b>					
Single Family	0	\$0	\$0	1	\$26,019.60
<b>Total</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>1</b>	<b>\$26,019.60</b>
<b>Town of Robersonville</b>					
Single Family	9	\$3,017	\$2,105,000	2	\$32,886.38
Non-Residential	0	\$0	\$0	1	\$6,951.90
<b>Total</b>	<b>9</b>	<b>\$3,017</b>	<b>\$2,105,000</b>	<b>3</b>	<b>\$39,838.28</b>
<b>Town of Williamston</b>					
Single Family	38	\$22,190	\$6,751,300	6	\$27,699.39
2-4 Family	9	\$6,414	\$1,930,000	0	\$0.00
Non-Residential	9	\$9,011	\$1,642,000	4	\$189,250.51
<b>Total</b>	<b>56</b>	<b>\$37,615</b>	<b>\$10,323,300</b>	<b>10</b>	<b>\$216,949.90</b>

Source: FEMA Community Information System, accessed February 2020

**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
<b>Martin County Unincorporated Area</b>					
A01-30 & AE Zones	16	\$14,135	\$2,682,500	7	\$165,058.69
A Zones	3	\$4,356	\$775,500	6	\$64,924.20
B, C & X Zone					
Preferred	23	\$8,346	\$6,230,000	6	\$48,550.43
<b>Total</b>	<b>42</b>	<b>\$26,837</b>	<b>\$9,688,000</b>	<b>19</b>	<b>\$278,533.32</b>
<b>Town of Hamilton</b>					
A Zones	0	\$0	\$0	1	\$26,019.60
<b>Total</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>1</b>	<b>\$26,019.60</b>
<b>Town of Robersonville</b>					
B, C & X Zone					
Standard	0	\$0	\$0	2	\$33,986.13
Preferred	9	\$3,017	\$2,105,000	1	\$5,852.15
<b>Total</b>	<b>9</b>	<b>\$3,017</b>	<b>\$2,105,000</b>	<b>3</b>	<b>\$39,838.28</b>
<b>Town of Williamston</b>					
A01-30 & AE Zones	20	\$17,607	\$2,278,300	2	\$21,217.54
A Zones	0	\$0	\$0	1	\$359.00
B, C & X Zone					
Standard	10	\$7,678	\$1,075,000	3	\$62,743.44
Preferred	26	\$12,330	\$6,970,000	3	\$131,457.87
<b>Total</b>	<b>56</b>	<b>\$37,615</b>	<b>\$10,323,300</b>	<b>9</b>	<b>\$215,777.85</b>

Source: FEMA Community Information System, accessed February 2020

**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
<b>Martin County Unincorporated Area</b>					
A01-30 & AE Zones	9	\$10,699	\$1,087,000	6	\$164,889.10
A Zones	0	\$0	\$0	4	\$43,396.01
B, C & X Zone	16	\$6,280	\$4,795,000	5	\$44,603.90

**ANNEX C: MARTIN COUNTY**

Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Preferred	16	\$6,280	\$4,795,000	5	\$44,603.90
<b>Total</b>	<b>25</b>	<b>\$16,979</b>	<b>\$5,882,000</b>	<b>15</b>	<b>\$252,889.01</b>
<b>Town of Hamilton</b>					
A Zones	0	\$0	\$0	1	\$26,019.60
<b>Total</b>	<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>1</b>	<b>\$26,019.60</b>
<b>Town of Robersonville</b>					
B, C & X Zone	8	\$2,573	\$1,755,000	2	\$33,986.13
Standard	0	\$0	\$0	2	\$33,986.13
Preferred	8	\$2,573	\$1,755,000	0	\$0.00
<b>Total</b>	<b>8</b>	<b>\$2,573</b>	<b>\$1,755,000</b>	<b>2</b>	<b>\$33,986.13</b>
<b>Town of Williamston</b>					
A01-30 & AE Zones	14	\$13,251	\$1,779,400	2	\$21,217.54
A Zones	0	\$0	\$0	1	\$359.00
B, C & X Zone	26	\$15,264	\$5,860,000	6	\$194,201.31
Standard	8	\$7,172	\$1,040,000	3	\$62,743.44
Preferred	18	\$8,092	\$4,820,000	3	\$131,457.87
<b>Total</b>	<b>40</b>	<b>\$28,515</b>	<b>\$7,639,400</b>	<b>9</b>	<b>\$215,777.85</b>

Source: FEMA Community Information System, accessed February 2020

**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
<b>Martin County Unincorporated Area</b>					
A01-30 & AE Zones	7	\$3,436	\$1,595,500	1	\$169.59
A Zones	3	\$4,356	\$775,500	2	\$21,528.19
B, C & X Zone	7	\$2,066	\$1,435,000	1	\$3,946.53
Standard	0	\$0	\$0	0	\$0.00
Preferred	7	\$2,066	\$1,435,000	1	\$3,946.53
<b>Total</b>	<b>17</b>	<b>\$9,858</b>	<b>\$3,806,000</b>	<b>4</b>	<b>\$25,644.31</b>
<b>Town of Robersonville</b>					
B, C & X Zone	1	\$444	\$350,000	1	\$5,852.15
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$444	\$350,000	1	\$5,852.15
<b>Total</b>	<b>1</b>	<b>\$444</b>	<b>\$350,000</b>	<b>1</b>	<b>\$5,852.15</b>
<b>Town of Williamston</b>					
A01-30 & AE Zones	6	\$4,356	\$498,900	0	\$0.00
B, C & X Zone	10	\$4,744	\$2,185,000	0	\$0.00
Standard	2	\$506	\$35,000	0	\$0.00
Preferred	8	\$4,238	\$2,150,000	0	\$0.00
<b>Total</b>	<b>16</b>	<b>\$9,100</b>	<b>\$2,683,900</b>	<b>0</b>	<b>\$0.00</b>

Source: FEMA Community Information System, accessed February 2020

C.4 MITIGATION STRATEGY

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
M1	Continue to develop a county-wide Geographic Information System (GIS). This system will include a comprehensive land use inventory that will be used for improving upon future hazard mitigation vulnerability analysis.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	Medium	4.2	PP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	Martin County will work to address this system as the County's GIS and planning capabilities continue to expand through the implementation of this plan.
M2	Consider applying for participation in the National Flood Insurance Program Community Rating System Program.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.1	P	<ul style="list-style-type: none"> <li>• Martin County Emergency Management</li> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2 to 3 years	Not Started – Carry Forward	Martin County, as well as each participating municipal jurisdiction, will consider joining the Community Rating System program through implementation of this plan
M3	Monitor development rates and issues over the next five years. If the county feels that it is the appropriate time to establish either limited or county-wide zoning regulations, then this effort will be initiated.	Martin Co.	All Hazards	Low	1.3	PP	<ul style="list-style-type: none"> <li>• Martin County Board of Commissioners</li> <li>• Martin County Administration</li> </ul>	\$70,000	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Started – Carry Forward	Martin County continues to consider the development of comprehensive land use regulations. The County will continue to monitor this issue closely through implementation of this plan.
M4	Annually assess the need for the establishment of subdivision regulations. If the county determines that regulations are necessary to address increased development pressure, then this effort will be initiated.	Martin Co.	All Hazards	Low	1.3	PP	<ul style="list-style-type: none"> <li>• Martin County Board of Commissioners</li> <li>• Martin County Administration</li> </ul>	\$15,000	General Fund, NCDPS, NCDEQ	3 to 5 years	Not Started – Carry Forward	Martin County continues to consider the development of comprehensive land use regulations. The County will continue to monitor this issue closely through implementation of this plan.
M5	Continue to monitor Flood Damage Prevention Ordinances and update as deemed necessary due to local conditions or as directed by FEMA and/or NCEM. Additionally, the county will consider increasing the freeboard requirement.	Martin Co., Bear Grass, Hamilton, Hassell, Jamesville, Oak City, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	PP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Martin County will review the County's Flood Damage Prevention Regulations annually to address any necessary changes. These efforts will also assess the need for increasing the County's finished floor requirement.
M6	Work in conjunction with the Regional HMPC on dealing with county drainage issues. This effort will involve an inventory of stormwater "hot spots." Following identification of drainage concerns, the county will work to address each issue on a case-by-case basis.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	3.2	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Northeastern NC Regional HMPC</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	Not Started – Carry Forward	Martin County will continue to work with the HMPC, as well as NCDOT, to address localized flooding issues.
M7	Continue to maintain a post-disaster debris management contract with a qualified service provider. The county will review this contract on an annual basis.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Severe Winter Storm, Earthquake, Wildfire, Dam & Levee Failure, Severe Weather, Tornado	High	2.2	ES	<ul style="list-style-type: none"> <li>• Martin County Board of Commissioners</li> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Martin County will continue to review annually the County's Post Disaster Debris Management Contract. The terms and provider will be reviewed, and changes made when deemed necessary.

ANNEX C: MARTIN 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
M8	Work closely with county Emergency Management and the Regional HMPC to ensure that adequate evacuation procedures are in place. This effort will involve the establishment of a public outreach campaign to ensure that the public is aware of the proper procedures.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Earthquake, Wildfire, Dam & Levee Failure, Tornado	High	4.1	PIO	<ul style="list-style-type: none"> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	1 year	Not Started – Carry Forward	Martin County will establish a dialogue with the regional partners in an effort to improve upon evacuation and emergency notification protocols.
M9	Maintain information on flood damage protection techniques for dissemination to citizens and property owners. Additionally, provide guidance to individuals looking for options relating to the elevation or retrofitting of homes. Make these materials available at the local library.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>• Martin County Building Inspections</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	The Martin County Planning and Inspection Department works closely with property owners and builders to retrofit homes in an effort to minimize future flood damages.
M10	Work closely on addressing mitigation needs, including the identification of structural mitigation projects and the establishment of new mitigation policies and initiatives.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	High	2.2	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	Not Started – Carry Forward	Martin County will continue to identify projects that may be eligible for funding through either annual or post disaster mitigation funding.
M11	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation (addressed above), mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	Martin County, as well as participating municipal jurisdictions, will continue to maintain a listing of vulnerable and/or repetitive loss properties and work to identify treatment options as funding becomes available.
M12	Work to implement all strategies and recommendations outlined within the Martin County Hurricane Matthew Resilient Redevelopment Plan.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.1	SP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ, FEMA	5 years	New	N/A
M13	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.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	Medium	4.1	ES	<ul style="list-style-type: none"> <li>• Martin County Emergency Management</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2 to 3 years	New	N/A
M14	Work to improve the emergency notification system in an effort to increase awareness regarding the locations of shelters and evacuation routes during natural hazard events.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	All Hazards	Medium	4.2	PIO	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS	2 to 3 years	New	N/A
M15	Continue to monitor water resources in an effort to mitigate the impacts of drought conditions. These efforts will include maintaining a local water shortage ordinance. This ordinance will be activated in coordination with all utility providers as the need arises.	Martin Co., Bear Grass, Everetts, Hamilton, Hassell, Jamesville, Oak City, Parmele, Robersonville, Williamston	Extreme Heat, Drought	High	1.1	NRP	<ul style="list-style-type: none"> <li>• Martin County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	New	N/A

# Annex D Tyrrell County

## D.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Tyrrell County and the Town of Columbia, including information on population, asset exposure, housing, and economy.

### Geography

Figure D.1 shows a base map of Tyrrell County and the Town of Columbia.

### Population and Demographics

Table D.1 provides population counts and growth estimates for Tyrrell County and participating jurisdictions as compared to the Region overall. Though the unincorporated areas of the County are losing population at a rate similar to the Region overall, the Town of Columbia is growing. Thus, overall, the County population has only experienced minor declines in recent years. Table D.2 provides demographic information for the County.

**Table D.1 – Population Counts, Tyrrell County, 2000-2017**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Columbia	819	891	939	8.8%	5.4%	14.7%
Unincorporated Areas	3,338	3,516	3,151	5.3%	-10.4%	-5.6%
<b>Tyrrell County</b>	<b>4,149</b>	<b>4,407</b>	<b>4,090</b>	<b>6.2%</b>	<b>-7.2%</b>	<b>-1.4%</b>
<b>Region Total</b>	<b>69,064</b>	<b>69,232</b>	<b>65,068</b>	<b>0.2%</b>	<b>-6.0%</b>	<b>-5.8%</b>

Source: US Census Bureau American Community Survey.

**Table D.2 – Racial Demographics, Tyrrell County, 2017**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Columbia	32.9%	45.9%	0.0%	19.5%	1.7%	27.8%
<b>Tyrrell County</b>	<b>55.1%</b>	<b>35.7%</b>	<b>0.4%</b>	<b>6.4%</b>	<b>2.4%</b>	<b>7.6%</b>

\*Other races include 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, Tyrrell County



## ANNEX D: TYRRELL COUNTY

### Asset Inventory

The following tables summarize the asset inventory for Tyrrell 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 D.2. 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 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 & Waste	Postal and Shipping	Transportation Systems	Energy	Emergency Services	Water	Total
Tyrrell County	456	0	0	72	0	2	0	23	2	0	0	0	0	3	0	3	0	561
Town of Columbia	8	2	0	54	0	1	0	26	3	0	0	0	0	4	1	4	0	103

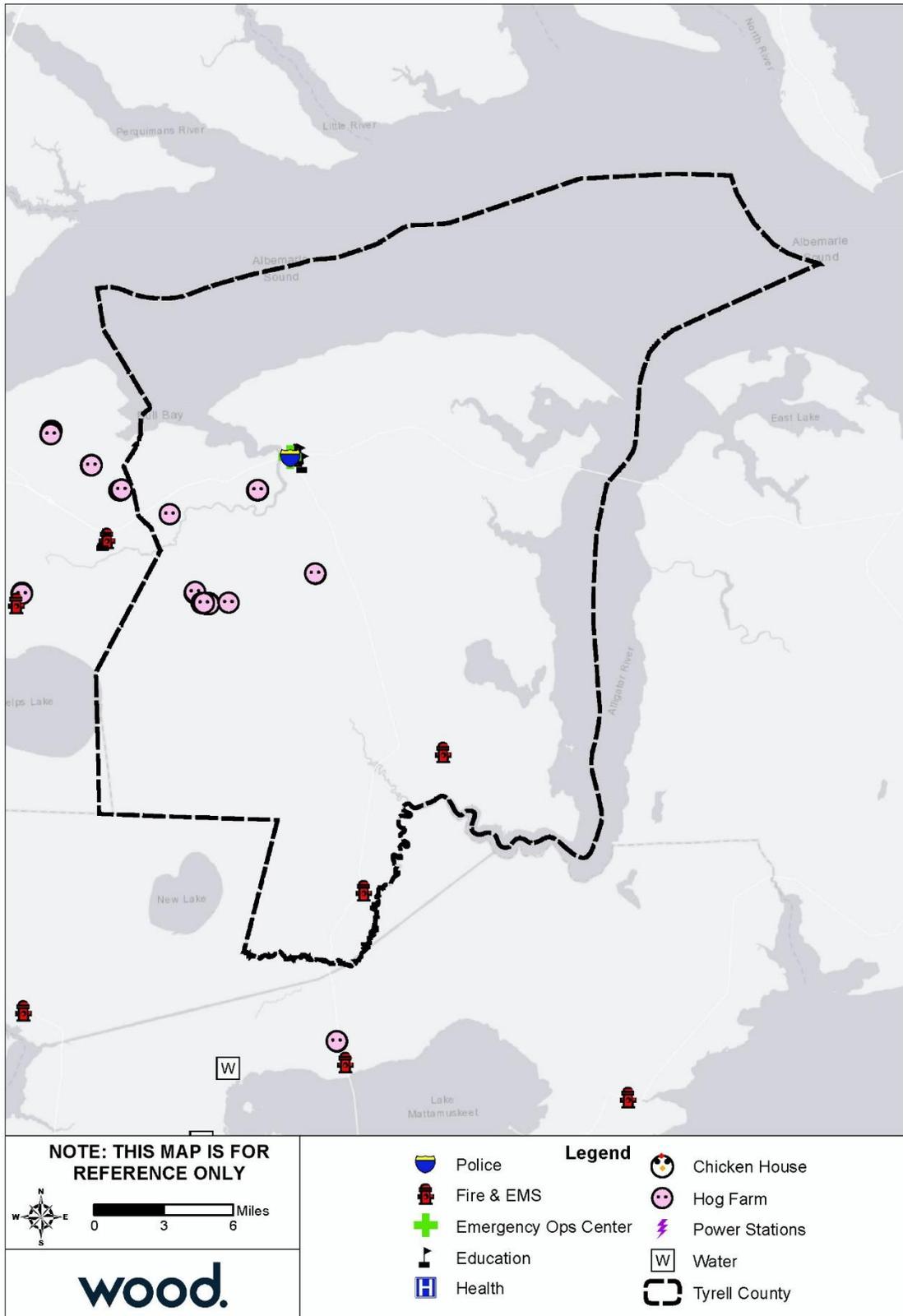
Source: NCEM Risk Management Tool

**Table D.4 – High Potential Loss Facilities by Use**

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Tyrrell County	1	0	0	4	4	1	0	10
Town of Columbia	0	2	0	3	0	0	0	5
<b>Tyrrell County Total</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>15</b>

Source: NCEM Risk Management Tool

Figure D.2 – Critical Facilities, Tyrrell County



Source: NCEM IRISK Database, GIS Analysis

## ANNEX D: TYRRELL COUNTY

### Housing

The table below details key housing statistics for Tyrrell County. As a percent of growth from 2010 housing, Tyrrell County's housing stock has grown by over 4%.

**Table D.5 – Housing Statistics, Tyrrell County, 2010-2017**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Columbia	433	500	15.5%	72.4%	27.6%
<b>Tyrrell County</b>	<b>2,068</b>	<b>2,152</b>	<b>4.1%</b>	<b>71.5%</b>	<b>28.5%</b>

Source: US Census Bureau American Community Survey.

### Economy

The following tables present key economic statistics for Tyrrell County. Unemployment is particularly high in the Town of Columbia, which has a large economic dependence on the service industry.

**Table D.6 – Economic Indicators, Tyrrell County, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Columbia	53.2%	44.4%	8.8%	46.8%	16.6%
<b>Tyrrell County</b>	<b>47.6%</b>	<b>43.6%</b>	<b>4.0%</b>	<b>52.4%</b>	<b>8.5%</b>

Source: US Census Bureau American Community Survey.

**Table D.7 – Employment by Industry, Tyrrell County, 2017**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Columbia	6.9%	36.4%	20.5%	16.9%	19.3%
<b>Tyrrell County</b>	<b>16.8%</b>	<b>28.6%</b>	<b>24.5%</b>	<b>17.0%</b>	<b>13.1%</b>

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 Tyrrell County than for the Northeastern NC 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.

### D.2.1 Flood

Table D.8 details the acreage of Tyrrell County's total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, the Town of Columbia is entirely within the SFHA and over half of Tyrrell County overall is within the SFHA.

**Table D.8 – Flood Zone Acreage by Jurisdiction, Tyrrell County**

Flood Zone	Acreage	Percent of Total (%)
<b>Columbia</b>		
Zone AE	780.96	100.0%
<b>Total</b>	<b>780.96</b>	<b>--</b>

**ANNEX D: TYRRELL COUNTY**

Flood Zone	Acreage	Percent of Total (%)
<b>Unincorporated Tyrrell County</b>		
Open Water	116,914.69	30.4%
Zone AE	213,392.94	55.5%
Zone X (500-year)	12,107.74	3.1%
Zone X (unshaded)	42,171.34	11.0%
<b>Total</b>	<b>384,586.72</b>	<b>--</b>
<b>Tyrrell County Total</b>		
Open Water	116,914.69	30.3%
Zone AE	214,173.90	55.6%
Zone X (500-year)	12,107.74	3.1%
Zone X Unshaded	42,171.34	10.9%
<b>Total</b>	<b>385,367.68</b>	<b>--</b>

Source: FEMA Effective DFIRM

Figure D.3 and Figure D.4 reflect the effective mapped flood hazard zones for Tyrrell County and the Town of Columbia, and Figure D.5 displays 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. 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**

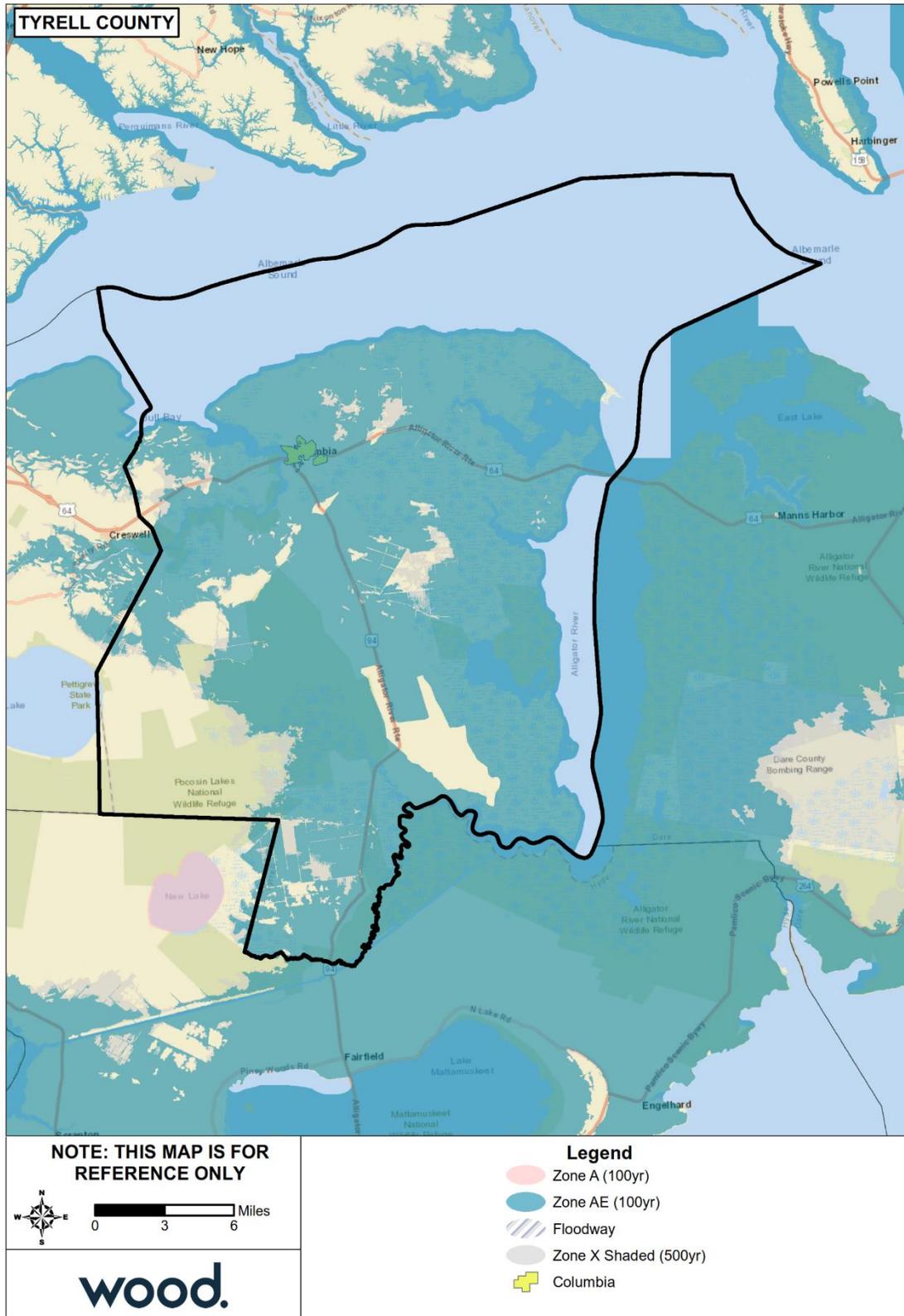
Sector	Event	Number of Buildings at Risk	Estimated Damages
<b>Town of Columbia</b>			
Commercial Facilities	100 Year	19	\$146,716
Critical Manufacturing	100 Year	1	\$2,301
Emergency Services	100 Year	2	\$14,817
Food and Agriculture	100 Year	1	\$9
Government Facilities	100 Year	4	\$100,893
Healthcare and Public Health	100 Year	2	\$193,820
Transportation Systems	100 Year	1	\$9,244
<b>All Categories</b>	<b>100 Year</b>	<b>30</b>	<b>\$467,800</b>
<b>Tyrrell County Unincorporated Area</b>			
Commercial Facilities	100 Year	13	\$136,239
Critical Manufacturing	100 Year	1	\$16,209
Food and Agriculture	100 Year	29	\$36,181
Government Facilities	100 Year	1	\$19,291
Transportation Systems	100 Year	1	\$28,904
<b>All Categories</b>	<b>100 Year</b>	<b>45</b>	<b>\$236,824</b>

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
<b>Town of Columbia</b>			
Commercial	100 Year	1	\$51
<b>Tyrrell County Unincorporated Area</b>			
Residential	100 Year	1	\$15,436

Figure D.3 – FEMA Flood Hazard Areas, Tyrrell County



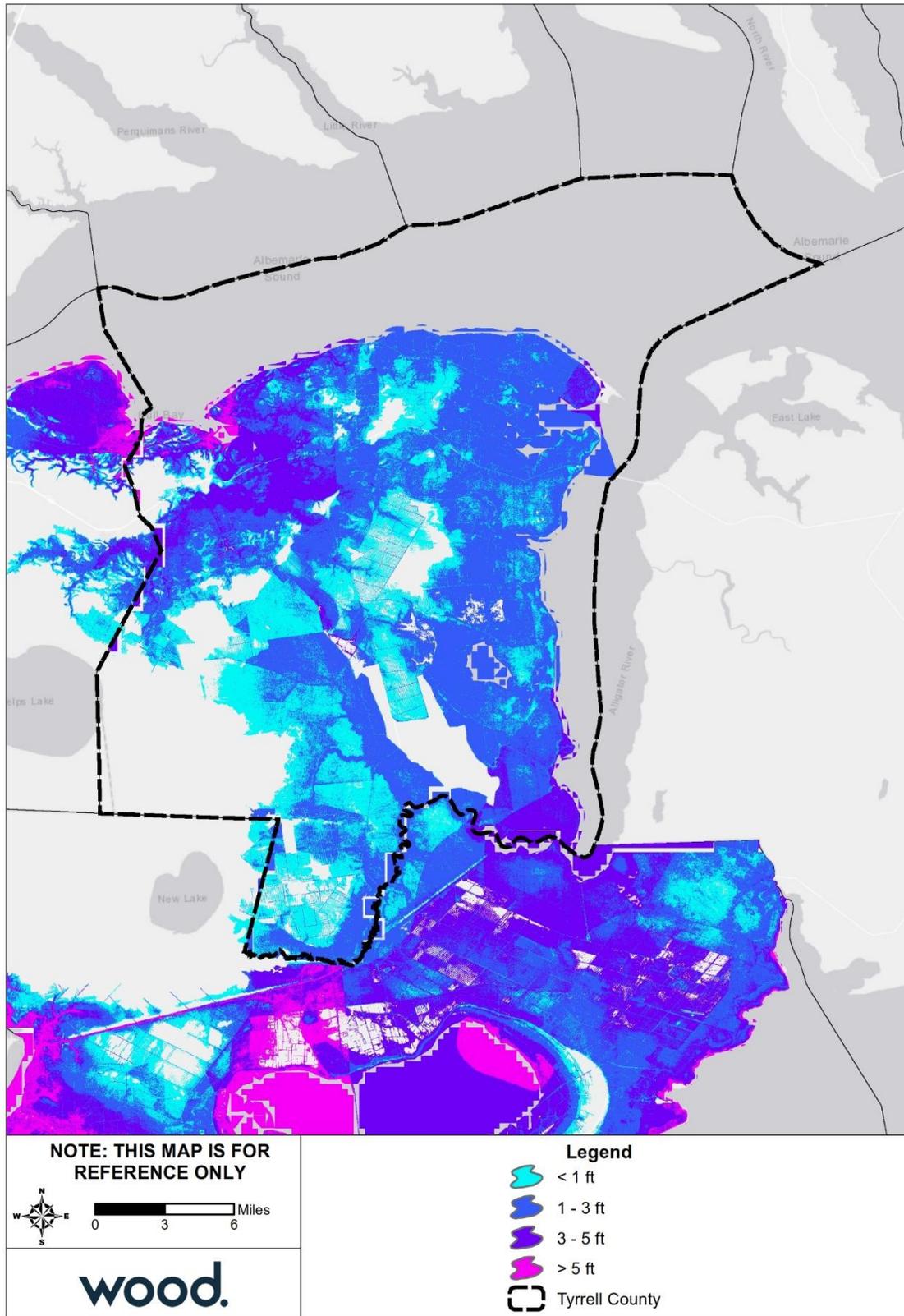
Source: FEMA Effective DFIRM

Figure D.4 – FEMA Flood Hazard Areas, Town of Columbia



Source: FEMA Effective DFIRM

Figure D.5 – Flood Depth, 1%-Annual-Chance Floodplain, Tyrrell County



Source: FEMA Effective DFIRM

**D.2.2 Wildfire**

Table D.11 summarizes the acreage in Tyrrell 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 92 percent of Tyrrell County is not included in the WUI.

**Table D.11 – Wildland Urban Interface Acreage, Tyrrell County**

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	353,970.0	91.9%
	LT 1hs/40ac	20,605.7	5.4%
	1hs/40ac to 1hs/20ac	3,620.8	0.9%
	1hs/20ac to 1hs/10ac	2,662.4	0.7%
	1hs/10ac to 1hs/5ac	2,351.6	0.6%
	1hs/5ac to 1hs/2ac	1,170.5	0.3%
	1hs/2ac to 3hs/1ac	533.5	0.1%
	GT 3hs/1ac	47.8	0.0%
	<b>Total</b>	<b>384,962.4</b>	

Source: Southern Wildfire Risk Assessment

Figure D.6 depicts the WUI for Tyrrell County. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure D.7 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure D.8 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

WUI areas are very limited in Tyrrell County and occur primarily in the northwestern quadrant of the county near the Albemarle Sound. There are large areas of high potential fire intensity in unincorporated Tyrrell County, particularly along the Albemarle Sound and Alligator River as well as in inland areas. Burn probability is highest in the southern portion of the county, but moderate burn probability covers much of the county, including WUI areas. Areas of high potential fire intensity and moderate burn probability overlap with portions of the WUI in unincorporated Tyrrell County. A potential fire here could pose a high risk to human settlement and the built environment.

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 Tyrrell 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, Tyrrell County**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Tyrrell County Unincorporated Area</b>		
Commercial Facilities	42	\$9,616,409
Critical Manufacturing	2	\$476,165
Food and Agriculture	199	\$11,387,663
Government Facilities	15	\$26,411,898
Healthcare and Public Health	2	\$8,084,129
Transportation Systems	1	\$408,925
<b>All Categories</b>	<b>261</b>	<b>\$56,385,189</b>

**ANNEX D: TYRRELL COUNTY**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Town of Columbia</b>		
Commercial Facilities	20	\$7,483,931
Emergency Services	2	\$2,366,086
Food and Agriculture	2	\$37,719
Government Facilities	10	\$10,300,308
Healthcare and Public Health	1	\$318,551
Transportation Systems	2	\$760,740
<b>All Categories</b>	<b>37</b>	<b>\$21,267,335</b>

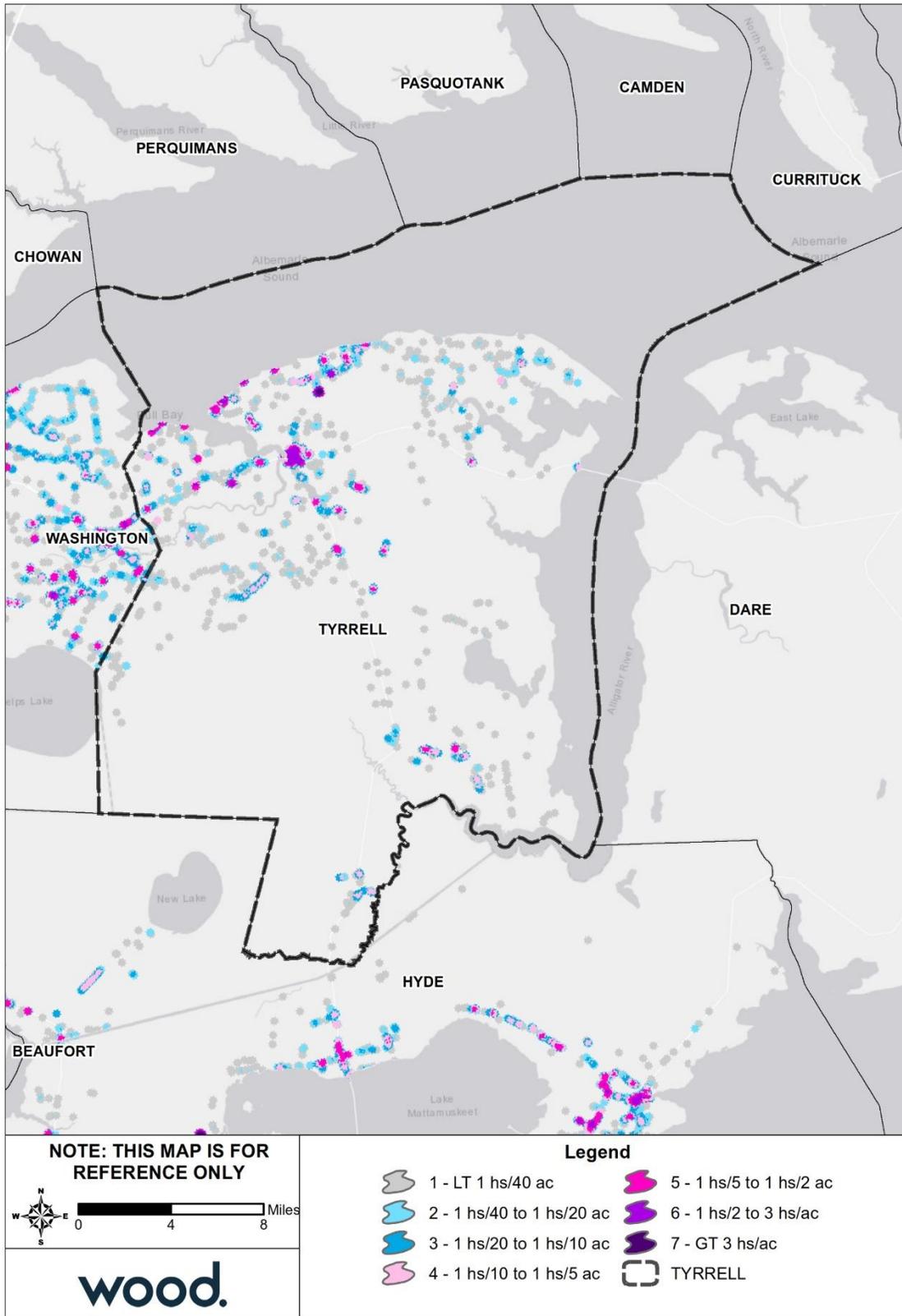
Source: NCEM Risk Management Tool

**Table D.13 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Tyrrell County**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Tyrrell County Unincorporated Area</b>		
Government	3	\$19,371,420
Residential	1	\$1,543,596
<b>All Categories</b>	<b>4</b>	<b>\$20,915,016</b>
<b>Town of Columbia</b>		
Commercial	1	\$2,973,383
Government	1	\$1,466,232
<b>All Categories</b>	<b>2</b>	<b>\$4,439,615</b>

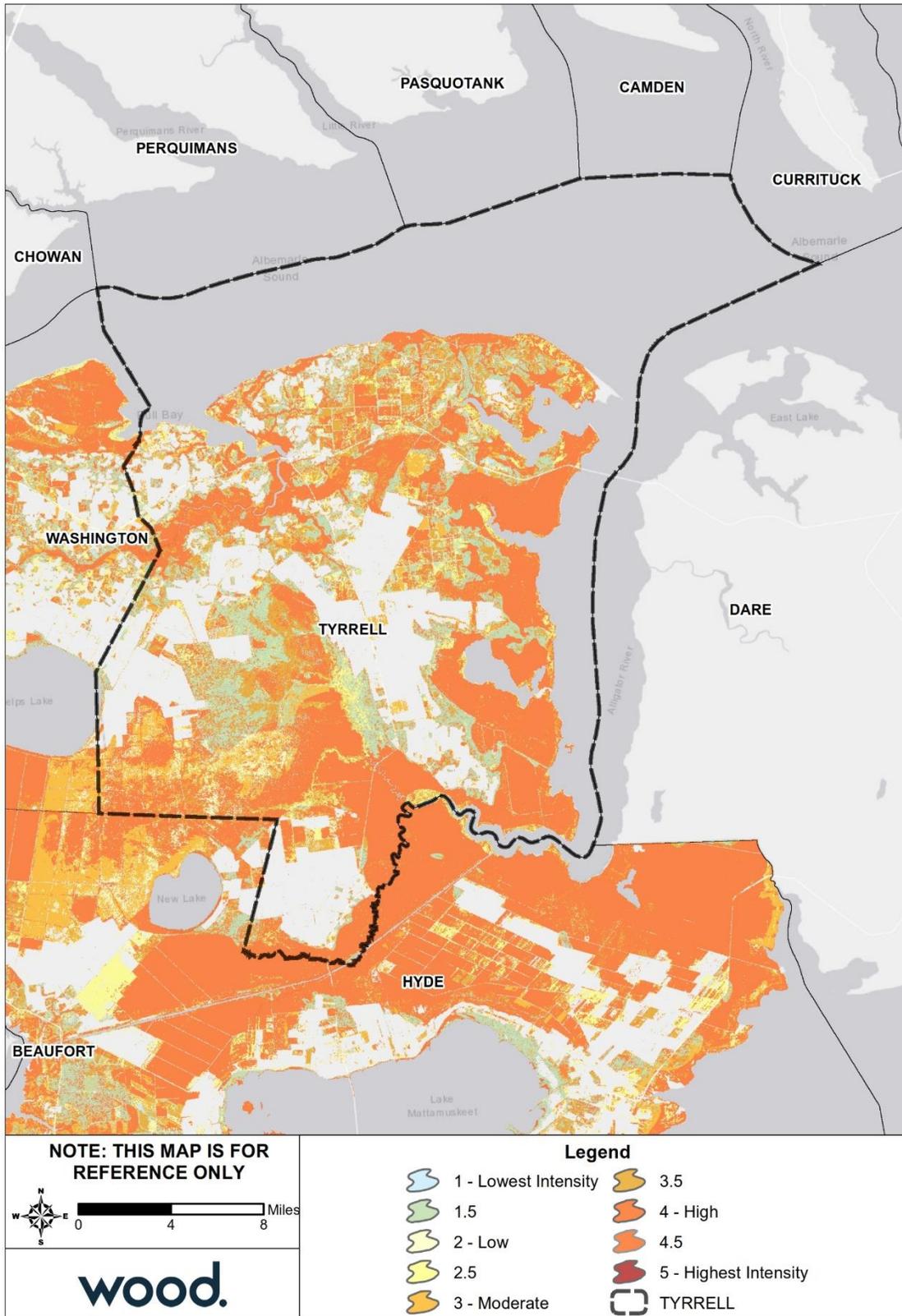
Source: NCEM Risk Management Tool

Figure D.6 – Wildland Urban Interface, Tyrrell County



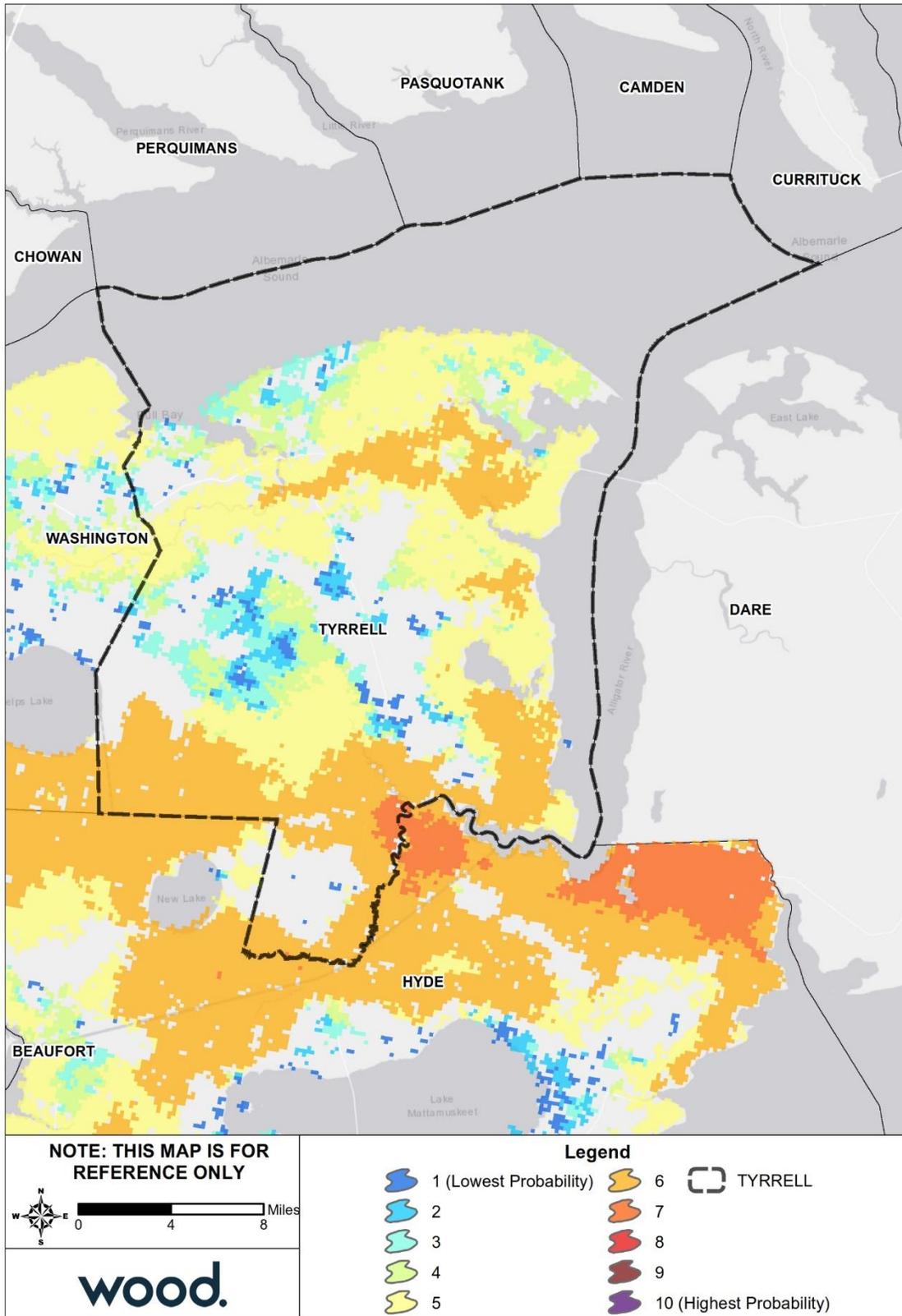
Source: Southern Wildfire Risk Assessment

Figure D.7 – Fire Intensity Scale, Tyrrell County



Source: Southern Wildfire Risk Assessment

Figure D.8 – Burn Probability, Tyrrell 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 Tyrrell 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, Tyrrell County has an overall capability rating of Moderate, in line with their own self-assessed overall capability. The Town of Columbia’s capability was rated as Low despite self-assessing as Moderate. However, capability gaps in the Town may be moderated by support from the County. The County’s Self-Assessment of key capability areas is summarized in Table D.14 below.

**Table D.14 – Capability Self-Assessment Ratings, Tyrrell County**

Capability Area	Tyrrell County
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 Tyrrell County and the Town of Columbia categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table D.15 – NFIP Program Entry Dates**

Community	Regular Entry Date
Tyrrell County (Unincorporated Area)	August 19, 1985
Town of Columbia	August 5, 1985

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
<b>Tyrrell County Unincorporated Area</b>					
Single Family	392	\$258,589	\$57,032,400	297	\$3,816,266.29
2-4 Family	3	\$2,274	\$750,000	0	\$0.00
All Other Residential	4	\$7,313	\$1,808,100	1	\$20,724.85
Non-Residential	23	\$42,343	\$8,004,200	20	\$636,740.50
<b>Total</b>	<b>422</b>	<b>\$310,519</b>	<b>\$67,594,700</b>	<b>318</b>	<b>\$4,473,731.64</b>
<b>Town of Columbia</b>					
Single Family	85	\$101,450	\$10,157,300	114	\$2,070,930.91
2-4 Family	18	\$10,588	\$2,261,300	2	\$173,696.55
All Other Residential	2	\$5,899	\$388,900	3	\$26,829.13
Non-Residential	40	\$223,800	\$12,970,100	24	\$1,187,202.44
<b>Total</b>	<b>145</b>	<b>\$341,737</b>	<b>\$25,777,600</b>	<b>143</b>	<b>\$3,458,659.03</b>

Source: FEMA Community Information System, accessed February 2020

**ANNEX D: TYRRELL COUNTY**

**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
<b>Tyrrell County Unincorporated Area</b>					
A01-30 & AE Zones	380	\$286,663	\$61,562,900	292	\$4,214,066.17
B, C & X Zone					
Standard	11	\$9,557	\$1,481,100	9	\$109,049.88
Preferred	18	\$6,499	\$4,097,000	14	\$129,467.51
<b>Total</b>	<b>409</b>	<b>\$302,719</b>	<b>\$67,141,000</b>	<b>315</b>	<b>\$4,452,583.56</b>
<b>Town of Columbia</b>					
A01-30 & AE Zones	139	\$338,336	\$25,253,100	142	\$3,457,719.03
B, C & X Zone					
Preferred	1	\$401	\$350,000	0	\$0.00
<b>Total</b>	<b>140</b>	<b>\$338,737</b>	<b>\$25,603,100</b>	<b>142</b>	<b>\$3,457,719.03</b>

Source: FEMA Community Information System, accessed February 2020

**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
<b>Tyrrell County Unincorporated Area</b>					
A01-30 & AE Zones	152	\$156,129	\$18,718,600	212	\$3,491,471.45
B, C & X Zone					
Standard	9	\$8,833	\$1,405,200	7	\$75,459.87
Preferred	11	\$3,600	\$2,177,000	7	\$53,508.87
<b>Total</b>	<b>172</b>	<b>\$168,562</b>	<b>\$22,300,800</b>	<b>226</b>	<b>\$3,620,440.19</b>
<b>Town of Columbia</b>					
A01-30 & AE Zones	122	\$316,526	\$20,926,600	135	\$3,348,849.72
B, C & X Zone					
Preferred	1	\$401	\$350,000	0	\$0.00
<b>Total</b>	<b>123</b>	<b>\$316,927</b>	<b>\$21,276,600</b>	<b>135</b>	<b>\$3,348,849.72</b>

Source: FEMA Community Information System, accessed February 2020

**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
<b>Tyrrell County Unincorporated Area</b>					
A01-30 & AE Zones	228	\$130,534	\$42,844,300	80	\$722,594.72
B, C & X Zone					
Standard	2	\$724	\$75,900	2	\$33,590.01
Preferred	7	\$2,899	\$1,920,000	7	\$75,958.64
<b>Total</b>	<b>237</b>	<b>\$134,157</b>	<b>\$44,840,200</b>	<b>89</b>	<b>\$832,143.37</b>
<b>Town of Columbia</b>					
A01-30 & AE Zones	17	\$21,810	\$4,326,500	7	\$108,869.31
<b>Total</b>	<b>17</b>	<b>\$21,810</b>	<b>\$4,326,500</b>	<b>7</b>	<b>\$108,869.31</b>

Source: FEMA Community Information System, accessed February 2020

D.4 MITIGATION STRATEGY

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
T1	Make information available regarding floodplain protection and hazards at the county administrative building, and in the building inspections office. The county will aim to make this information available through the local library and real estate agencies, as well as the Town municipal building.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Building Inspections</li> <li>• Municipal Administration</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Tyrrell County continues to provide this information to interested parties and employs a certified floodplain manager to assist citizens with construction in the SFHA.
T2	Maintain a policy of keeping branches and limbs from encroaching upon the right-of-way and power lines. The Town will assist in this effort through ensuring that this issue is properly addressed by utility providers.	Columbia	Flood, Hurricane & Tropical Storm, Severe Winter Storm, Earthquake, Wildfire, Severe Weather, Tornado	High	1.1	P	<ul style="list-style-type: none"> <li>• Columbia Administration</li> <li>• Electric Service Providers</li> </ul>	Staff Time	General Fund, Electric Service Providers	2020-2025	Not Started – Carry Forward	The Town will coordinate with utility providers to minimize the impacts of natural hazard events on Town-wide infrastructure systems.
T3	Monitor the county’s equipment and facility needs with respect to mitigation and emergency management. Following a natural disaster, the county will utilize potential Hazard Mitigation Grant Funds to acquire any identified needs.	Tyrrell Co., Columbia	All Hazards	High	1.2	ES	<ul style="list-style-type: none"> <li>• Tyrrell County Emergency Management</li> <li>• Tyrrell County Board of Commissioners</li> <li>• Municipal Administration</li> </ul>	Staff Time	General Fund, NCDPS	1 year	Not Started – Carry Forward	As Tyrrell County identifies either facility and/or equipment needs, the County will work to identify funding opportunities to address the respective need. Columbia will monitor its equipment and facilities.
T4	Mail a floodplain protection informational flyer to all county and town property owners a minimum of two times over the next five years. This effort will ensure that this critical information is being disseminated to a broad base of the population.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	4.2	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Building Inspections</li> <li>• Municipal Administration</li> </ul>	\$4,000	General Fund	1 year	Not Started – Carry Forward	Tyrrell County will undertake this effort, which will be integral to the County securing participation in the Community Rating System Program.
T5	Advertise the availability of federal flood insurance offered through the National Flood Insurance Program once annually in the local newspapers. Additionally, the county will assist property owners in acquiring this insurance.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.1	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Municipal Administration</li> </ul>	\$4,000	General Fund	2 years	Not Started – Carry Forward	Tyrrell County continues to promote the availability of federally subsidized flood insurance available to all County residents. Particular attention is given to those citizens that are not located within the defined special flood hazard area but are still potentially subject to flood damage.
T6	Develop a county website and include information pertinent to emergency preparedness, response, and mitigation. Information will be made available focused on expanding the county’s mitigation effectiveness.	Tyrrell Co., Columbia	All Hazards	High	4.1	PIO	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	\$4,500	General Fund	1 to 2 years	Not Started – Carry Forward	Tyrrell County will develop this page in an effort to prepare for application into the Community Rating System Program.
T7	Consider applying for participation in the National Flood Insurance (NFIP) Community Rating System Program.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.2	P	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Building Inspections</li> <li>• Municipal Administration</li> </ul>	\$8,500	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Tyrrell County, as well as the Town of Columbia, will consider joining the Community Rating System program through implementation of this plan
T8	Establish a long-range plan in conjunction with the US Army Corps of Engineers to clean out the arterial canals located throughout the county.	Tyrrell Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.3	NRP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• US Army Corps of Engineers</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ	2 to 3 years	In Progress – Carry Forward	Tyrrell County has been dealing with this issue for many years. The County will continue to seek out a long-term sustainable solution to this issue.
T9	Work towards a long-term solution to the flooding and drainage issues impacting the Alligator and Goat Neck communities within the county.	Tyrrell Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.3	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Public Services</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ	2 to 3 years	In Progress – Carry Forward	Tyrrell County has been dealing with this issue for many years. The County will continue to seek out a long-term sustainable solution to this issue.

ANNEX D: TYRRELL 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
T10	Work to relocate all County service facilities to a site outside the flood hazard area.	Tyrrell Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	3.1	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Board of Commissioners</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA, USDA Loan Program	5 years	Not Started – Carry Forward	Through implementation of this plan, Tyrrell County will identify vulnerable County facilities and identify potential funding, as well as relocation sites for the respective facilities.
T11	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. The following provides a summary of mitigation target areas established following Hurricane Matthew in 2016: <ul style="list-style-type: none"> <li>• Alligator Community</li> <li>• Albemarle Sound Area</li> <li>• Town of Columbia</li> </ul>	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ, NCDOT	5 years	New	N/A
T12	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"> <li>• Drainage system – Grendle Hill Canal</li> <li>• Drainage system – Alligator Canal</li> <li>• Drainage system – South Fork Creek Canal</li> <li>• Drainage system – Rider Creek Canal</li> </ul>	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	1.3	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, NCDEQ, NCDOT	5 years	New	N/A
T13	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation, mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2020-2025	New	N/A
T14	Work to implement all strategies and recommendations outlined within the County’s Hurricane Matthew Resilient Redevelopment Plan.	Tyrrell Co., Columbia	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	2.1	SP	<ul style="list-style-type: none"> <li>• Tyrrell County Administration</li> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA, NCDEQ	5 years	New	N/A
T15	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.	Tyrrell Co., Columbia	All Hazards	Medium	4.1	ES	<ul style="list-style-type: none"> <li>• Tyrrell County Emergency Management</li> <li>• Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2 to 3 years	New	N/A

## Annex E Washington County

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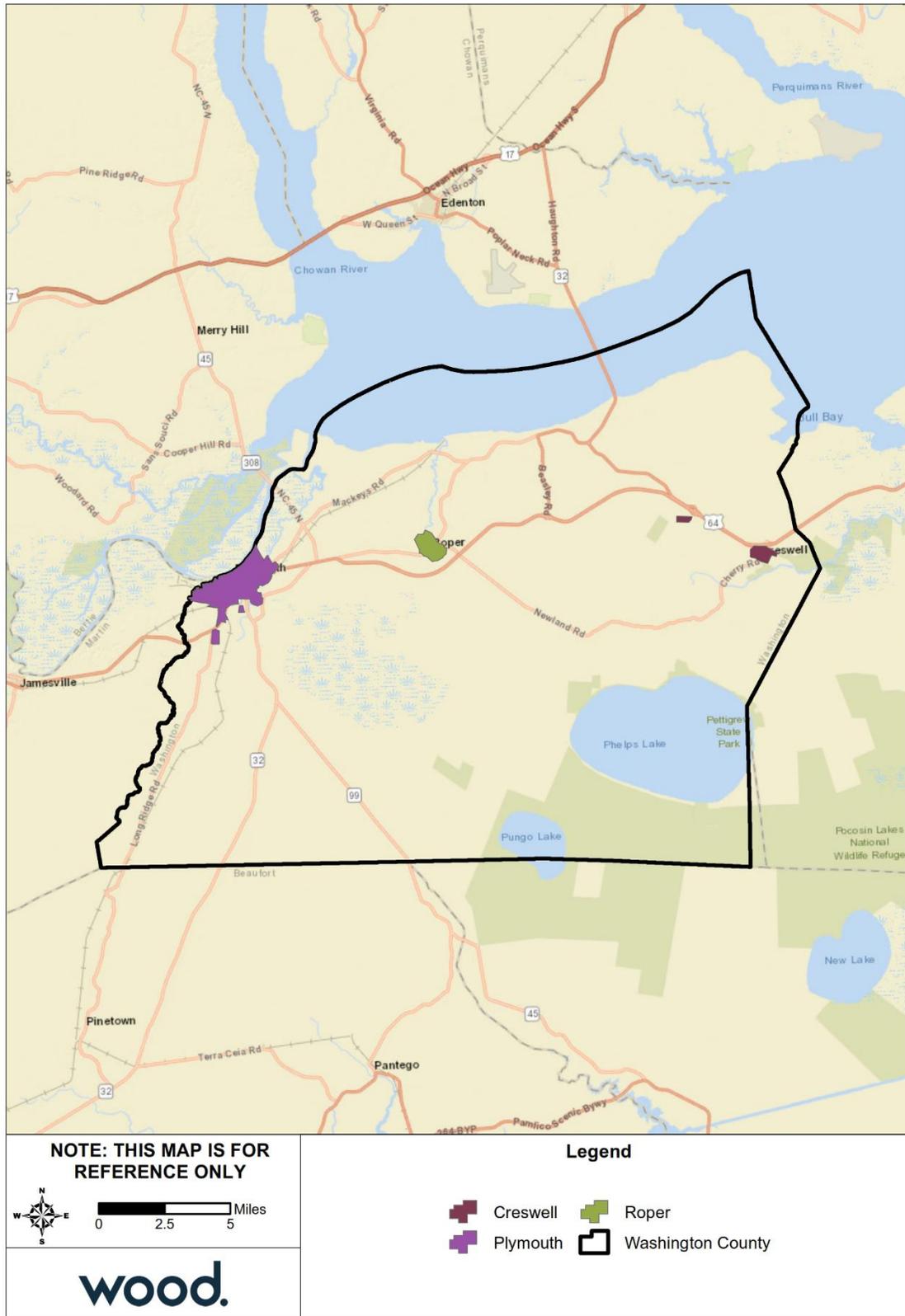
### E.1 COMMUNITY PROFILE

This section contains a summary of maps and statistics for current conditions and characteristics of Washington County, including information on population, asset exposure, housing, and economy.

#### Geography

Figure E.1 shows a base map of Washington County and participating jurisdictions.

Figure E.1 – Jurisdictional Locations, Washington County



## ANNEX E: WASHINGTON COUNTY

### Population and Demographics

Table E.1 provides population counts and growth estimates for Washington County and participating jurisdictions as compared to the Region overall. The Town of Roper has experienced a slight increase in population, but the County as a whole has experienced a decrease greater than that of the Region. Table E.2 provides demographic information for the County.

**Table E.1 – Population Counts, Washington County, 2000-2017**

Jurisdiction	2000	2010	2017	% Change 2000-2010	% Change 2010-2017	Overall % Change 2000-2017
Creswell	278	276	272	-0.7%	-2.2%	-2.2%
Plymouth	4,107	3,878	3,599	-5.6%	-7.2%	-12.4%
Roper	613	611	658	-0.3%	7.7%	7.3%
<b>Municipalities</b>	<b>4,998</b>	<b>4,765</b>	<b>4,529</b>	<b>-4.7%</b>	<b>-5.0%</b>	<b>-9.4%</b>
Unincorporated Areas	8,725	8,463	7,802	-3.0%	-7.8%	-10.6%
<b>Washington County</b>	<b>13,723</b>	<b>13,228</b>	<b>12,331</b>	<b>-3.6%</b>	<b>-6.8%</b>	<b>-10.1%</b>
<b>Region Total</b>	<b>69,064</b>	<b>69,232</b>	<b>65,068</b>	<b>0.2%</b>	<b>-6.0%</b>	<b>-5.8%</b>

Source: US Census Bureau American Community Survey.

**Table E.2 – Racial Demographics, Washington County, 2017**

Jurisdiction	Caucasian	African-American	Asian	Other Race*	Two or More Races	Persons of Hispanic or Latino Origin**
Creswell	50.0%	47.4%	0.0%	2.6%	0.0%	13.6%
Plymouth	30.4%	69.5%	0.0%	0.1%	0.0%	0.1%
Roper	6.8%	75.2%	0.0%	15.7%	2.3%	13.4%
<b>Washington County</b>	<b>46.9%</b>	<b>48.2%</b>	<b>0.2%</b>	<b>1.2%</b>	<b>3.5%</b>	<b>5.0%</b>

\*Other races include 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

This section provides an explanation of anticipated development trends for jurisdictions in Washington County that are participants 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.

Washington County is very rural in nature. A majority of development is centered within and around the Town of Plymouth, which also serves as the County seat. Roper and Creswell support a small commercial base; however, these communities are extremely small, and growth has been limited dating back to the 1990 Census year. New development has been minimal throughout the County, including the Town of Plymouth. US Highway 264 which traverses through Washington County serves as the gateway to the Outer Banks of North Carolina. Due to this fact, many highway-oriented businesses and retail outlets are situated along this route. Like other County's within the region, most non-residential development in rural portions of the County provides service to the agricultural industry.

### Washington County CAMA Land Use Plan

The Washington County CAMA Land Use Plan was adopted by the Washington County Board of Commissioners in January of 2009. The plan covers Washington County and its incorporated areas. The Land Use Plan defines twelve primary Future Land Use Districts including:

## ANNEX E: WASHINGTON COUNTY

- ▶ Residential Agriculture
- ▶ Low Density Residential
- ▶ Medium Density Residential
- ▶ High Density Residential
- ▶ Historic District
- ▶ Corridor Commercial
- ▶ Downtown/Waterfront-Mixed-Use
- ▶ Heavy Industrial
- ▶ Light Industrial
- ▶ Office/Institutional
- ▶ Public Lands
- ▶ Environmentally Sensitive Areas

These districts are defined in detail under Section 6 (pages 130 to 141) of the Washington County Land Use Plan.

Figure E.2 through Figure E.5 provide the delineation of Washington County's Future land Use Districts.

Figure E.2 – Washington County Future Land Use

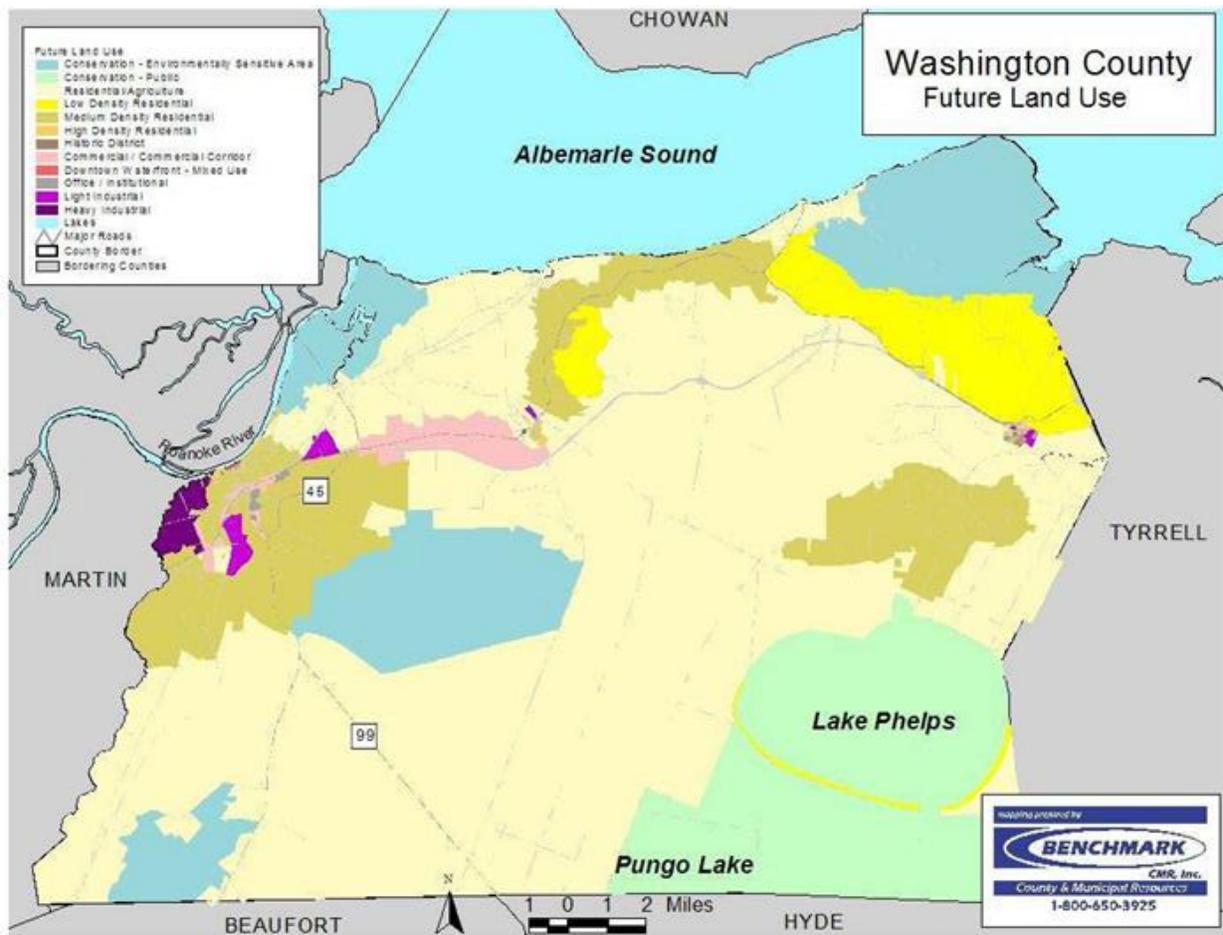


Figure E.3 – Washington County Future Land Use, Plymouth

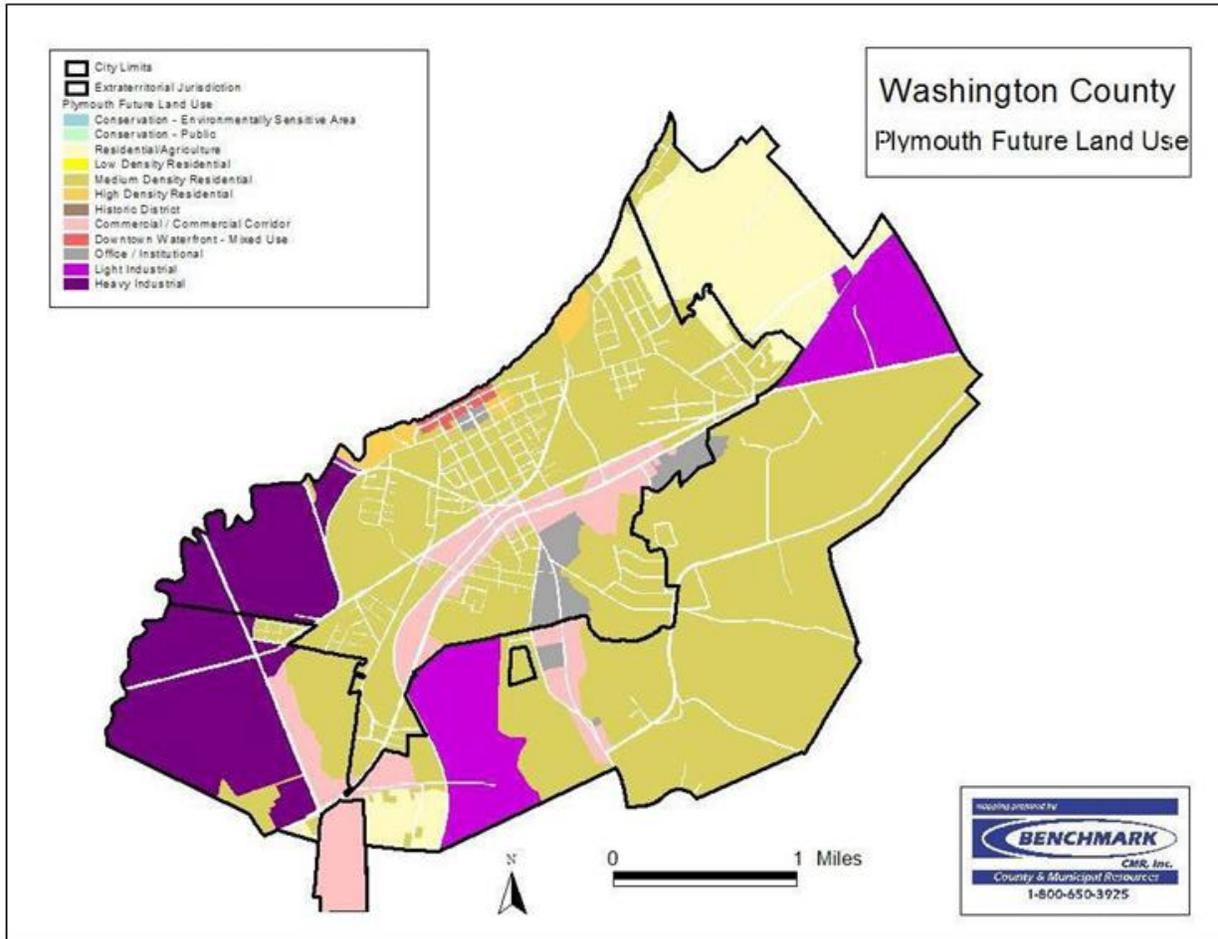


Figure E.4 – Washington County Future Land Use, Creswell

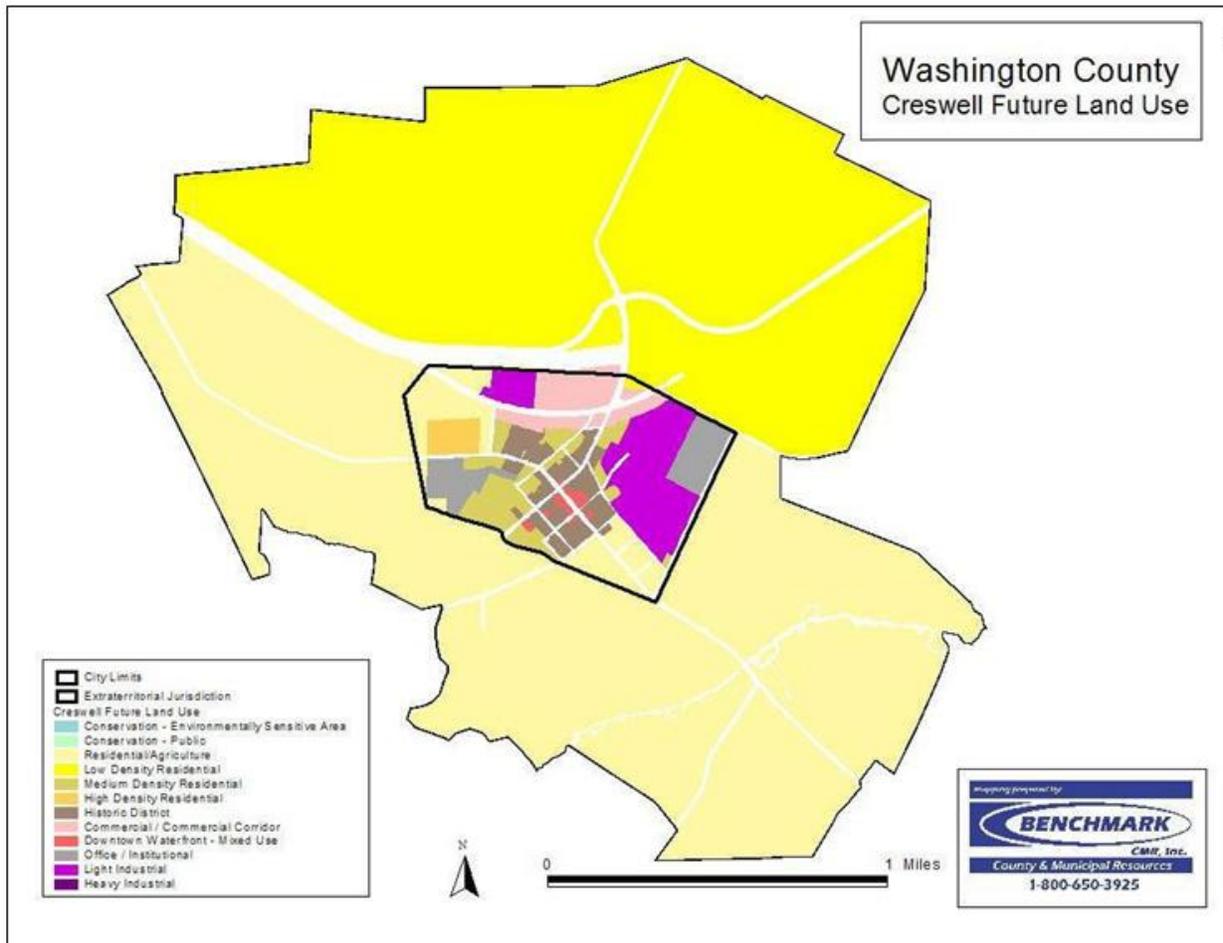
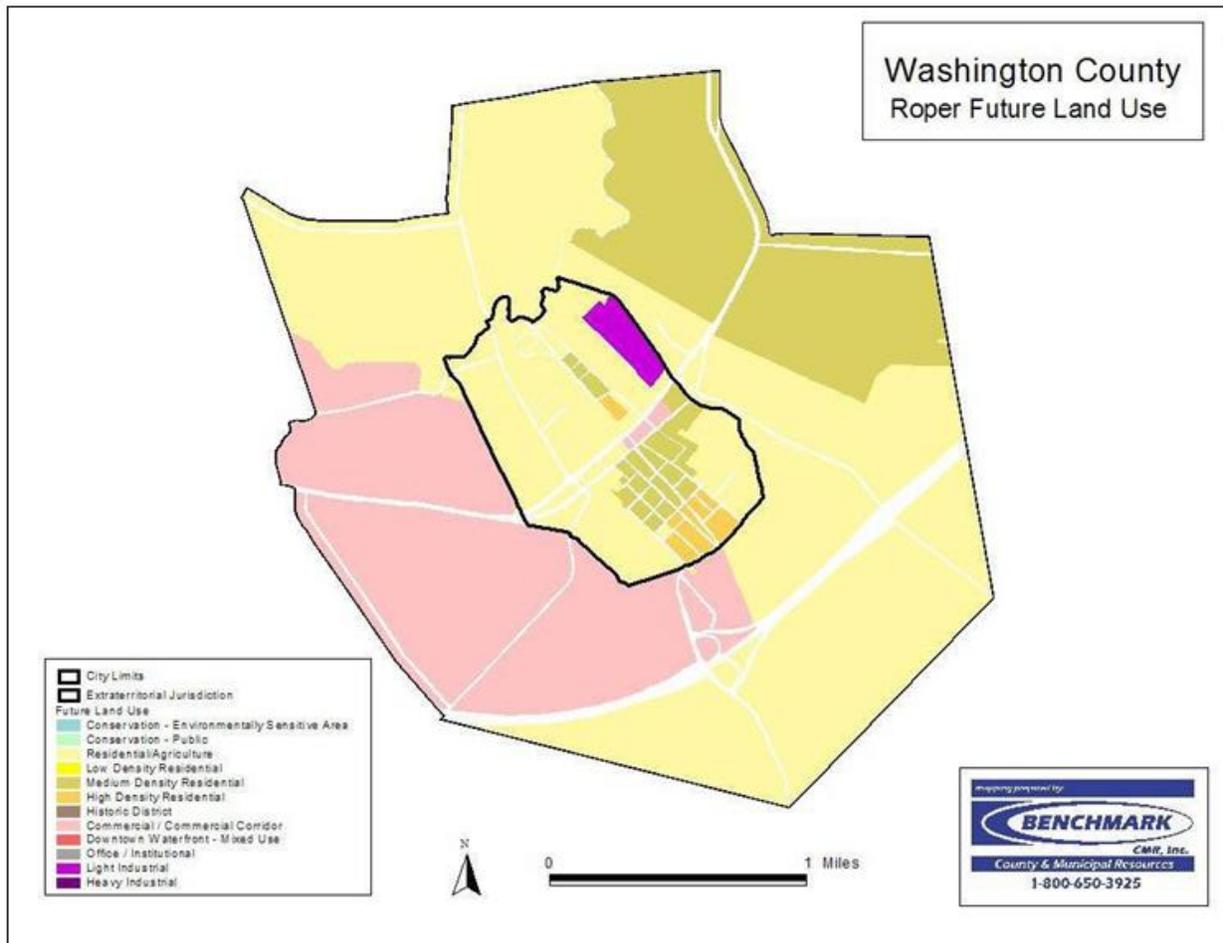


Figure E.5 – Washington County Future Land Use, Creswell



## ANNEX E: WASHINGTON COUNTY

### Asset Inventory

The following tables summarize the asset inventory for Washington 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.6. 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
Washington County	1,277	0	0	114	0	35	0	26	4	0	0	1	0	5	0	2	8	1,472
Town of Creswell	30	1	0	41	0	5	0	10	1	0	0	1	1	2	0	1	0	93
Town of Plymouth	87	8	0	239	2	30	0	36	18	0	0	0	1	7	0	4	0	432
Town of Roper	48	3	0	38	0	1	0	8	1	0	0	0	2	0	0	1	3	105
<b>Washington County Total</b>	<b>1,442</b>	<b>12</b>	<b>0</b>	<b>432</b>	<b>2</b>	<b>71</b>	<b>0</b>	<b>80</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>14</b>	<b>0</b>	<b>8</b>	<b>11</b>	<b>2,102</b>

Source: NCEM Risk Management Tool

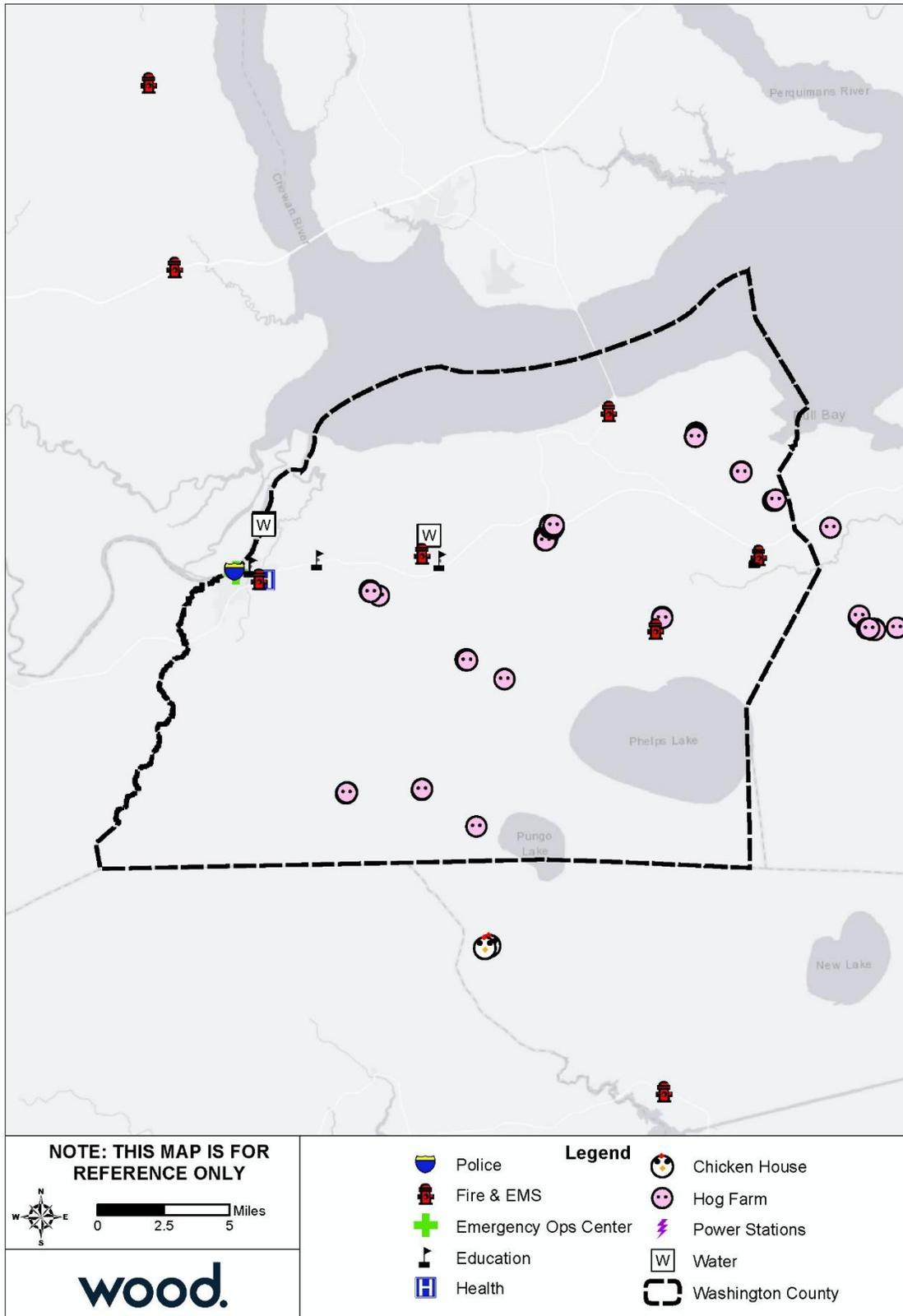
**Table E.4 – High Potential Loss Facilities by Use**

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Washington County	0	0	1	1	1	0	0	3
Town of Creswell	0	0	0	2	0	0	0	2
Town of Plymouth	0	4	0	2	0	0	0	6
Town of Roper	0	0	0	1	0	0	0	1
<b>Washington County Total</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>12</b>

Source: NCEM Risk Management Tool

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

Figure E.6 – Critical Facilities, Washington County



Source: NCEM IRISK Database, GIS Analysis

## ANNEX E: WASHINGTON COUNTY

### Housing

The table below details key housing statistics for Washington County. As a percent of growth from 2010 housing, Washington County's housing stock has increased slightly despite decreases in many incorporated areas. The majority of occupied housing is owner occupied throughout the county and incorporated jurisdictions.

**Table E.5 – Housing Statistics, Washington County, 2010-2017**

Jurisdiction	Housing Units (2010)	Housing Units (2017)	% Change 2010-2017	% Owner Occupied (2017)	% Vacant Units (2017)
Creswell	133	149	12.0%	80.7%	19.3%
Plymouth	1,856	1,797	-3.2%	71.8%	28.2%
Roper	318	383	20.4%	83.0%	17.0%
<b>Washington County</b>	<b>6,491</b>	<b>6,471</b>	<b>-0.3%</b>	<b>70.0%</b>	<b>30.0%</b>

Source: US Census Bureau American Community Survey.

### Economy

The following tables present key economic statistics for Washington County.

**Table E.6 – Economic Indicators, Washington County, 2017**

Jurisdiction	Population in Labor Force	Percent Employed (%)	Percent Unemployed (%)	Percent Not in Labor Force (%)	Unemployment Rate (%)
Creswell	60.2%	59.7%	0.5%	39.8%	0.9%
Plymouth	51.2%	44.6%	4.5%	48.8%	9.2%
Roper	48.6%	42.6%	6.0%	51.4%	12.3%
<b>Washington County</b>	<b>50.6%</b>	<b>44.8%</b>	<b>5.2%</b>	<b>49.4%</b>	<b>10.4%</b>

Source: US Census Bureau American Community Survey.

**Table E.7 – Employment by Industry, Washington County, 2017**

Jurisdiction	Management, Business, Science and Arts (%)	Service (%)	Sales and Office (%)	Natural Resources, Construction, and Maintenance (%)	Production, Transportation, and Material Moving (%)
Creswell	30.7	30.7	11.4	13.2	14.0
Plymouth	13.3	22.7	37.0	6.1	20.9
Roper	9.5	39.1	21.2	16.8	13.4
<b>Washington County</b>	<b>15.8</b>	<b>23.0</b>	<b>23.6</b>	<b>12.3</b>	<b>25.3</b>

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 Washington County than for the Northeastern NC 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 Washington County’s total area by jurisdiction and flood zone on the Effective DFIRM. Per this assessment, at 35 percent, the Town of Plymouth has the largest portion of its land area within the mapped 1%-annual-chance floodplain. Overall, approximately 16.1 percent of the county’s total area falls within the SFHA.

**Table E.8 – Flood Zone Acreage by Jurisdiction, Washington County**

Flood Zone	Acreage	Percent of Total (%)
<b>Unincorporated Washington County</b>		
Open Water	20,171.22	7.5%
Zone A	140.26	0.1%
Zone AE	42,092.13	15.6%
Zone X Shaded	6,338.32	2.4%
Zone X Unshaded	197,190.32	73.2%
<b>Total</b>	<b>265,932.24</b>	<b>--</b>
<b>Creswell</b>		
Zone AE	73.99	20.4%
Zone X Shaded	4.47	1.2%
Zone X Unshaded	283.70	78.3%
<b>Total</b>	<b>362.16</b>	<b>--</b>
<b>Plymouth</b>		
Zone AE	921.60	35.7%
Zone X Shaded	260.13	10.1%
Zone X Unshaded	1,399.83	54.2%
<b>Total</b>	<b>2,581.56</b>	<b>--</b>
<b>Roper</b>		
Zone AE	138.72	25.3%
Zone X Shaded	42.40	7.7%
Zone X Unshaded	366.95	67.0%
<b>Total</b>	<b>548.07</b>	<b>--</b>
<b>Washington County Total</b>		
Open Water	20,171.22	7.5%
Zone A	140.26	0.1%
Zone AE	43,226.44	16.0%
Zone X Shaded	6,645.31	2.5%
Zone X Unshaded	199,240.79	74.0%
<b>Total</b>	<b>269,424.02</b>	<b>--</b>

Source: FEMA Effective DFIRM

Figure E.7 through Figure E.10 reflect the effective mapped flood hazard zones for all jurisdictions with land in the Special Flood Hazard Area in Washington County, and Figure E.11 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

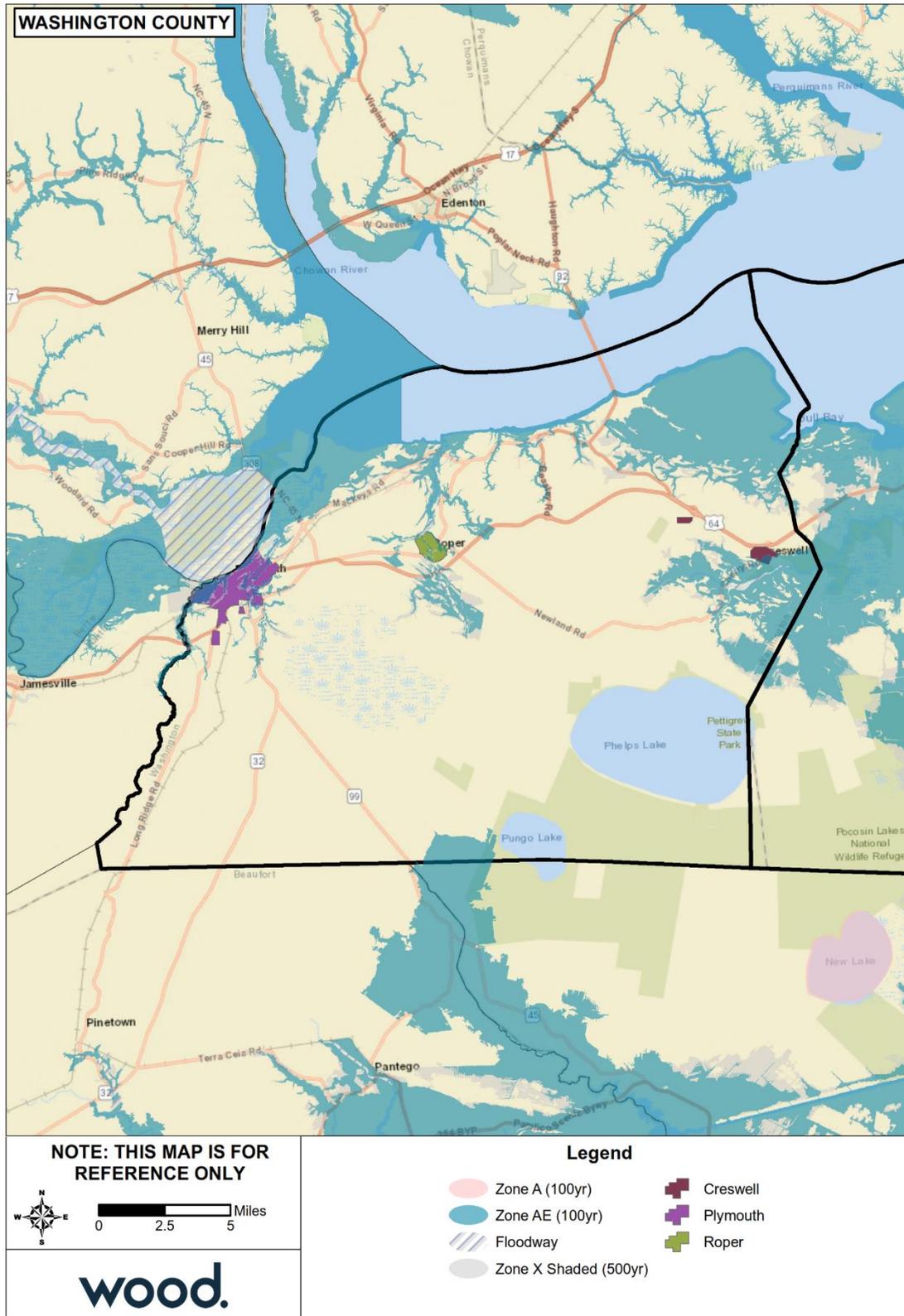
Table E.9 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector in Washington County and incorporated jurisdictions.

**Table E.9 – Critical Facilities Exposed to Flooding by Event and Jurisdiction**

Sector	Event	Number of Buildings at Risk	Estimated Damages
<b>Washington County Unincorporated Areas</b>			
Commercial Facilities	100 Year	1	\$2,554
Critical Manufacturing	100 Year	6	\$24,683
Food and Agriculture	100 Year	8	\$11,255
Healthcare and Public Health	100 Year	1	\$1,529
<b>All Categories</b>	<b>100 Year</b>	<b>16</b>	<b>\$40,021</b>
<b>Town of Plymouth</b>			
Commercial Facilities	100 Year	3	\$1,367
<b>All Categories</b>	<b>100 Year</b>	<b>3</b>	<b>\$1,367</b>

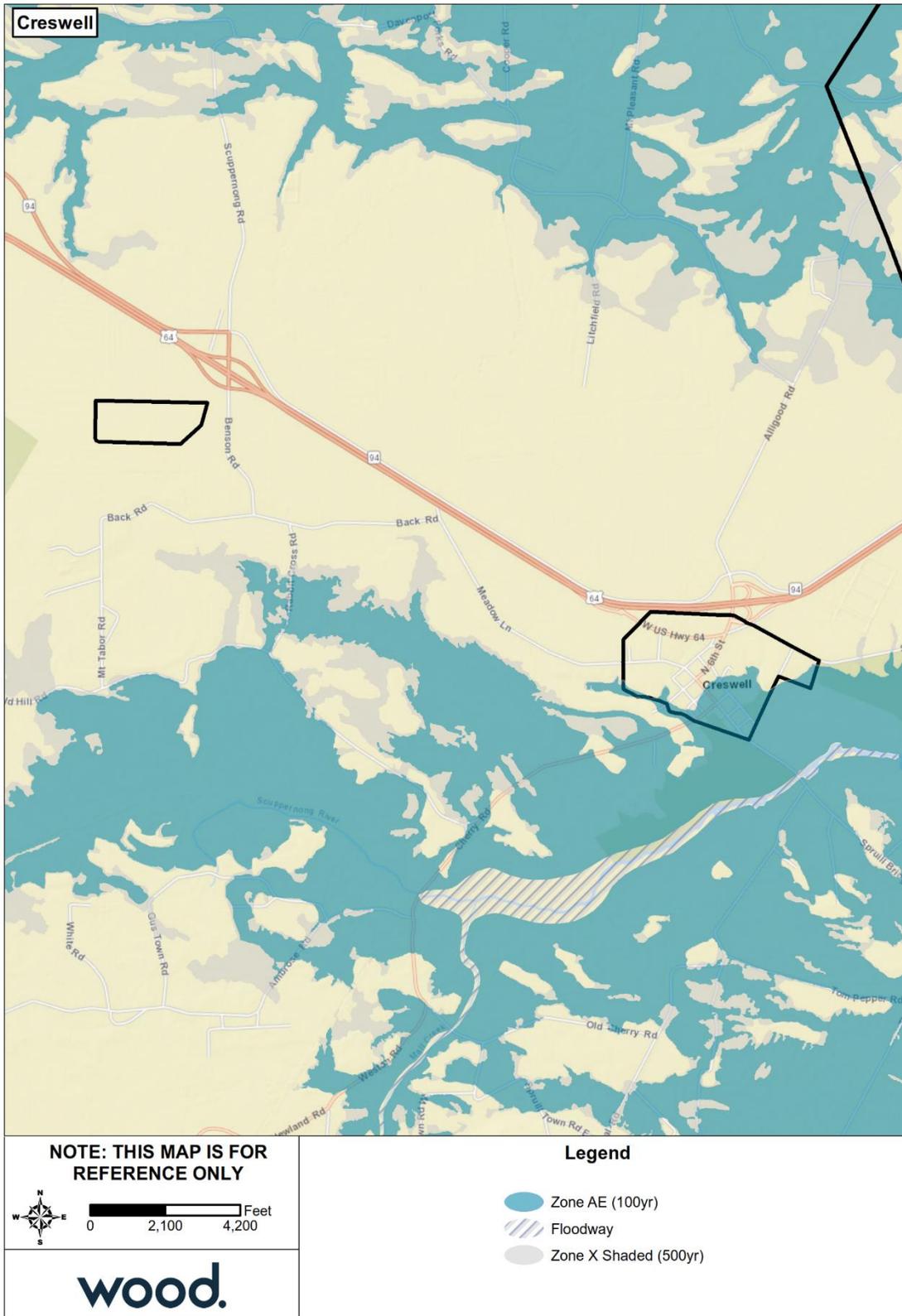
Source: NCEM Risk Management Tool

Figure E.7 – FEMA Flood Hazard Areas, Washington County



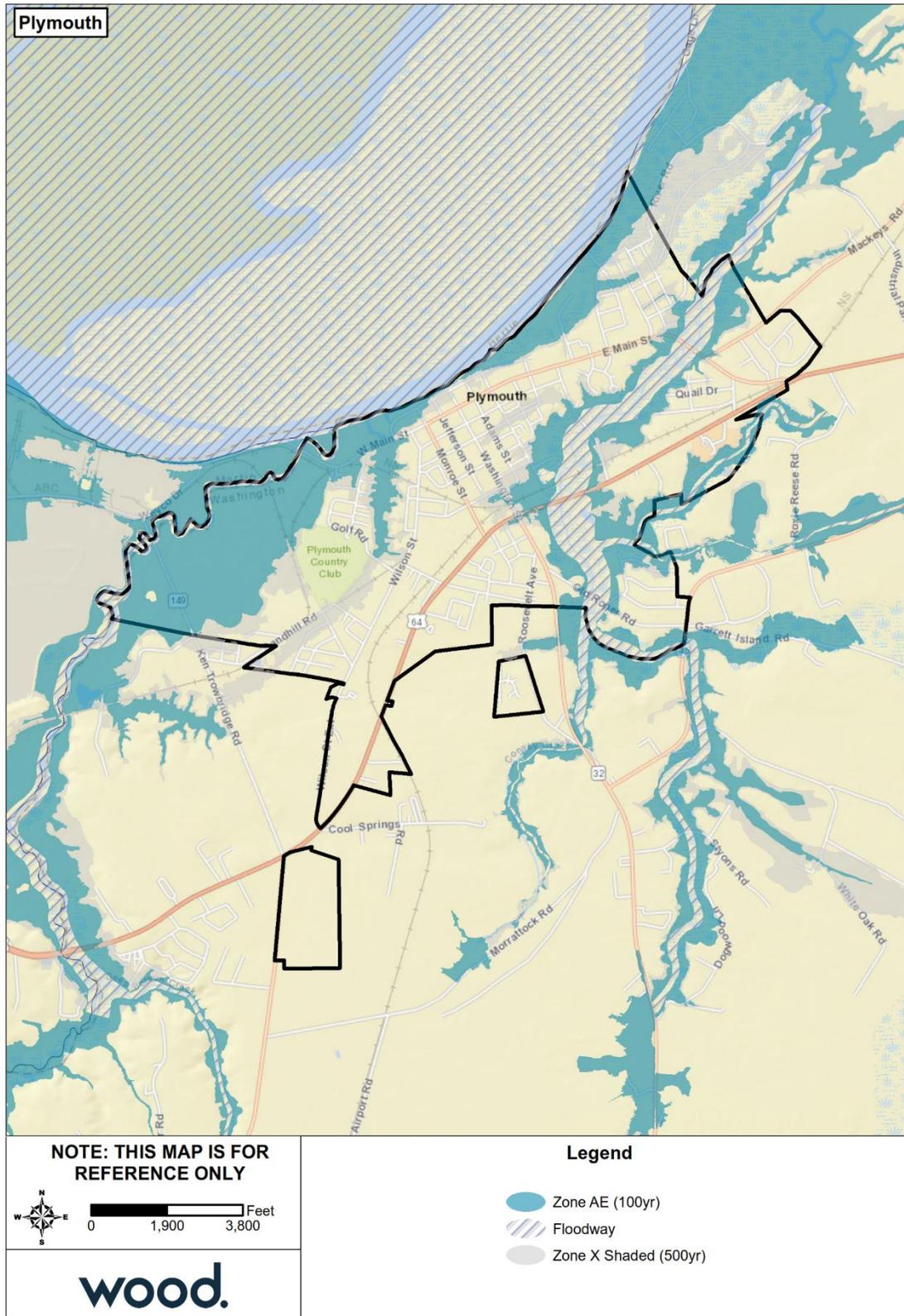
Source: FEMA Effective DFIRM

Figure E.8 – FEMA Flood Hazard Areas, Town of Creswell



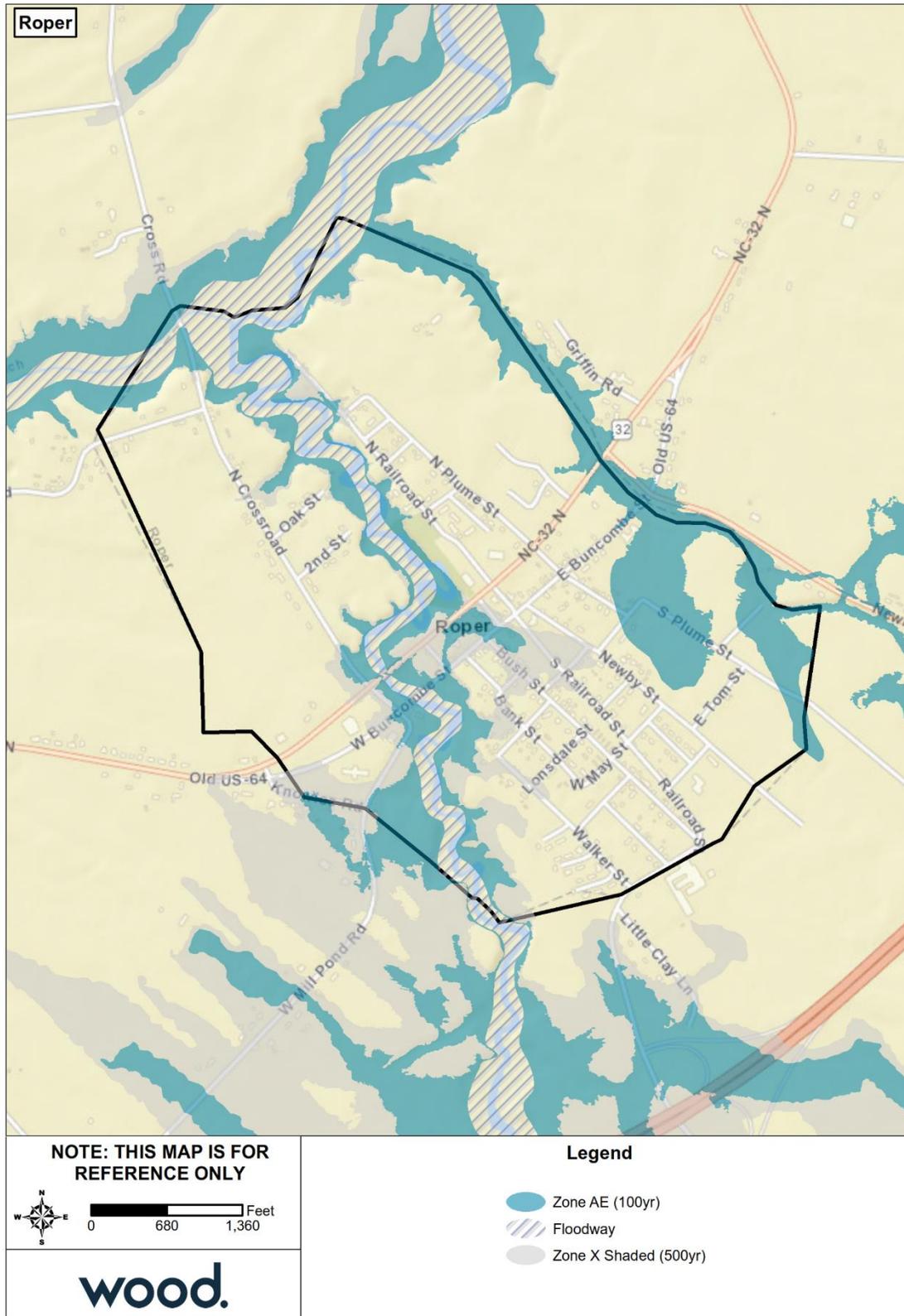
Source: FEMA Effective DFIRM

Figure E.9 – FEMA Flood Hazard Areas, Town of Plymouth



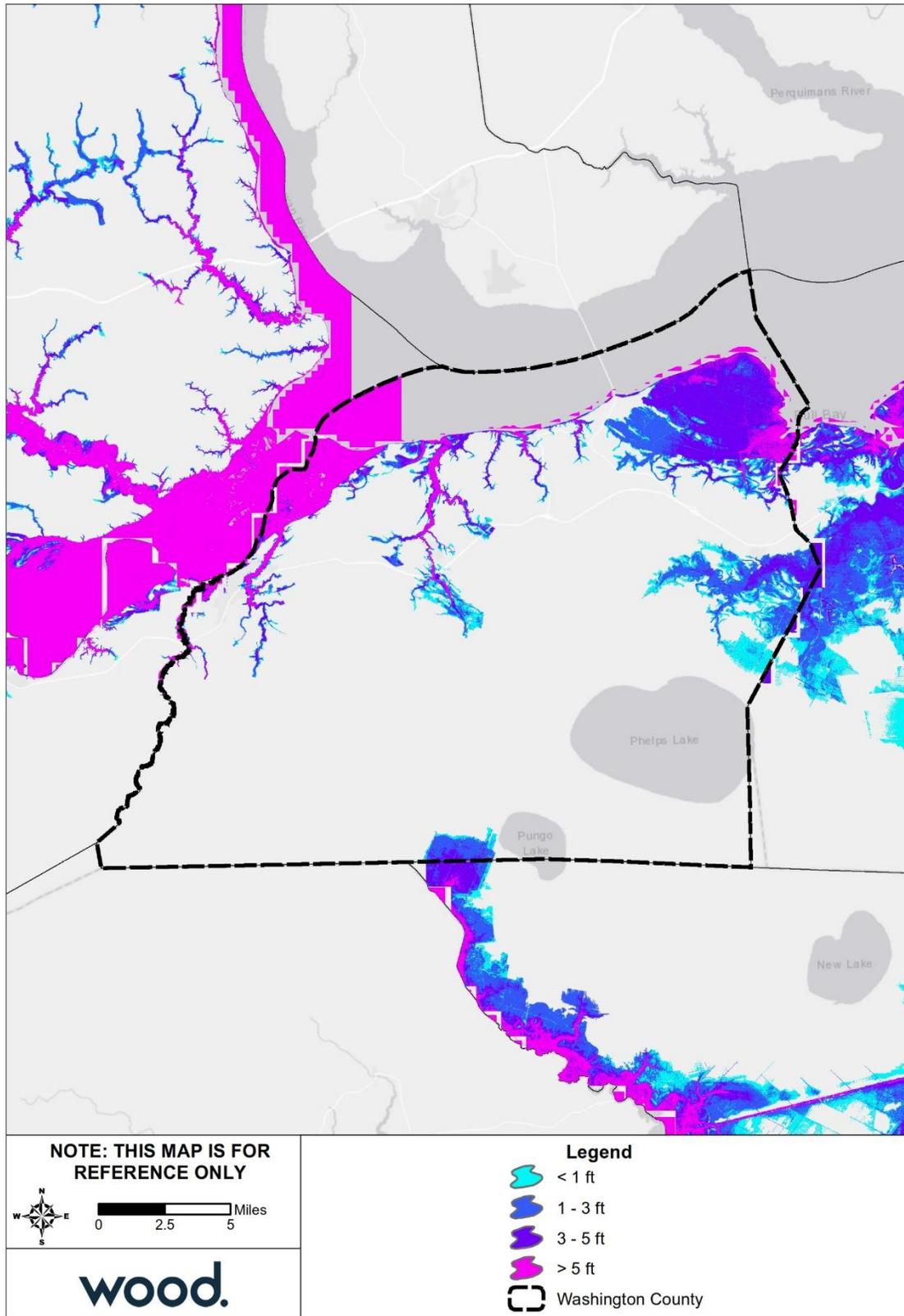
Source: FEMA Effective DFIRM

Figure E.10 – FEMA Flood Hazard Areas, Village of Roper



Source: FEMA Effective DFIRM

Figure E.11 – Flood Depth, 1%-Annual-Chance Floodplain, Washington County



Source: FEMA Effective DFIRM

**E.2.2 Wildfire**

Table E.10 summarizes the acreage in Washington 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 78 percent of Washington County is not included in the WUI.

**Table E.10 – Wildland Urban Interface Acreage, Washington County**

	Housing Density	Total Acreage	Percent of Total Acreage
	<i>Not in WUI</i>	207,523.7	78.1%
	LT 1hs/40ac	24,591.5	9.3%
	1hs/40ac to 1hs/20ac	11,055.9	4.2%
	1hs/20ac to 1hs/10ac	8,710.6	3.3%
	1hs/10ac to 1hs/5ac	5,938.2	2.2%
	1hs/5ac to 1hs/2ac	4,976.7	1.9%
	1hs/2ac to 3hs/1ac	2,941.4	1.1%
	GT 3hs/1ac	2.2	0.0%
	<b>Total</b>	<b>265,740.0</b>	

Source: Southern Wildfire Risk Assessment

Figure E.12 depicts the WUI for Washington County. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure E.13 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure E.14 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts.

Areas of high potential fire intensity occur in the southeastern corner of the county and along the northern and eastern edges of the county. Moderate burn probability also exists in these areas with high potential fire intensity. Although much of the County is outside the WUI, there are many areas of overlap between high potential fire intensity, moderate burn probability, and WUI. These overlaps occur primarily in the unincorporated areas of the county. Based on these correlations, there is significant exposure to wildfire in Washington County.

Table E.11 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard in Washington County and participating jurisdictions. Table E.12 provides counts and estimated damages for High Potential Loss Properties in these areas.

**Table E.11 – Critical Facilities Exposed to Wildfire by Jurisdiction, Washington County**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Washington County Unincorporated Area</b>		
Commercial Facilities	88	\$21,597,048
Critical Manufacturing	26	\$10,362,562
Emergency Services	1	\$184,997
Food and Agriculture	711	\$37,347,704
Government Facilities	26	\$7,724,684
Healthcare and Public Health	3	\$1,002,865
Nuclear Reactors, Materials and Waste	1	\$153,300
Transportation Systems	2	\$168,834
<b>All Categories</b>	<b>858</b>	<b>\$78,541,994</b>

**ANNEX E: WASHINGTON COUNTY**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Town of Creswell</b>		
Banking and Finance	1	\$492,432
Commercial Facilities	32	\$5,635,852
Critical Manufacturing	5	\$1,436,095
Emergency Services	1	\$462,620
Food and Agriculture	28	\$1,831,320
Government Facilities	10	\$9,270,553
Nuclear Reactors, Materials and Waste	1	\$199,240
Transportation Systems	2	\$294,808
<b>All Categories</b>	<b>80</b>	<b>\$19,622,920</b>
<b>Town of Plymouth</b>		
Banking and Finance	5	\$2,416,967
Commercial Facilities	196	\$66,578,299
Communications	2	\$205,453
Critical Manufacturing	23	\$7,742,454
Emergency Services	3	\$2,296,902
Food and Agriculture	83	\$3,885,939
Government Facilities	33	\$12,665,192
Healthcare and Public Health	15	\$10,941,618
Postal and Shipping	1	\$800,000
Transportation Systems	5	\$1,792,968
<b>All Categories</b>	<b>366</b>	<b>\$109,325,792</b>
<b>Town of Roper</b>		
Banking and Finance	1	\$974,100
Commercial Facilities	26	\$9,849,368
Critical Manufacturing	1	\$1,000
Emergency Services	1	\$578,115
Food and Agriculture	33	\$1,334,111
Government Facilities	7	\$6,005,287
Healthcare and Public Health	1	\$354,508
Postal and Shipping	2	\$800,000
Water	3	\$279,300
<b>All Categories</b>	<b>75</b>	<b>\$20,175,789</b>

Source: NCEM Risk Management Tool

**Table E.12 – High Potential Loss Properties Exposed to Wildfire by Jurisdiction, Washington County**

Sector	Number of Buildings at Risk	Estimated Damages
<b>Washington County Unincorporated Area</b>		
Government	1	\$2,753,547
Industrial	1	\$2,562,300
<b>All Categories</b>	<b>2</b>	<b>\$5,315,847</b>
<b>Town of Creswell</b>		
Government	2	\$3,297,457
<b>All Categories</b>	<b>2</b>	<b>\$3,297,457</b>
<b>Town of Plymouth</b>		
Commercial	4	\$11,731,187
Government	2	\$3,155,492
<b>All Categories</b>	<b>6</b>	<b>\$14,886,679</b>

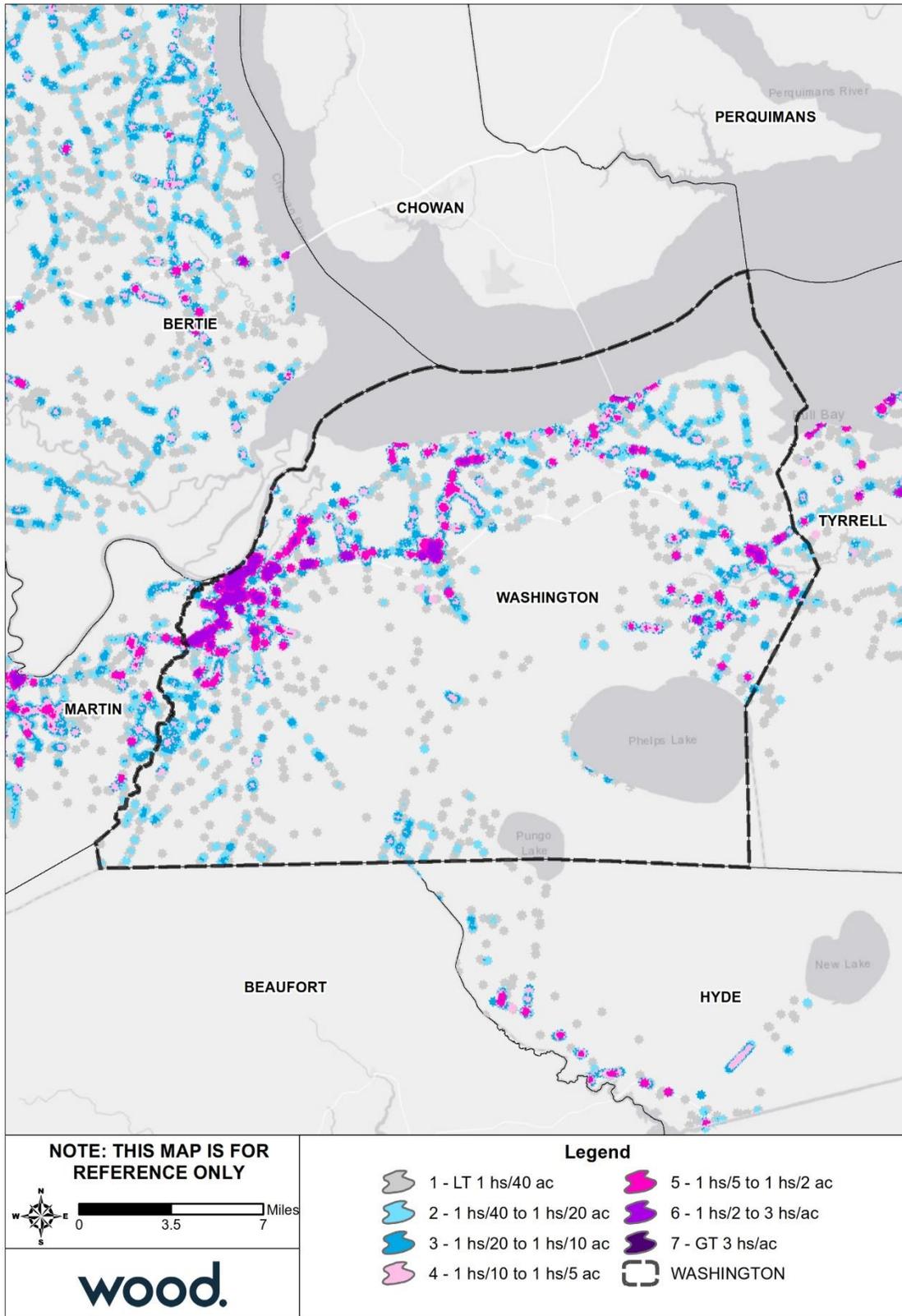
## ANNEX E: WASHINGTON COUNTY

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Sector	Number of Buildings at Risk	Estimated Damages
<b>Town of Roper</b>		
Government	1	\$3,535,201
<b>All Categories</b>	<b>1</b>	<b>\$3,535,201</b>

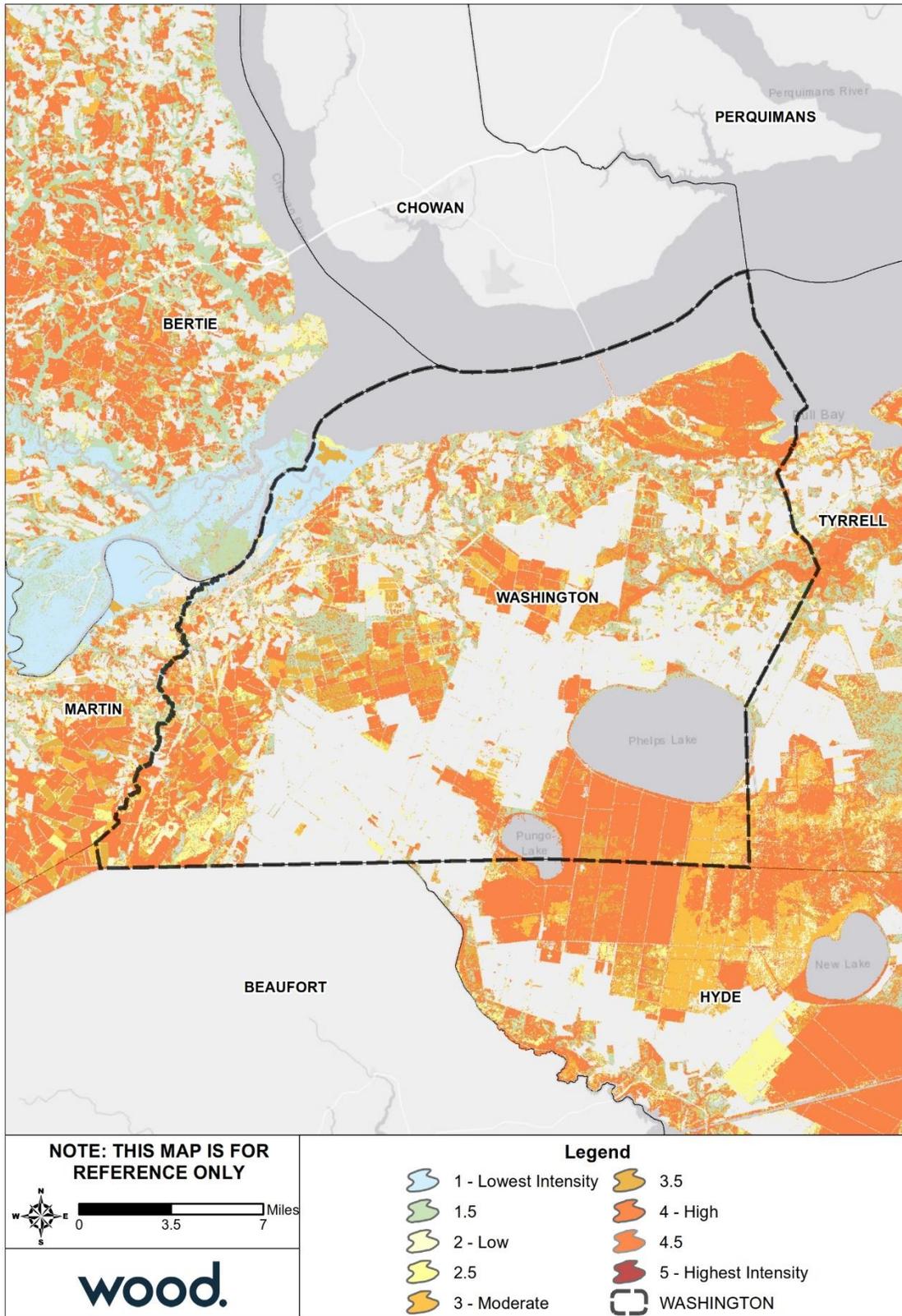
Source: NCEM Risk Management Tool

Figure E.12 – Wildland Urban Interface, Washington County



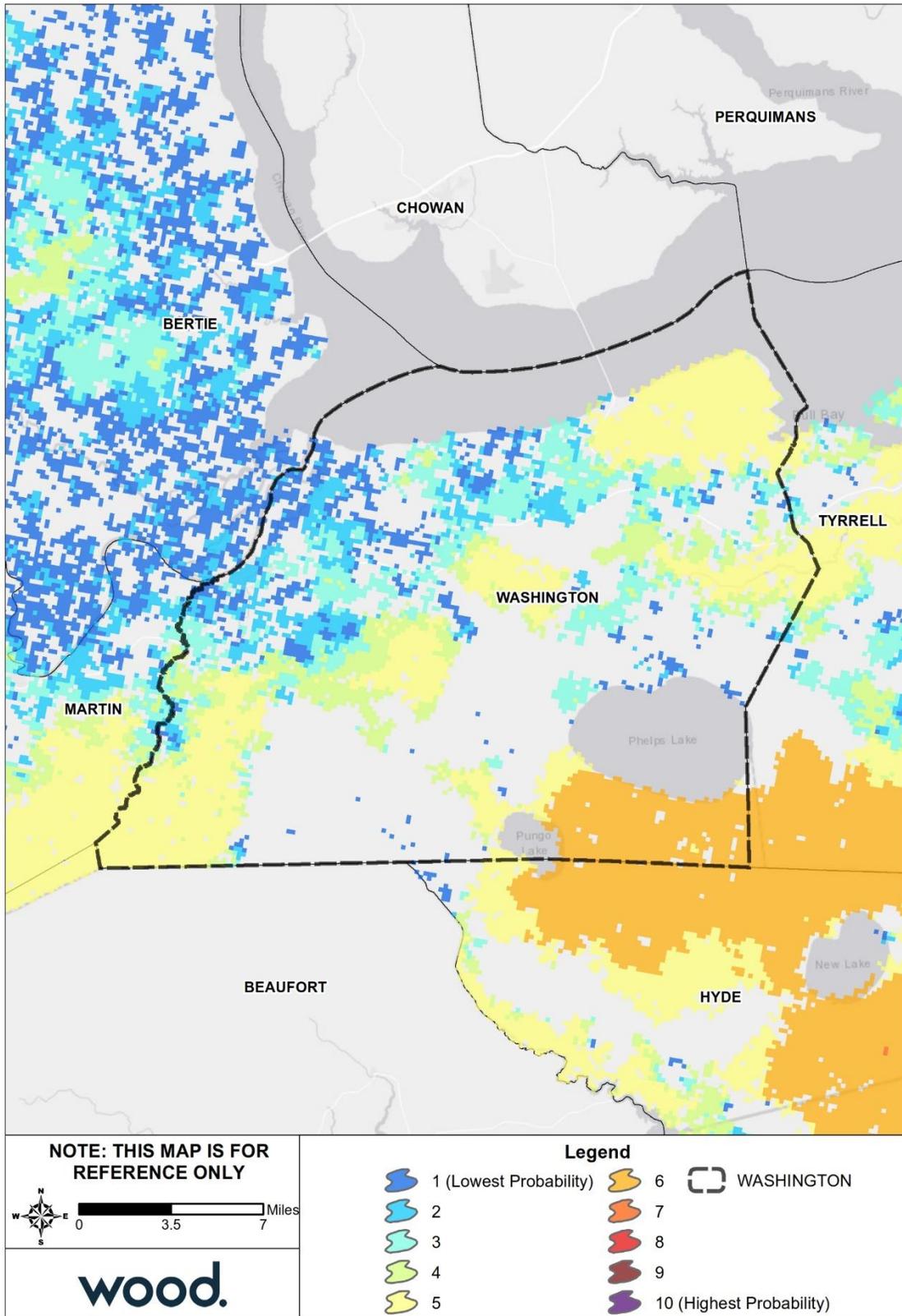
Source: Southern Wildfire Risk Assessment

Figure E.13 – Fire Intensity Scale, Washington County



Source: Southern Wildfire Risk Assessment

Figure E.14 – Burn Probability, Washington 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 Washington 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, Washington County has an overall capability rating of Moderate, in line with their own self-assessed overall capability. The incorporated areas have an overall capability rating of Low despite self-assessing as Moderate. However, capability gaps at the local level may be addressed by County support. Washington 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.13.

**Table E.13 – Capability Self-Assessment Ratings, Washington County**

Capability Area	Washington County
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

**E.3.2 Floodplain Management**

The following tables reflect NFIP entry dates as well as policy and claims data for Washington County and incorporated categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table E.14 – NFIP Program Entry Dates**

Community	Regular Entry Date
Washington County (Unincorporated Area)	August 19, 1985
Town of Creswell	August 19, 1985
Town of Plymouth	August 19, 1985
Town of Roper	August 5, 1987

Source: FEMA Community Information System

**Table E.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
<b>Washington County Unincorporated Area</b>					
Single Family	152	\$81,945	\$33,133,700	72	\$1,112,216.58
2-4 Family	0	\$0	\$0	0	\$0.00
All Other Residential	0	\$0	\$0	0	\$0.00
Non-Residential	1	\$861	\$49,900	2	\$104,192.80
<b>Total</b>	<b>153</b>	<b>\$82,806</b>	<b>\$33,183,600</b>	<b>74</b>	<b>\$1,216,409.38</b>
<b>Town of Creswell</b>					
Single Family	12	\$4,466	\$2,068,900	5	\$25,575.37
<b>Total</b>	<b>12</b>	<b>\$4,466</b>	<b>\$2,068,900</b>	<b>5</b>	<b>\$25,575.37</b>
<b>Town of Plymouth</b>					
Single Family	60	\$43,292	\$14,389,700	29	\$385,197.99

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Structure Type	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
Non-Residential	13	\$24,632	\$5,893,800	8	\$881,522.80
<b>Total</b>	<b>73</b>	<b>\$67,924</b>	<b>\$20,283,500</b>	<b>37</b>	<b>\$1,266,720.79</b>
<b>Town of Roper</b>					
Single Family	11	\$7,826	\$2,457,200	3	\$100,477.60
<b>Total</b>	<b>11</b>	<b>\$7,826</b>	<b>\$2,457,200</b>	<b>3</b>	<b>\$100,477.60</b>

Source: FEMA Community Information System, accessed February 2020

**Table E.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
<b>Washington County Unincorporated Area</b>					
A01-30 & AE Zones	96	\$56,369	\$18,444,800	65	\$857,960.32
A Zones	1	\$1,204	\$250,000	1	\$12,274.32
B, C & X Zone					
Standard	5	\$6,116	\$965,000	2	\$130,906.42
Preferred	49	\$17,917	\$13,454,000	6	\$215,268.32
<b>Total</b>	<b>151</b>	<b>\$81,606</b>	<b>\$33,113,800</b>	<b>74</b>	<b>\$1,216,409.38</b>
<b>Town of Creswell</b>					
A01-30 & AE Zones	6	\$2,064	\$774,000	4	\$21,833.16
B, C & X Zone					
Preferred	5	\$1,802	\$1,260,000	1	\$3,742.21
<b>Total</b>	<b>11</b>	<b>\$3,866</b>	<b>\$2,034,000</b>	<b>5</b>	<b>\$25,575.37</b>
<b>Town of Plymouth</b>					
A01-30 & AE Zones	46	\$46,369	\$11,053,100	24	\$778,200.50
A Zones	1	\$515	\$250,000	4	\$20,097.38
B, C & X Zone					
Standard	4	\$6,634	\$1,195,400	5	\$440,084.03
Preferred	22	\$14,406	\$7,785,000	4	\$28,338.88
<b>Total</b>	<b>73</b>	<b>\$67,924</b>	<b>\$20,283,500</b>	<b>37</b>	<b>\$1,266,720.79</b>
<b>Town of Roper</b>					
A01-30 & AE Zones	3	\$4,367	\$567,400	0	\$0.00
B, C & X Zone					
Standard	0	\$0	\$0	1	\$62,517.01
Preferred	6	\$2,259	\$1,820,000	2	\$37,960.59
<b>Total</b>	<b>9</b>	<b>\$6,626</b>	<b>\$2,387,400</b>	<b>3</b>	<b>\$100,477.60</b>

Source: FEMA Community Information System, accessed February 2020

**Table E.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
<b>Washington County Unincorporated Area</b>					
A01-30 & AE Zones	37	\$29,417	\$5,927,800	34	\$566,929.63
A Zones	1	\$1,204	\$250,000	1	\$12,274.32
B, C & X Zone					
Standard	4	\$5,000	\$755,000	2	\$130,906.42
Preferred	31	\$11,224	\$8,232,000	6	\$215,268.32
<b>Total</b>	<b>73</b>	<b>\$46,845</b>	<b>\$15,164,800</b>	<b>43</b>	<b>\$925,378.69</b>

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Flood Zone	Policies in Force	Total Premium	Insurance in Force	Number of Closed Paid Losses	Total of Closed Paid Losses
<b>Town of Creswell</b>					
A01-30 & AE Zones	2	\$806	\$309,000	4	\$21,833.16
B, C & X Zone	5	\$1,802	\$1,260,000	1	\$3,742.21
Preferred	5	\$1,802	\$1,260,000	1	\$3,742.21
<b>Total</b>	<b>7</b>	<b>\$2,608</b>	<b>\$1,569,000</b>	<b>5</b>	<b>\$25,575.37</b>
<b>Town of Plymouth</b>					
A01-30 & AE Zones	24	\$28,635	\$4,648,200	13	\$710,421.49
A Zones	1	\$515	\$250,000	0	\$0.00
B, C & X Zone	22	\$16,458	\$7,365,400	8	\$456,632.04
Standard	3	\$5,468	\$1,070,400	4	\$428,293.16
Preferred	19	\$10,990	\$6,295,000	4	\$28,338.88
<b>Total</b>	<b>47</b>	<b>\$45,608</b>	<b>\$12,263,600</b>	<b>21</b>	<b>\$1,167,053.53</b>
<b>Town of Roper</b>					
A01-30 & AE Zones	1	\$3,473	\$160,900	0	\$0.00
B, C & X Zone	5	\$1,858	\$1,470,000	3	\$100,477.60
Standard	0	\$0	\$0	1	\$62,517.01
Preferred	5	\$1,858	\$1,470,000	2	\$37,960.59
<b>Total</b>	<b>6</b>	<b>\$5,331</b>	<b>\$1,630,900</b>	<b>3</b>	<b>\$100,477.60</b>

Source: FEMA Community Information System, accessed February 2020

**Table E.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
<b>Washington County Unincorporated Area</b>					
A01-30 & AE Zones	59	\$26,952	\$12,517,000	31	\$291,030.69
B, C & X Zone	19	\$7,809	\$5,432,000	0	\$0.00
Standard	1	\$1,116	\$210,000	0	\$0.00
Preferred	18	\$6,693	\$5,222,000	0	\$0.00
<b>Total</b>	<b>78</b>	<b>\$34,761</b>	<b>\$17,949,000</b>	<b>31</b>	<b>\$291,030.69</b>
<b>Town of Creswell</b>					
A01-30 & AE Zones	4	\$1,258	\$465,000	0	\$0.00
<b>Total</b>	<b>4</b>	<b>\$1,258</b>	<b>\$465,000</b>	<b>0</b>	<b>\$0.00</b>
<b>Town of Plymouth</b>					
A01-30 & AE Zones	22	\$17,734	\$6,404,900	11	\$67,779.01
A Zones	0	\$0	\$0	4	\$20,097.38
B, C & X Zone	4	\$4,582	\$1,615,000	1	\$11,790.87
Standard	1	\$1,166	\$125,000	1	\$11,790.87
Preferred	3	\$3,416	\$1,490,000	0	\$0.00
<b>Total</b>	<b>26</b>	<b>\$22,316</b>	<b>\$8,019,900</b>	<b>16</b>	<b>\$99,667.26</b>
<b>Town of Roper</b>					
A01-30 & AE Zones	2	\$894	\$406,500	0	\$0.00
B, C & X Zone	1	\$401	\$350,000	0	\$0.00
Standard	0	\$0	\$0	0	\$0.00
Preferred	1	\$401	\$350,000	0	\$0.00
<b>Total</b>	<b>3</b>	<b>\$1,295</b>	<b>\$756,500</b>	<b>0</b>	<b>\$0.00</b>

Source: FEMA Community Information System, accessed February 2020

E.4 MITIGATION STRATEGY

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
W1	Continue to seek funding for assistance in constructing a new dedicated EOC. The county's existing facility is adequate; however, there is a need for a new and dedicated facility.	Washington Co., Creswell, Plymouth, Roper	All Hazards	Low	2.1	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Board of Commissioners</li> <li>Municipal Administrations</li> </ul>	To be Determined	General Fund, NCDPS, FEMA	5 years	Not Started – Carry Forward	Washington County has been working towards establishing a new EOC for many years. The County will continue to look for opportunities to move forward with this project.
W2	Continue to seek grant funding that will enable the removal of all critical infrastructure from the floodplain. This effort is currently underway; however, there is more to be accomplished. This effort will require assistance from the county Emergency Management Department.	Washington Co., Plymouth	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	3.1	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Board of Commissioners</li> <li>Municipal Administration</li> </ul>	To be determined	General Fund, NCDPS, FEMA	5 years	Not Started – Carry Forward	Washington County has been working towards addressing this issue for many years and has not been able to move forward. The County will continue to look for opportunities to move forward with this project.
W3	Monitor all land development codes, including the county and town Flood Damage Prevention Ordinances, on an annual basis to ensure that they are up-to-date and address current issues and concerns. This review will also be conducted following substantial natural hazard events.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.3	P	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Inspections</li> <li>Washington County Board of Commissioners</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	Washington County continues to closely monitor the impacts that natural hazards have on the County's built environment. These factors will be incorporated into decisions regarding amendment to the County's land development regulations.
W4	Through implementation of this plan, consider increasing the County's required freeboard within the county's FDPO.	Washington Co.	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	1.2	PP	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Inspections</li> <li>Washington County Board of Commissioners</li> </ul>	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Washington County will review the County's minimal design standards within the defined special flood hazard area to ensure that those standards are adequate to address the potential impacts of recently occurring flooding events.
W5	Continue to work towards the development of a system to provide on-line offerings of permits, inspections, and taxes. This effort will streamline operations and provide for a more efficient flow of information.	Washington Co.	All Hazards	High	3.1	PP	<ul style="list-style-type: none"> <li>Washington County Inspections</li> </ul>	\$20,000	General Fund	2 years	Not Started – Carry Forward	Washington County has not yet initiated this process but will do so through implementation of this plan. This effort will also impact all participating municipal jurisdictions.
W6	The Washington County Inspections office will aim to acquire a new permitting program that will be helpful in tracking floodplain development activity.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure, Severe Weather	High	3.1	PP	<ul style="list-style-type: none"> <li>Washington County Inspections</li> <li>Municipal Administrations</li> </ul>	\$20,000	General Fund	2 years	Not Started – Carry Forward	Washington County has not yet initiated this process but will do so through implementation of this plan. This effort will also impact all participating municipal jurisdictions.
W7	Mail a notice once annually to all property owners whose land is located within a special flood hazard area. The notice should clearly state that the recipient's property is susceptible to flooding and provide information pertinent to emergency evacuation and post-disaster recovery. Additionally, the county will notify all property owners once annually via mail, either through individual mailers or utility bill inserts, of the hazards associated with flooding and other hazards resulting from severe weather events.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	SP	<ul style="list-style-type: none"> <li>Washington County Inspections</li> <li>Municipal Administrations</li> </ul>	\$4,500	General Fund, NCDPS	2020-2025	In Progress – Carry Forward	This effort is currently underway and relates to the County's ongoing Community Rating System Program. These efforts will continue through implementation of his 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
W8	Maintain a map information service involving the following: <ul style="list-style-type: none"> <li>• 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.</li> <li>• Provide information regarding the flood insurance purchase requirement.</li> <li>• Maintain historical <b>and</b> current FIRMs.</li> <li>• Locally advertise once annually in the local newspaper.</li> <li>• Provide information to inquirers about local floodplain management requirements.</li> </ul>	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PIO	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Washington County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	Washington County provides this service on a daily basis to property owners, builders, as well as contractors and will continue to do so through implementation of this plan.
W9	Work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The county will provide these agencies with brochures documenting the concerns relating to development located within flood-prone areas and ways that homeowners may make their homes more disaster-resistant to strong winds, lightning, and heavy rains.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.1	PIO	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, Municipal Administrations	2020-2025	In Progress – Carry Forward	This effort is integral to the County's Community Rating System Program and will continue through implementation of this plan. Maintaining a high CRS rating is a high priority for the County.
W10	Make information regarding hazards and development regulations within floodplains available through the following for: <ul style="list-style-type: none"> <li>• Ensure that the local library maintains information relating to flooding and flood protection.</li> <li>• Provide a link on county/town websites to FEMA resources addressing flooding and flood protection.</li> <li>• Maintain information pertinent to local development conditions and make this information readily available to the public, including being posted at the local library.</li> </ul>	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	2.2	PIO	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Washington County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	In Progress – Carry Forward	This effort is integral to the County's Community Rating System Program and will continue through implementation of this plan. Maintaining a high CRS rating is a high priority for the County.
W11	Provide comprehensive services regarding planning and development activities within the defined SFHA and issues relating to the construction of disaster-resistant structures. These services will include: <ul style="list-style-type: none"> <li>• Provide site-specific flood and flood related information on an as-needed basis.</li> <li>• Maintain a list of contractors with experience in floodproofing and retrofit techniques.</li> <li>• Provide information on methods of windproofing construction methods for new and renovated structures.</li> <li>• Maintain materials providing an overview of how to select a qualified contractor.</li> <li>• Make site visits upon request to review occurrences of flooding, drainage problems, and sewer problems. If applicable, the inspector should provide one-on-one advice to the property owner.</li> <li>• Provide advice and assistance regarding CRS Activity 530 (Flood Protection).</li> <li>• Advertise the availability of this service in the local newspaper once annually.</li> <li>• Maintain a log of all individuals assisted through this service, including all site visits.</li> </ul>	Washington Co, Creswell, Plymouth, Roper	All Hazards	High	1.2	PP	<ul style="list-style-type: none"> <li>• Washington County Inspections</li> <li>• Washington County Administration</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund	2020-2025	In Progress – Carry Forward	The Washington County Inspections Department provides comprehensive services regarding development and the retrofitting of homes associated with floodplain development.
W12	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 Planning and Building Inspections Department.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Medium	2.2	PIO	<ul style="list-style-type: none"> <li>• Washington County Tax Office</li> <li>• Washington County Inspections</li> <li>• Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS	2 to 3 years	Not Started – Carry Forward	Washington County has not initiated this effort but will do so through the implementation of this plan based on the impacts of Hurricanes Matthew and Florence.

ANNEX E: WASHINGTON 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
W13	Seek grant funding for mitigation opportunities eligible under the most current version of the UHMA guidance and Public Assistance 406 Mitigation Guidance at the time of application. Projects may include but are not limited to: acquisition/elevation, mitigation/reconstruction, and wet/dry floodproofing to residential and non-residential structures. Funding may also be utilized for redundant power to critical facilities, wind retrofits to critical facilities, storm shelters and other activities that reduce the loss of life and property.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	High	1.2	SP	<ul style="list-style-type: none"> <li>Washington County Administration</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCPDS, FEMA	2020-2025	In Progress – Carry Forward	Washington County, as well as participating municipal jurisdictions, will continue to maintain a listing of vulnerable and/or repetitive loss properties and work to identify treatment options as funding becomes available.
W14	Work to implement all strategies and recommendations outlined within the Washington County Hurricane Matthew Resilient Redevelopment Plan.	Washington Co., Creswell, Plymouth, Roper	Flood, Hurricane & Tropical Storm, Dam & Levee Failure	Low	3.1	SP	<ul style="list-style-type: none"> <li>Washington County Administrations</li> <li>Municipal Administrations</li> </ul>	To be Determined	General Fund, NCPDS, NCDEQ, FEMA	5 years	New	N/A
W15	Promote and encourage the training of Community Emergency Response Teams (CERT) throughout the county.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	4.2	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Community Emergency Response Teams</li> <li>Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	1 to 3 years	New	N/A
W16	Work to develop continuity of operations plans (COOP) for county/town departments, assisted living facilities, long-term care facilities, day care centers, etc.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	3.1	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	1 to 3 years	New	N/A
W17	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.	Washington Co., Creswell, Plymouth, Roper	All Hazards	Medium	1.2	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Washington County Administration</li> <li>Municipal Administrations</li> </ul>	To be determined	General Fund, NCDPS, FEMA	2 to 3 years	New	N/A
W18	Maintain a contract with a qualified post-disaster recovery service provider. This contract will include the provision of essential services and equipment, including generators, and will include documentation required for reimbursement from FEMA/NCCEM.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	3.2	NRP	<ul style="list-style-type: none"> <li>Washington County Administration</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	New	N/A
W19	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 all participating municipalities to ensure that all jurisdictions continue to be educated and prepared for activation of the EOP in the event of a disaster event.	Washington Co., Creswell, Plymouth, Roper	All Hazards	High	4.2	ES	<ul style="list-style-type: none"> <li>Washington County Planning &amp; Safety</li> <li>Municipal Administrations</li> </ul>	Staff Time	General Fund, NCDPS, FEMA	2020-2025	New	N/A

# Appendix A Plan Review Tool

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## LOCAL MITIGATION PLAN REVIEW TOOL

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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*.

<b>Jurisdiction:</b> Northeastern NC Region (Bertie County, Hyde County, Martin County, Tyrrell County, Washington County, and incorporated jurisdictions)	<b>Title of Plan:</b> Northeastern NC Regional Hazard Mitigation Plan	<b>Date of Plan:</b> March 2020
<b>Local Point of Contact:</b> David Stroud	<b>Address:</b> 4021 Stirrup Creek Drive, Suite 100 Durham, NC 27703	
<b>Title:</b>		
<b>Agency:</b>		
<b>Phone Number:</b> 919-856-6485	<b>E-Mail:</b> David.stroud@woodplc.com	

<b>State Reviewer:</b> John Mello	<b>Title:</b> Hazard Mitigation Planner	<b>Date:</b> 7/10/2020 7/16/2020
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<b>FEMA Reviewer:</b> Martin Erbele Carl Mickalonis Edwardine S. Marrone	<b>Title:</b> FEMA RIV Program Analyst/ HM Planning Lead NC-FIT-Mitigation Planner	8-18-2020/ 3/18/2021 4/5/2021
<b>Date Received in FEMA Region IV</b>	7-17-2020	
<b>Plan Not Approved</b>		
<b>Plan Approvable Pending Adoption</b>		
<b>Plan Approved</b>	4/13/21	

**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 Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
<b>ELEMENT A. PLANNING PROCESS</b>			
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. 5-18) A1a p. 5-16 A1b p. 7 A1c p. 11-14 ✓ A1d: Appendix B, B1-B3	X	
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. 8-9, 15); Appendix B (p.B.39-B.40, PDF 488-489) A2a p. 8-9, 15 Appendix B, B39-B41 A2b: Appendix B, B39-B41 A2c p. 8-9, 15 Appendix B, B39-B41	X	
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. 13-15); Appendix B (p.B.21-B.37) A3a and A3b: Section 2 (p. 13-15); Appendix B (p.B.21-B.37)	X	
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) A4a and A4b: Section 2 (p. 8-9); Section 5 pg. 266-267	X	

<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan (section and/or page number)</b>	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
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. 306) 45: Section 8 (p. 306)	X		
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. 304-306) 46a: p.301-306 46b: p.304 46c: p.304 46d: p.304	X		
<b>ELEMENT A: REQUIRED REVISIONS</b>				
<p><b>NCEM 1<sup>st</sup> Review:</b></p> <p>A1: See Required Revisions Below</p> <p>A2: No Required Revisions.</p> <p>A3: No Required Revisions.</p> <p>A4: No Required Revisions.</p> <p>A5: No Required Revisions.</p> <p>A6: No Required Revisions.</p> <p><b><u>Plan Review Guide Regulation Checklist Element/ Sub-element description</u></b></p> <p>A1d. For <b>each jurisdiction</b> seeking plan approval, the plan <b>must</b> document how they were involved in the planning process. For example, the plan may document meetings attended, data provided, or stakeholder and public involvement activities offered. Jurisdictions that adopt the plan without documenting how they participated in the planning process will not be approved.</p> <p><b><u>NCEM First Review Required Revisions:</u></b></p> <p>A1d. Please identify <u>location</u> or add <u>documentation</u> of participation for the <b>Town of Hassell</b> in the planning process. Was the town represented at any meetings by a <u>proxy</u> representative?  <b>Corrected. Language added above Table 2.4 on pg. 10.</b></p> <p><b><u>NCEM Second Review:</u></b></p> <p>Corrected; Language was added above Table 2.4 on pg. 10 (pdf page 16), last paragraph.</p> <p>-</p>				
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>				
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. 81-263; Hazard Description, Location, Extent, Hazard Summary by Jurisdiction), Annex A – pdf 314 Annex B – pdf 344 Annex C – pdf 365 Annex D – pdf 390 Annex E – pdf 408 ✓	X		

<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan</b> (section and/or page number)	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
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. 81-263; Past Occurrences, Probability of Future Occurrence, Hazard Summary by Jurisdiction),  <b>B2(a-c): Pgs. 81-263; see NC's submitted supplemental table</b>	X		
3. 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. 81-263; Vulnerability Assessment, Hazard Summary by Jurisdiction), Annex A – pdf 314 Annex B – pdf 344 Annex C – pdf 365 Annex D – pdf 390 Annex E – pdf 408  <b>B3 (a, b): Pgs. 81-263; see NC's submitted supplemental table</b>	X		
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))  <b>Data was not available on property type, however, it can be reasonably concluded based on current policy statistics, which are detailed in the county annexes, that the majority of these repetitive loss properties are residential.</b>	Section 4.5.6 (p. 153, pdf 159)  <b>Pg.153</b>	X		
<b><u>ELEMENT B: REQUIRED REVISIONS</u></b> NCEM 1 <sup>st</sup> Review: B1: No Required Revisions. B2: No Required Revisions. B3: No Required Revisions. B4: No Required Revisions.				
<b>ELEMENT C. MITIGATION STRATEGY</b>				
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. 264-282)  <b>HM capabilities, ordinance/programs, listed by community</b>	X		

<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan</b> (section and/or page number)	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
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. 271-272) P 148 (Table 4.43); 278 (Table 5.2)	X	
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. 283-286) <b>Section 6 (p. 283-286)</b>	X	
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. 283-286), Section 7 (p. 287-300, pdf 294) <b>Section 6 (p. 283-286), Section 7 (p. 287-300, pdf 294)</b>	X	
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. 283-286), Section 7 (p. 287-300, pdf 294) <b>Section 6 (p. 283-286), Section 7 (p. 287-300, pdf 294)</b>	X	
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.301-303) <b>Section 8 (p.301-303)</b>	X	

# 1. REGULATION CHECKLIST

Regulation (44 CFR 201.6 Local Mitigation Plans)

Location in Plan  
(section and/or  
page number)

Met Not  
Met Met

## **ELEMENT C: REQUIRED REVISIONS**

NCEM 1<sup>st</sup> Review:

C1: No Required Revisions.

C2: No Required Revisions.

C3: No Required Revisions.

C4: No Required Revisions.

C5: See Required Revisions Below

C6: No Required Revisions.

### **Plan Review Guide Regulation Checklist Element/ Sub-element description**

C5c **"The plan must identify** the position, office, department, or agency responsible for implementing and administering the action (for each jurisdiction), and identify potential funding sources and **expected timeframes for completion**. Please revise the Implementation Timelines for the following actions. This is simply adding dates or date ranges to the following actions.

### **C5. Mitigation Action Table NCEM First Review Required Revisions:**

**Bertie County**, B1, B8, B10, B11, B12, B14, B15, Implementation Timeline must have a completion date (2025) or a date range (2020-2025). Cannot use phrases without a date; e.g. as necessary, as required, annually, ongoing, as opportunities arise, etc.

Corrected. Date range added.

**Hyde County**, H2, H3, H5, H6, H7, H8, H9, H10, H11, H12, H14, Implementation Timeline must have a completion date (2025) or a date range (2020-2025). Cannot use phrases without a date; e.g. annually, ongoing, as funding becomes available, etc.

Corrected. Date range added.

**Martin County**, M5, M6, M7, M9, M10, M11, M15, Implementation Timeline must have a completion date (2025) or a date range (2020-2025). Cannot use phrases without a date; e.g. annually, ongoing, as needed, as necessary, as opportunities arise, etc.

Corrected. Date range added.

**Tyrrell County**, T1, T2, T13, Implementation Timeline must have a completion date (2025) or a date range (2020-2025). Cannot use phrases without a date; e.g. annually, ongoing, as necessary, etc.

Corrected. Date range added.

**Washington County**, W3, W7, W8, W9, W10, W11, W13, W18, W19, Implementation Timeline must have a completion date (2025) or a date range (2020-2025). Cannot use phrases without a date; e.g. annually, ongoing, as necessary, etc.

Corrected. Date range added.

### **C5. Mitigation Action Table NCEM Second Review:**

All Tables corrected and "Implementation Timeline" meets Federal Criteria.

**ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION** (applicable to plan updates only)

<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan</b> (section and/or page number)	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 3 (p. 19-60), Section 4 (p. 61-263; Asset Inventory, Vulnerability Assessment), Annex A – pdf 314 Annex B – pdf 344 Annex C – pdf 365 Annex D – pdf 390 Annex E – pdf 408	X		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 2 (p. 15-18), Section 5 (p. 264-282) Section 7 (p. 288, pdf 294)	X		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 6 (p. 283-286), Section 7 (p. 287-300)	X		
<b>Pgs. 283-300</b>				
<b><u>ELEMENT D: REQUIRED REVISIONS</u></b>				
NCEM 1 <sup>st</sup> Review: D1: None. D2: None. D3: None.				
<b>ELEMENT E. PLAN ADOPTION</b>				

<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan (section and/or page number)</b>	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
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	X		
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  All 26 submitted adoption resolutions as of 6-16-21	X		
<b><u>ELEMENT E: REQUIRED REVISIONS</u></b>				
<p>Prior to review completion adoption documentation was provided by:            Counties: Bertie, Hyde, Tyrrell, Washington.            Towns: Askewville, Aulander, Bear Grass, Columbia, Creswell, Hassell, Jamesville, Kelford, Lewiston Woodville, Parmele, Plymouth, Powellsville, Robersonville, Roper, Roxobel, Williamston, Windsor.</p> <p>5/13/21 – adoption resolutions received and processed: Everetts, Oak City, Martin County</p> <p>6/16/21 – adoption resolutions for Colerain and Hamilton</p>				
<b>ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)</b>				
F1.				
F2.				
<b><u>ELEMENT F: REQUIRED REVISIONS</u></b>				

## 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**

#### **Plan Strengths:**

- The planning committee included a diverse group of stakeholders from various local positions and across all communities. The wide assortment of local departments surely contributed to a thorough discussion and healthy exchange of ideas.
- The description of the planning process in Section 2 is clear and concise. A reader would be able to quickly understand how this plan was put together, who was involved, and what was considered. The use of well formatted tables and graphics further improve readability.
- The committee used community websites and other media to promote the plan and the update. A public survey provided opportunity for the public to be involved without having to attend an in-person meeting.
- Neighboring counties and communities were invited to attend planning meeting and provide feedback on the draft plan via emails, phone calls, and in-person discussions. Appendix B.39-B.40 also shows non-profit, educational, and other governmental stakeholders were also engaged.
- The plan outlines a variety of local plans, studies, and reports, and Section 5, Capability, summarizes which communities have those in place. The layout for this information, especially considering the number of jurisdictions, is easy to read and understand. Communities are also able to utilize this section of the plan to quickly see which of their neighbors have certain plans and capabilities. Perhaps most importantly, there is an explanation of most of these plans and communities can look to the list for new ideas.

#### **Opportunities for Improvement:**

- The public survey was promoted, and a flyer was created, but the planning committee should try to improve participation in future plans, perhaps by sharing the survey at an existing community event or asking community leaders to help share the survey in their professional circles.
- While several non-governmental and community representatives were on the planning committee (local businesses, non-governmental groups, etc.) there is no detailed discussion on how these unique organizations were able to contribute to the process or their motivation for participating. Including this additional information and background could help further cement partnerships with local organizations.

### **Element B: Hazard Identification and Risk Assessment**

#### **Plan Strengths:**

- The plan utilizes both qualitative and quantitative data to discuss vulnerability across the region. Including property damage estimates and detailed data from risk management tools alongside local experiences and vulnerable populations is a best practice for generating a whole picture of the community.
- The plan does a good job of localizing hazard events, impacts, risks, etc. to each jurisdiction, even with hazards that are expected to be consistent across the region (drought for instance is profiled regionally, but also includes great simple tables that help convey slight differences in previous events at a county level). The additional information is welcome because it provides additional clarity at a community level and is communicated clearly to the reader.
- Data visualization and GIS mapping is exceptionally clear, readable, and consistently formatted. Throughout the plan and particularly in the annexes, these additional graphics perfectly support the written text and provide the reader a lot of useful information. The graphics in each county's annex for flooding and wildfire risk are extremely clear with each community highlighted against the larger county.
- Heavy use of tables and consistent formatting, especially considering the size and extent of the planning area, is very helpful and makes the plan easy to read and follow.

- The inclusion of flood depth grids, narratives, and detailed maps showing the precise boundaries of the Special Flood Hazard Area is very well done.
- Providing general summary data for the hazards in Section 4 fulfills most of the requirements, but county specific annexes include more specific data, information, charts, graphs, etc. to further drill down on the differences between communities/counties in the Region.

**Opportunities for Improvement:**

**Element C: Mitigation Strategy**

**Plan Strengths:**

- Actions from the previous plan each have information for their implementation status. Completed or combined actions are discussed at the beginning of the plan. Including additional status notes would only further improve this section.
- The plan outlines very clearly the applicable plans, existing authorities, policies, programs, and resources that the various communities have in place to help support and advance hazard mitigation efforts. Plans and programs include definitions and descriptions of how the various plans/programs can support resiliency. Additionally, by summarizing which communities participate in each program and which ones do not, a community official looking to improve and expand their jurisdictions capability could see which community they could contact for more information.
- In addition to outlining available plans and programs to advance mitigation, the plan also includes a table that outlines relevant staff and personnel, such as planners, emergency managers, and GIS knowledgeable staff. This is a great resource for other communities to understand what resources are available in the area should one community not have all the needed resources for a particular effort.
- The variety of actions across all jurisdictions is impressive and it is clear there is a lot of partnership between the cities and counties within this region. Responsible parties, sources of funding, etc. are for the most part well defined.
- The goals and further detailed objectives of the plan are consistent with the risks outlined in the hazard assessment and the actions proposed to reduce that risk. The overall goals of the plan seem to come through in the majority of the proposed actions.

**Opportunities for Improvement:**

- The plan includes programs, plans, and features County staff leading many mitigation activities, but it might be helpful to discuss in additional detail the staff positions in each jurisdiction that are able to help advance mitigation, especially through routine work or normal annual funding. Every community is unique.
- The prioritization of the mitigation actions is unclear. While the prioritization factors seem comprehensive and imply that each prioritization list is most appropriate to the individual jurisdiction, it would be very difficult for a new local official/planning team member to understand why the rankings are what they are in this plan. It is encouraged that each jurisdiction includes a rationale for why the actions received the priority they did or to include a scoring sheet in each county specific annex that shows how the priority determination was made, like how hazards were profiled.

**Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)**

**Plan Strengths:**

- The plan contains an entirely updated risk assessment and hazard review, a refreshed and updated set of mitigation strategies, and provides ample detail on existing land use, development trends, and issues of

community vulnerability, among other subjects. The planning committee and consultants also paid close attention to updating narratives and descriptions throughout the plan to reference new information and updates.

- Including so much information in the jurisdiction specific annexes, including individual community risk, allow each county to essentially have their own plan (which is likely more actionable, readable, and useable to the specific jurisdiction), while at the same time also benefiting from the comprehensive regional analysis. The excellent organization of the plan keeps that plan readable despite the size.

### **Opportunities for Improvement:**

## **B. Resources for Implementing Your Approved Plan**

**Region IV Planning Toolkit:** This toolkit was produced by Region IV and Resilience Action Partners, the Community Engagement and Risk Communications Contractor. The document was developed for communities writing/implementing their hazard mitigation plan ‘In-house’ without the use of a contractor. It offers credible data sources, summarized content, and helpful suggestions related to hazard mitigation plans. It is not available online, but can be requested through the State Planning Coordinator as well as the FEMA Planning Team.

**Local Mitigation Planning Handbook:** This Handbook provides guidance to local governments on developing or updating hazard mitigation plans to meet the requirements under the Code of Federal Regulations (CFR) Title 44 – Emergency Management and Assistance §201.6. Use the Local Plan Guide and Handbook in tandem to understand technical requirements  
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=7209>

**Integrating Mitigation Strategies with Local Planning:** This resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns.  
<http://www.fema.gov/library/viewRecord.do?id=7130>

**Mitigation Ideas:** Communities can use this resource to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters.  
<http://www.fema.gov/media-library/assets/documents/30627?id=6938>

**Mitigation Assistance Programs:** Currently, FEMA administers three programs that provide funding for eligible mitigation projects that reduces disaster losses and protect life and property from future disaster damages. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.  
<http://www.fema.gov/hazard-mitigation-assistance>

**Integrating Mitigation Strategies with Local Planning:** Provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns.  
<http://www.fema.gov/library/viewRecord.do?id=7130>

### **State NFIP Coordinators:**

<http://www.floods.org/index.asp?menuID=274&firstlevelmenuID=185&siteID=1>

## Mitigation Funding Sources:

### Federal Emergency Management Agency

Program	Details	Notes
Hazard Mitigation Grant Program (HMGP)	Provides grants to implement long-term hazard mitigation measures after a major disaster declaration <a href="https://www.fema.gov/hazard-mitigation-grant-program">https://www.fema.gov/hazard-mitigation-grant-program</a>	See website
Pre-Disaster Mitigation Program (PDM)	Provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event <a href="https://www.fema.gov/pre-disaster-mitigation-grant-program">https://www.fema.gov/pre-disaster-mitigation-grant-program</a>	See website
Flood Mitigation Assistance (FMA)	Provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis <a href="https://www.fema.gov/flood-mitigation-assistance-program">https://www.fema.gov/flood-mitigation-assistance-program</a>	See website

### Environmental Protection Agency

The EPA makes available funds for water management and wetlands protection programs that help mitigate against future costs associated with hazard damage.

Mitigation Funding Sources Program	Details	Notes
Wetland Program Development Grants	Funds for projects that promote research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. <a href="http://water.epa.gov/grants_funding/">http://water.epa.gov/grants_funding/</a>	See website

### National Oceanic and Atmosphere Administration (NOAA)

NOAA is the major source for mitigation funding related to coastal zone management and other coastal protection projects.

Mitigation Funding Sources Program	Details	Notes
Coastal Services Center Grant Opportunities	Formula and program enhancement grants for implementing and enhancing Coastal Zone Management programs that have been approved by the Secretary of Commerce.  <a href="http://coast.noaa.gov/funding/?redirect=301ocm">http://coast.noaa.gov/funding/?redirect=301ocm</a>	See website.

### National Fire Protection Association - Firewise

Mitigation Funding Sources Program	Details	Notes
Firewise Communities Program	Effort to involve homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire before a fire starts.	See website

	<a href="http://www.firewise.org">http://www.firewise.org</a>	
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**U.S. Department of Agriculture**

There are multiple mitigation funding and technical assistance opportunities available from the USDA and its various sub-agencies: the Farm Service Agency, Forest Service, and Natural Resources Conservation Service.

USDA Forest Service National Fire Plan	Funding for organizing, training, and equipping fire districts through Volunteer, State and Rural Fire Assistance programs. Technical assistance for fire related mitigation. <a href="http://www.forestsandrangelands.gov/">http://www.forestsandrangelands.gov/</a>	See website
USDA Natural Resources Conservation Service Watershed Protection and Flood Prevention	Information and funds for landscape planning, soil conservation; flood prevention; conservation, development, utilization and disposal of water; and conservation and proper utilization of land. <a href="http://www.nrcs.usda.gov/programs/watershed/index.html">http://www.nrcs.usda.gov/programs/watershed/index.html</a>	See website

**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	Bertie County	County					Y	Y	Y	Y	Y	
2	Askewville	Town					Y	Y	Y	Y	Y	
3	Aulander	Town					Y	Y	Y	Y	Y	
4	Colerain	Town					Y	Y	Y	Y	Y	
5	Kelford	Town					Y	Y	Y	Y	Y	
6	Lewiston-Woodville	Town					Y	Y	Y	Y	Y	
7	Powellsville	Town					Y	Y	Y	Y	Y	
8	Roxobel	Town					Y	Y	Y	Y	Y	
9	Windsor	Town					Y	Y	Y	Y	Y	

**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	Hyde	County					Y	Y	Y	Y	Y	
11	Martin County	County					Y	Y	Y	Y	Y	
12	Bear Grass	Town					Y	Y	Y	Y	Y	
13	Everetts	Town					Y	Y	Y	Y	Y	
14	Hamilton	Town					Y	Y	Y	Y	Y	
15	Hassell	Town					Y	Y	Y	Y	Y	
16	Jamesville	Town					Y	Y	Y	Y	Y	
17	Oak City	Town					Y	Y	Y	Y	Y	
18	Parmelee	Town					Y	Y	Y	Y	Y	
19	Robersonville	Town					Y	Y	Y	Y	Y	
20	Williamston	Town					Y	Y	Y	Y	Y	
21	Tyrrell County	County					Y	Y	Y	Y	Y	
22	Columbia	Town					Y	Y	Y	Y	Y	
23	Washington County	County					Y	Y	Y	Y	Y	

**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
24	Creswell	Town					Y	Y	Y	Y	Y	
25	Plymouth	Town					Y	Y	Y	Y	Y	
26	Roper	Town					Y	Y	Y	Y	Y	

# 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 Kick-Off	<ol style="list-style-type: none"> <li>1) Introduction to DMA, CRS, and FMA requirements and the planning process</li> <li>2) Review of HMPC responsibilities and the project schedule.</li> </ol>	February 6, 2019 2:00 p.m.	Town of Plymouth Council Chambers, 132 E. Water Street, Plymouth, NC
HMPC Mtg. #2	<ol style="list-style-type: none"> <li>1) Review and update plan goals</li> <li>2) Brainstorm a vision statement</li> <li>3) Report on status of actions from the 2017 plan</li> <li>4) Complete the capability self-assessment</li> </ol>	February 27, 2019 2:00 p.m.	Former Quintiles Space (beside NC Telecenter) 411 East Boulevard, Williamston, NC
HMPC Mtg. #3	<ol style="list-style-type: none"> <li>1) Review Draft Hazard Identification &amp; Risk Assessment (HIRA)</li> <li>2) Draft objectives and Mitigation Action Plans</li> </ol>	July 26, 2019 10:00 a.m.	Hyde County Government Center Multi-Purpose Room, 30 Oyster Creek Road, Swan Quarter, NC
HMPC Mtg. #4	<ol style="list-style-type: none"> <li>1) Review the Draft Hazard Mitigation Plan</li> <li>2) Solicit comments and feedback</li> </ol>	March 10, 2020 3:30 p.m.	Bertie County Commissioners’ Room, 106 Dundee Street, Windsor, NC 27983

Note: All HMPC Meetings were open to the public.

## HMPC Meeting Agendas, Minutes, and Sign-in Sheets

HMPC Meeting 1: February 6, 2019

### Agenda

Northeastern Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Committee Meeting  
February 6, 2019, 2:00 PM  
Town of Plymouth Town 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
  - Review and Update Mitigation Goals & Objectives
  - Review Existing Mitigation Projects
  - Complete Plan Survey
  - Share Link to Plan Website on Local Community Websites
- Questions

**Northeastern NC Regional Hazard Mitigation Plan**  
**Hazard Mitigation Planning Committee Meeting**  
**Wednesday, February 6, 2019-2:00 PM**  
**Meeting Minutes**

Landin Holland called the meeting to order at 2:00 pm in the Town of Plymouth 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 the project partners, project schedule, and plan content. The presentation has been attached as a component of these minutes.

**Questions**

Several Hazard Mitigation Planning Committee (HMPC) members requested clarification regarding local committee composition. Mr. Holland provided clarification regarding the need for two staff members, as well as two citizen stakeholders for communities participating in the Community Rating System program. He provided further clarification that the citizen stakeholders could not be elected officials.

**Adjourn**

There being no further business to conduct, Mr. Holland adjourned the meeting at 3:12 PM.

Northeastern NC Regional Hazard Mitigation Plan  
 Mitigation Advisory Committee Kick-Off Meeting  
 Wednesday, February 6, 2019, 2:00 PM

	Name	Organization	Phone	E-Mail
1.	James Peake	Town of Powellsville	252-332-5933	TownofPowellsville@nc.hsi.com
2.	CARLYE HOBGAARD	Town of Powellsville	252-332-5933	11
3.	Raemon Jackson	Town of Roper	252-217-7664	rmccray25@gmail.com
4.	John R. Adams	Town of Cedarw	252-356-2124	TownofCedarw@medinacountysb.gov
5.	Jacazza Jones	NCEM Hazard Mit	919 825 2592	jacazza.jones@ncdps.gov
6.	Wesley Hopkins	Tyrrell EM	252-796-4616	weshopk78@tyrrellcounty.net
7.	Victoria Hoggard	BartlettCO EMO office	252 794 0302	Victoria.Hoggard@BartlettCo.gov
8.	Charles Sharpe	Town of Roper	252-661-3247	csharpe.Roper@centurylink.net
9.	Aurc Hayes	Washington County	252-793-4111	ahayes@washcount.net
10.	Pat Perdue	Tyrrell EM	252-796-2625	patperdue@tyrrellcounty.net
11.	Jessica Clifton	Town of Roper	252-217-0834	jclifton122713@gmail.com
12.	William E. Williams	Town of Jamesville	252-792-1272	willis.williams@embargo.com
13.	Doris Williams			
14.	Lily Jenkins	Town of Robersonville	252-802-0412	lujenkins@suddenlink.net
15.	Betsy Barber	Town of Kelford	252-287-4204	
16.	Christina Barber	Town of Kelford	252-325-1566	
17.	Vonetta Porter	Town of Oak City	(252) 798-7791	oakcity204@embargo.com
18.	Penny Chapman	Town of Creswell	(252) 797-4852	chreswell@centurylink.net
19.	Syble Spruill	Town of Creswell Commissioner	(252) 797-4386	rayandsyble@embargo.com
20.	John C. Carter	Town of Jamesville	252-792-5516	john.carter@embargo.com

Northeastern NC Regional Hazard Mitigation Plan  
 Mitigation Advisory Committee Kick-Off Meeting  
 Wednesday, February 6, 2019, 2:00 PM

21.	Calvin Owens	Town of Bear Grass	252-792-5455	Calvin.Owens@embargo.com
22.	Charlotte Griffin	Town of Bear Grass	252-989-9319 252-989-9323	gabby45@suddenlink.net
23.	John O'Daniel	Town of Williamston	252-792-5142	jdaniel@townofwilliamston.com
24.	Cameron Braddy	Town of Williamston	252-794-6185	cbaddy@townofwilliamston.com
25.	Traci White	Bertie County		traci.white@bertie.nc.gov
26.	Vanessa P. Palin	Washington County	252-741-0119	lovanke@embargo.com
27.	Pat Perdue	Tyrrell County	252-796-2623	patperdue@tyrellcounty.net
28.	JERRY M. MCCRARY	TOWN OF PHAMELE	252-792-9912	MaryAnnM@GMAIL.COM
29.	Joyce Koss	Town of Plymouth	252-793-9101	Joyce.Koss@visitplymouthnc.com
30.	Mike Wright	Town of Plymouth	252-793-9101	mike.wright@visitplymouthnc.com
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HMPC Meeting 2: February 27, 2019

**Agenda**

Northeastern NC Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Committee Meeting  
February 27, 2019, 2:00 PM  
Former Quintiles Space

- Participants/Attendance
- Community Rating System
  - What is CRS?
  - CRS in Northeastern NC Region
  - CRS Goals
- Mitigation Goals
  - Existing Goals from 2017 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 March 27, 2019
  - Review and return capability assessment by March 27, 2019
- Questions

**Northeastern NC Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Committee Meeting  
Wednesday, February 27, 2019-2:00 PM  
Meeting Minutes**

Landin Holland called the meeting to order at 2:00 at the former Quintiles Space (beside the NC Telecenter) in Williamston 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 presented a presentation that focused on the community's participation in the planning process. In particular, Mr. Holland discussed a review of mitigation strategies and county/municipal capability outlined in the 2017 Plan at the local level. This presentation has been attached as a component of these minutes.

**Questions**

Mr. Holland was asked how future strategies will be developed through the Planning Process. Mr. Holland went on to state that the project team will be in direct contact with communities to draft and developed revised/new strategies that are applicable to a local community's current situation. This dialogue will be handled prior to the committee's third meeting.

**Adjourn**

There being no further business to conduct, Mr. Holland adjourned the meeting at 3:17 PM.

Northeastern NC Regional Hazard Mitigation Plan  
 Hazard Mitigation Planning Committee Meeting  
 Wednesday, February 27, 2019, 2:00 PM

	Name	Organization	Phone	E-Mail
1.	<i>Andrew C. Keyes</i>	<i>Wash. Co. EM</i>	<i>252-793-4114</i>	<i>akeyes@washcon.org</i>
2.	<i>Shanetta Williams</i>	<i>Bear Grass</i>	<i>252-792-7323</i>	
3.	<i>Colin Owens</i>	<i>Bear Grass</i>	<i>252-792-5455</i>	
4.	<i>Moni Stiles</i>	<i>Commissioner Ann Helle</i>	<i>252-798-0931</i>	
5.	<i>Penny Chapman</i>	<i>Town of Creswell</i>	<i>252-797-4852</i>	<i>creswellnc@centurylink.net</i>
6.	<i>Sybil Spruill</i>	<i>Town of Creswell</i>	<i>252-797-4386</i>	<i>rayandsybil@embarqmail.com</i>
7.	<i>Wesley Hopkins</i>	<i>Tyrrell County</i>	<i>252-796-4516</i>	<i>weshopkins@tyrrellcounty.net</i>
8.	<i>Joseph Griffin</i>	<i>Martin County</i>	<i>252-799-4310</i>	<i>jgriffin@martincountync.gov</i>
9.	<i>MICHAEL BRYANT</i>	<i>MARTIN COUNTY</i>	<i>252-789-4559</i>	<i>michael.bryant@martincountync.gov</i>
10.	<i>Hal Fleming</i>	<i>Town of Columbia</i>	<i>252-394-0262</i>	<i>hal.flem@gmail.com</i>
11.	<i>Rhett B. White</i>	<i>Town of Columbus</i>	<i>252-796-2781</i>	<i>rhett.tromofcolumbia@yaho.com</i>
12.	<i>Matt Wilson</i>	<i>Town of Windsor</i>	<i>252-794-3121</i>	<i>Windsor.pw@ncshs.com</i>
13.	<i>Cameron Bradley</i>	<i>Town of Williamson</i>	<i>252-792-5147</i>	<i>cbredley@townofwilliamson.com</i>
14.	<i>Joyle Koss</i>	<i>Town of Plumbath</i>	<i>252-793-9101</i>	<i>joyle.koss@visitplymouthnc.com</i>
15.	<i>Mike Wright</i>	<i>Town of Plymouth</i>	<i>252-793-9101</i>	<i>mike.wright@visitplymouthnc.com</i>
16.	<i>Bailey A. Forber</i>	<i>Town of Kershaw</i>	<i>252-287-4204</i>	
17.	<i>Dianne Harrington</i>	<i>Town of Lewiston-Woodville</i>	<i>252-209-4828</i>	<i>lewistonwoodville@gmail.com</i>
18.	<i>[Signature]</i>	<i>Town of Roxobel</i>	<i>252-325-1566</i>	
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Northeastern NC Regional Hazard Mitigation Plan  
 Hazard Mitigation Planning Committee Meeting

Wednesday, February 27, 2019, 2:00 PM

21.	Vonetta Porter	oakcitygov@embargo.net	252-798-7721	Town of Oak City
22.	Kimberly Cocksell	jamesville@embargo.net	252-792-5500	Town of Jamesville
23.	Willis Williams	williswilliams@embargo.net	252-792-1250	Town of Jamesville
24.	Jerrey M. McCrory	mcj@jerrey.com	252-702-9912	Town of Arden
25.	William Freeman	willifre@hotmail.com	252-217-7376	Town of Hamilton
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Northeastern NC Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Committee Meeting

Wednesday, February 27, 2019, 2:00 PM

42.	Raeonna Jackson	Town of Roper	smccray25@gmail.com	252-217-7664
43.	Jessica Clifton	Town of Roper	jclifton122713@gmail.com	252-217-0834
44.	Charles Sharpe	"	c.sharpe.roper@centurylink.net	252-661-3247
45.	Renee Buck	Town of Aubander	rbuck@aubander.com	252-345-3541
46.	Steven Draper	Town of Aubander	psdraper@gmail.com	252-345-3541
47.	Victoria Hoggard	Bertie County Emofere	victoria.hoggard@bertie.nc.gov	252-744-5302
48.	Traci White	Bertie County Planning	traci.white@bertie.nc.gov	252-744-6185
49.	RAY DEANS	TOWN OF EVERGETTS	RAYDEANS@EVERGETTS.PEST	757-999-8732
50.	Libby Jenkins	Town of Robertsonville	ljjenkins@suddenlinkmail.com	252-508-0311
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HMPC Meeting 3: July 26, 2019

**Agenda**

Northeastern NC Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Committee Meeting  
July 26, 2019, 10:00 AM  
Hyde County Government Center Multi-Purpose Room

- Participants/Attendance
- Project Update
  - Schedule
  - Participation
  - Repetitive Loss Data
- Mitigation Goals
  - Review of Goals and Objectives
  - Overview of Draft Mitigation Strategies
  - Next Steps
- Presentation of Hazard Identification and Risk Assessment (HIRA)
  - Hazard identification
  - Asset Inventory
  - Hazard Profile
- Housekeeping
- Public Comment
- Questions

**Northeastern NC Regional Hazard Mitigation Plan**

**Hazard Mitigation Planning Committee Meeting**

**Thursday, July 26, 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 (see attached). This discussion provided a review of the Plan's existing as well as updated strategies. Mr. Holland requested that communities review the strategies for accuracy and completeness. In particular, communities were requested to provide an accurate status as well as an estimate of implementation cost. Projected cost can be based on either an estimate, or annual budget figures; however, if the task is carried by staff then "staff time" can be stated. Mr. Holland then provided 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 explain required participation to the group. Mr. Holland stated that each community needed to attend a minimum of two HMPC meeting to assure compliance with the plan. He went back over the status for each community, and addressed those communities that need to attend the fourth and final meeting to address this issue.

**Adjourn**

There being no further business to conduct, Mr. Holland adjourned the meeting at 11:05 PM.

HMPC Meeting #3  
7/26/2019

<u>Name</u>	<u>Agency</u>	<u>Email</u>
Raemona Jackson	Washington County, Roper	rmccray25@gmail.com
Charles Sharpe	Town of Roper	csharpe.ropert@centurylink.net
Kim Coakrell	Town of Jamesville	jamesville@emborgmail.com
Willis Williams	Town of Jamesville	williswilliams@emborgmail.com
Delsie Williams	Town of Jamesville	"
Syble Spruill	Town of Creswell	rayandsyble@emborgmail.com
Vanetta Porter	Town of Oak City	oakcity304@emborgmail.com
Sue Harrell	Town of Oak City	harrellr@ecu.edu
Joseph Griffin	Martin Co.	jgriffin@martincountync.gov
Wesley Hopkins	Tyrrell Co EM	weshopkins@tyrrellcounty.net
Crystal Freeman	Bertie Co. Emergency Services	Crystal.freeman@bertie.nc.gov
Vickena Haggard	Bertie Co EM office	Vickena.Haggard@bertie.nc.gov
Penny Chapman	Town of Creswell	creswellnc@centurylink.net
Syble Spruill	Town of Creswell	rayandsyble@emborgmail.com
Boiley W Tanker	Town of Kelford	
Sary Johnson	Town of Roxobel	
JoAnn Spencer	Hyde County - Engelhard FD	jasrstst@gmail.com
MATT Livingston	Town of Plymouth	townmanager@visitplymouthnc.com
Jacazza Jones	NCEM Mitigation	jacazza.jones@ncdps.gov

APPENDIX B: PLANNING PROCESS DOCUMENTATION

<u>Name</u>	<u>Agency</u>	<u>Email</u>
CHARLOTTE GRIFFIN	TOWN OF BEAR GRASS	gabby45@suddenlink.net
Calvin Owens	Town of Bear Grass	calvin01@embargo.net
John O'Daniel	Town of Williamston	jodaniel@townofwilliamston.com
Cameron Braddy	Town of Williamston	cbraddy@townofwilliamston.com
Rosemary Johnson	County of Hyde	rjohnson@hydecountrync.gov
Jane Hodges	County of Hyde	jhodges@hydecountrync.gov
EDWARDINE MARRONE	FEMA	EDWARDINE.MARRONE@FEMA.DHS.GOV
Pat Perdue	Tyrrell County	patperdue@tyrrellcounty.nc
Ann C. Keyes	Washington County	akeyes@washconl.org
JERRY M. McCRARY	TOWN OF PARNOTE	mcrary JERRY M @ Gmail.com
Rhett B. WHITE	Town of Columbia	rhett_townofcolumbia@yahoo.com
Libby Jenkins	Town of Robersonville	lwjenkins@suddenlinkmail.com
Allison Stalls	Town of Everetts	awhite02@suddenlink.net
Justin Gibbs	County of Hyde	justinz.gibbs@hydecountrync.gov

HMPC Meeting 4: March 10, 2020

**Agenda**

Northeastern NC Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Committee Meeting  
March 10, 2020, 3:30 PM  
Bertie County Commissioners Meeting Room

- Planning Process
- Structure of the Plan
- Community Annexes
- Hazards Profiled
- Goals and Objectives
- Mitigation Action Plans
- Plan Implementation and Maintenance
- Certification Compliance
- Completing the Planning Process
- Next Steps
  - Review the Draft Plan
  - Provide Comments
- Questions







### Jurisdictional Participation Agreements

The following letters detail participation agreements and acknowledgements for jurisdictions that were unable to attend formal HMPC meetings or required County support for the planning process.

Gloria Bryant  
Mayor  
Wendy White  
Clerk

Town of Askewville  
104 West Askewville Street .  
Windsor, N.C. 27983  
Phone 252-794-0563  
E-mail: townofaskewville@yahoo.com

Commissioners  
Kay Brantley  
Mike Baker  
Carla Pesce

Holland Consulting Planners Inc.  
Landin W. Holland, MPA, AICP, CZO  
Senior Planner  
3329 Wrightsville Avenue, Suite F  
Wilmington, NC 28403

Re: Northeastern NC Regional Hazard Mitigation Plan

Dear Mr. Landin Holland:

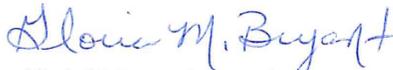
I, Gloria Bryant, Mayor for Askewville and the Town of Askewville Board members have been informed of the project website and have been involved in the planning process. The Town of Askewville has reviewed this plan on the project website and approve of this draft plan.

The Town of Askewville will hold a Formal Public Hearing that will be advertised in the newspapers to let our citizens of Askewville know our plans of adopting this plan pending our notice of an approval pending adoption letter from FEMA.

The Town of Askewville is very small town with limited funds and coordinates with Bertie County offices for their public works, police, Fire/EMS, and planning. The Town of Askewville complies with the standards set forth by the county and will continue to do so in the future.

The Town of Askewville in coordination with the County Planning as well as County Emergency Management Director meet on an as needed basis, to comply with Local/State/Government standards.

Thank you,



Gloria M. Bryant, Mayor of Askewville



---

## TOWN OF AULANDER

---

Holland Consulting Planners Inc.  
Landin W. Holland, MPA, AICP, CZO  
Senior Planner  
3329 Wrightsville Avenue, Suite F  
Wilmington, NC 28403

December 18, 2019

Re: Northeastern NC Regional Hazard Mitigation Plan

Dear Mr. Landin Holland:

I, Larry Drew, Mayor for Town of Aulander and the Town of Aulander Board members have been informed of the project website and have been involved in the planning process. The Town of Aulander has reviewed this plan on the project website and approve this draft plan.

The Town of Aulander will hold a formal Public Hearing that will be advertised in the newspapers to let the citizens of Aulander know our plans of adopting this plan pending our notice of an approval, pending the adoption letter from FEMA.

The Town of Aulander is a small town with very limited funds. The Town coordinates with Bertie County offices for their public works, police, Fire/EMS, and planning. The Town of Aulander complies with the standards set forth by the county and will continue to do so in the future.

The Town of Aulander in coordination with Bertie County Planning as well as the Bertie County Emergency Management Director will meet on an as needed basis in order to comply with Local/State/Government standards.

Thank you for your time and assistance.

Sincerely,

  
Larry Drew  
Mayor

119 S COMMERCE ST ★ PO BOX 100 ★ AULANDER, NC 27805 ★ (252) 345-3541 FAX (252) 345-1316  
townofaulander@gmail.com ★ www.facebook.com/townofaulander

**Town of Lewiston Woodville**

lewistonwoodville@gmail.com

103 West Church Street  
Post Office Box 340

Phone (252) 348-2824

Lewiston Woodville, North Carolina 27849

Mayor:  
James E. Pugh

Council:  
Chris Cordon  
Dianne Bazemore  
Michelle Gilliam  
June Jernigan  
Judy Brown

December 12, 2019

Landin Holland, Senior Planner  
Holland Consulting Planners, Inc.  
3329 Wrightsville Avenue, Suite F  
Wilmington, NC 28403

Re: Northeastern NC Regional Hazard Mitigation Plan

Dear Mr. Holland:

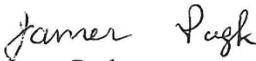
This letter is to inform you that I, James Pugh, Mayor of the Town of Lewiston Woodville along with the Lewiston Woodville Town Council have been informed of the project website and have been involved in the planning process. The Town of Lewiston Woodville has reviewed this plan on the project website and approve of this plan draft.

The Town of Lewiston Woodville will hold a Public Hearing which will be advertised in the newspapers to let our citizens know our intention of adopting this plan pending our notice of an approval pending adoption letter from FEMA.

The Town of Lewiston Woodville is a very small town with limited funds and coordinates with Bertie County offices for our public works, police, fire/EMS, and planning. The Town of Lewiston Woodville complies with the standards set forth by the County and will continue to do so in the future.

The Town of Lewiston Woodville in coordination with County Planning and County Emergency Management Director will meet on an as needed basis to comply with Local/State Government standards.

Yours truly,

  
James Pugh  
Mayor

**PLANNING STEP 2: INVOLVE THE PUBLIC**

**Table B.2 – Public Meeting Topics, Dates, Locations**

<b>Meeting Title</b>	<b>Meeting Topic</b>	<b>Meeting Date</b>	<b>Meeting Location</b>
Public Meeting #1	<ol style="list-style-type: none"> <li>1) Introduction to DMA, CRS, and FMA requirements and the planning process</li> <li>2) Review of HMPC responsibilities and the project schedule.</li> </ol>	February 27, 2019 6:00 p.m.	Former Quintiles Space (beside NC Telecenter) 411 East Boulevard, Williamston, NC
Public Meeting #2	<ol style="list-style-type: none"> <li>1) Review “Draft” Hazard Mitigation Plan</li> <li>2) Solicit comments and feedback</li> </ol>	March 10, 2020 5:30 p.m.	Bertie County Commissioners’ Room, 106 Dundee Street, Windsor, NC 27983

Public Meeting Agendas, Minutes, Sign-in Sheets, and Announcements

Public Meeting 1: February 27, 2019

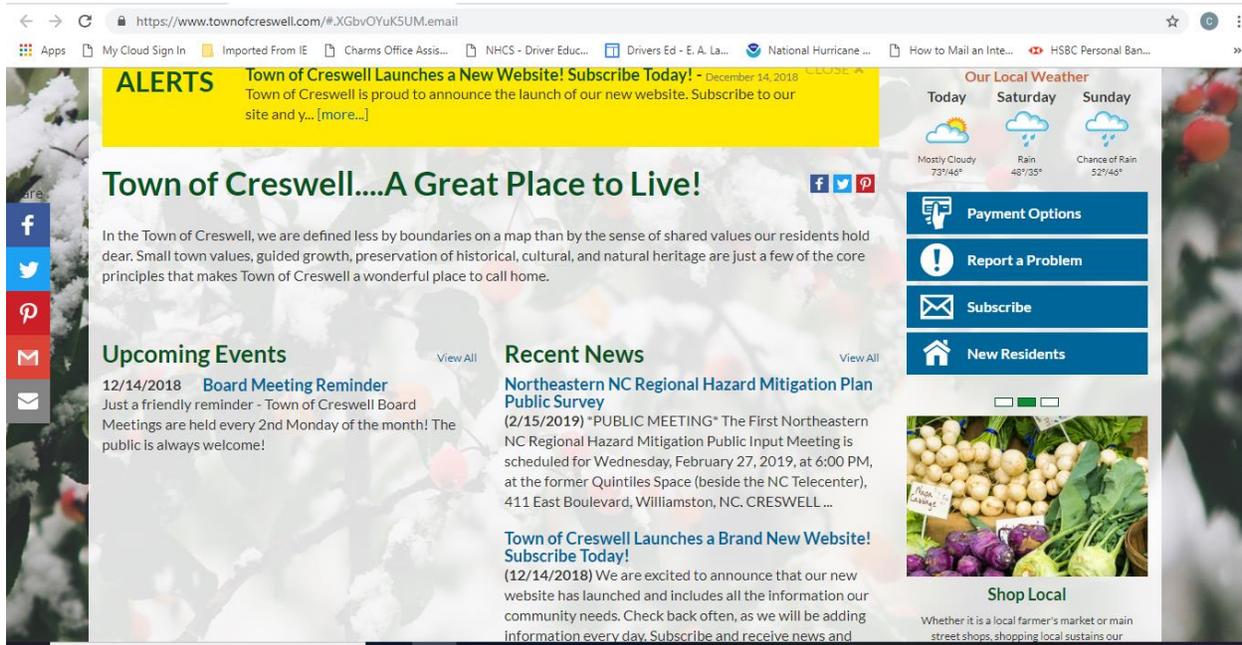
There were no attendees at this public meeting.

The first **Public Input Meeting** of the Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) has been scheduled for **Wednesday, February 27, 2019, at 6:00 PM**, at the former Quintiles Space (beside the NC Telecenter), 411 East Boulevard, Williamston, NC

**Bertie County would like your input!**

The Northeastern NC Regional Hazard Mitigation Plan is being updated and your participation is valuable. Please take a few moments to complete a brief survey regarding the community's mitigation efforts. The survey is available online through the following link:  
<https://www.surveymonkey.com/r/NortheasternHMP>. Thank you for your participation!

Information regarding the overall planning process is available at <http://www.northeasternhmp.com/>.





## PLYMOUTH WOULD LIKE YOUR INPUT

The Northeastern NC Regional Hazard Mitigation Plan is being updated and your participation is valuable. Please take a few moments to complete a brief survey regarding the community's mitigation efforts. The survey is available online through the following link:

<https://www.surveymonkey.com/r/northeasternHMP>

The first **Public Input Meeting** will be conducted on **Wednesday, February 27, 2019** at 6:00PM located at 411 East Boulevard, Williamston, NC.

Thank you for your participation!

Information regarding the overall process is available at <http://www.northeasternhmp.com/>

Click **HERE** for **PERMITS**

Check us out on **Facebook**

**RFQ's & Bids**



# TYRRELL COUNTY

North Carolina

- Home
- About Us
- Boards And Committees
- Board Meetings And Minutes
- Board of Commissioners Agenda
- Board Of Elections
- Budget Ordinance and Financial Statements
- County Departments
- County Commissioners
- Bids And Proposal
- Personnel Policy Manual
- Ordinances
- Forms And Applications
- Public Safety
- Job Listings and Applications

### Emergency Management

The next meeting of the Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) has been scheduled for **Wednesday, February 27, 2019, at 2:00 PM**, at the former Quintiles Space (beside the NC Telecenter), 411 East Boulevard, Williamston, NC.

The first **Public Input Meeting** will be conducted that evening at 6:00 PM at the same location AND a link to the Regional HMP website (<http://www.northeasternhmp.com/>).

Tyrrell County, NC COMMUNITY SIGN UP/WEATHER ALERTS

**APPENDIX B: PLANNING PROCESS DOCUMENTATION**

Public Meeting 2: March 10, 2020

**Northeastern NC Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Public Meeting #2  
Tuesday, March 10, 2020, 5:30 PM**

	Name	Organization (resident)	Phone	E-Mail
1.	Clay Wagner	Martin County Schools	252/792-1575	ewagner@martin.k12.nc.us
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

**APPENDIX B: PLANNING PROCESS DOCUMENTATION**

**Martin County**  
NORTH CAROLINA  
*Established March 14, 1774*

Home Government Departments Citizen Services Find It Here Public Notices

Search and Pay Taxes  
Martin County GIS  
Online Deeds  
County Directory  
Agenda & Minutes

### County Calendar

Home » Citizen Services » County Calendar

Event Types: -- All Event Types --

March 2020						
Su	Mo	Tu	We	Th	Fr	Sa
23	24 Early Voting	25 Early Voting	26 Early Voting	27 Early Voting	28 Early Voting	29 Early Voting
1	2	3 2020 Primary Election	4	5	6	7
8	9	10 Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) Meeting	11 County Commissioners' Regular Meeting	12	13	14
15	16	17	18 Departmental Budget Presentations	19 Departmental Budget Presentations (only if needed)	20	21
22	23	24	25 Agency Meeting	26	27	28

**Martin County**  
NORTH CAROLINA  
*Established March 14, 1774*

Home Government Departments Citizen Services Find It Here Public Notices

Search and Pay Taxes  
Martin County GIS  
Online Deeds  
County Directory  
Agenda & Minutes

### County Calendar

Home » Citizen Services » County Calendar

Event Types: -- All Event Types --

**Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) Meeting**

Description:

Location: Bertie County Commissioners' Room, 106 Dundee Street, Windsor, NC 27983

Date: 3/10/2020

Start Time: 03:30 PM

End Time:

Contact Name: Jody Griffin

Phone: 2527894310

Email:

[Print This Event](#)

March 2020						
Su	Mo	Tu	We	Th	Fr	Sa
23	24 Early Voting	25 Early Voting	26 Early Voting	27 Early Voting	28 Early Voting	29 Early Voting
1	2	3 2020 Primary Election	4	5	6	7
8	9	10 Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) Meeting	11 County Commissioners' Regular Meeting	12	13	14
15	16	17	18 Departmental Budget Presentations	19 Departmental Budget Presentations (only if needed)	20	21
22	23	24	25 Agency Meeting	26	27	28

**Town Powellsville**

Update Info | Activity Log

Timeline | About | Friends 685 | Photos | Archive | More

**Intro**  
Powellsville was named for Mr. Wright Powell originally called "Powell's Cross Roads"

**Office Hours**

TUESDAY	9:00AM - 3:30PM
WEDNESDAY	9:00AM- 3:30PM
THURSDAY	9:00AM- 3:30PM
FRIDAY	9:00AM- 5:00PM

**\*\*LUNCH DAILY 12PM TO 1PM\*\***

You can mail your payment (check or money order) to:  
**Town of Powellsville**  
 P O Box 22  
 Powellsville, NC 27967  
 or  
**CashApp: Stwnofville**  
 (include service address)

**PUBLIC ANNOUNCEMENT**

The Northeastern NC Regional Hazard Mitigation Committee (HMPC) will conduct its second Public Input Meeting on **Tuesday, March 10, 2020, at 5:30 PM**, at the **Bertie County Commissioners' Room, 106 Dundee Street, Windsor, NC 27983**. A link to the Regional HMP website is (<http://www.northeasternhmp.com/>).

Community

**Calendar of Events**

No matter what the season, there is always something going on in Town of Plymouth. Keeping our residents informed of scheduled events and local happenings is important.

Know of an upcoming event that we need to add? Give us a call or send us an email and we will be happy to add it for you.

**Upcoming Events**

**Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC)**  
 Begins: 3/10/2020 - 3:30 pm  
 Ends: 3/10/2020 - 7:30 pm

A Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) will be held at the Bertie County Commissioners' Room - 106 Dundee Street Windsor, NC 27983. The Public Input meeting will be conducted that evening at 5:30 pm at the same location.

Please find more information at the website below:  
 Northeastern HMP

**Community**

- About Us
- Calendar of Events
- Library
- Medical Facilities
- Recent News
- Schools and Education
- BCCC Continuing Education
- Senior Citizen Center
- Bear Towne Market
- 2019 Christmas Parade

**Local Weather**

Today	Tomorrow	Thursday
Rain 68°/56°	Rain 70°/42°	Rain 52°/31°

Powered by Dark Sky

**Payment Options**

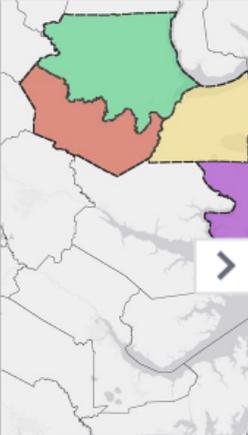
**Report a Problem**

**Subscribe**

**Plymouth**  
NORTH CAROLINA

**Washington County, NC** February 28 at 6:50 PM · 🌐 Like Page ⋮

A second Public Input Meeting will be conducted Tuesday, March 10, 2020 at 5:30PM at the Bertie County Commissioners' Room, 106 Dundee Street, Windsor, NC following the fourth meeting of the Northeastern NC Regional Hazard Mitigation Planning Committee (HMPC) at 3:30PM at that same location, to discuss releasing the full draft of the revised plan. For more information please visit: <http://www.northeasternhmp.com/>



**Northeastern NC Hazard Mitigation Plan**  
Welcome to the website for the 2019 Northeastern ...

**Northeastern NC Hazard Mitig**  
Welcome to the website for the :

👍 Like      💬 Comment      ➦ Share

Plan Website Outreach

**HMP** | HOME | AGENDAS, MINUTES, & MORE | DRAFT DOCUMENTS | HAZARDS | PUBLIC SURVEY | CONTACT US

Next Meeting Date and Location will be posted when available.

## Northeastern NC HMP

Welcome to the website for the 2019 Northeastern NC Hazard Mitigation Plan update. Northeastern NC is updating its 2015 plan to better protect the people and property of the region from the effects of natural and human-caused hazards and to maintain eligibility for mitigation funding from the Federal Emergency Management Agency (FEMA). On this website you can find information about upcoming and past Hazard Mitigation Planning Committee meetings and public meetings, take a survey on hazard risk and mitigation options to inform the plan's development, review draft documents and summaries of the hazards that affect Northeastern NC.

**MEETING SCHEDULES, AGENDAS, AND MINUTES**

**TAKE THE PUBLIC SURVEY**

**REVIEW DRAFT DOCUMENTS**

**Martin County would like your input!**

The Northeastern NC Regional Hazard Mitigation Plan is being updated and your participation is valuable. Please take a few moments to complete a brief survey regarding the community's mitigation efforts. The survey is available online through the following link:  
<https://www.surveymonkey.com/r/NortheasternHMP>. Thank you for your participation!

Information regarding the overall planning process is available at <http://www.northeasternhmp.com/>.

Mitigation Outreach Flyer

# NORTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN

**What Is a Hazard Mitigation Plan? Why is it Important to Me?**

A Hazard Mitigation Plan is the result of a planning process to identify hazards, develop strategies to reduce the loss of life and property damage resulting from these hazards, and educate community members about these hazards and loss reduction strategies. This planning process is structured around the four phases of the Disaster Mitigation Act of 2000, which the Region’s planning consultant has aligned with the ten steps of the Community Rating System (CRS). Having an adopted Hazard Mitigation Plan ensures a community is eligible for federal disaster funding. The planning team, with the community and stakeholders, has identified priority hazards, set goals, and developed mitigation actions. Now we need your feedback!



**What is the Community Rating System?**

The CRS is a national program developed by the Federal Emergency Management Agency (FEMA) to encourage communities to reduce their flood hazard risks. The CRS rewards the efforts communities take to exceed minimum requirements of the National Flood Insurance Program (NFIP) by providing discounts on flood insurance premiums. Specifically, the CRS encourages communities to reduce flood damage to existing buildings, manage development, protect new buildings, preserve and/or restore natural floodplain functions, help insurance agents obtain flood data, and help individuals obtain flood insurance.

**What Hazards are Included in the Plan?**

The planning committee has included the following hazards in the Northeastern NC Regional Hazard Mitigation Plan and prioritized them as shown to the right.

<b>High Risk</b>	Hurricane Extreme Heat Wildfire Flood Severe Winter Storm Tornado Severe Weather
<b>Moderate Risk</b>	Coastal Erosion Drought Dam & Levee Failure
<b>Low Risk</b>	Earthquake

**Why is it Important to Me?**

The mitigation actions and the action plan for implementation will be the framework for progress towards risk reduction and hazard mitigation in the Northeastern NC Region. It is important for residents, business owners, property owners, and other stakeholders to be involved in this process to ensure that mitigation actions will be feasible, effective, and supported by the community. The planning team needs your input on these actions to prevent or lessen the impacts of hazards.

**What Can I Do to Participate?**

Visit the website. Get more information and follow the planning process at [NortheasternHMP.com](http://NortheasternHMP.com). The website contains announcements for upcoming meetings, minutes and presentations from past planning meetings, information on the identified hazards, draft planning documents for review, and more.

Send us information or comments. If you have information to share, contact the planning consultants at [lholland@hcpplanning.com](mailto:lholland@hcpplanning.com) and [abigail.moore@woodplc.com](mailto:abigail.moore@woodplc.com). Additionally, the draft plan will be available for public review. You can provide comments on draft documents via the plan website.

**WE NEED YOUR INPUT**

### Public Survey

The Northeastern NC 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.

### Northeastern NC Regional Hazard Mitigation Plan Public Survey

Online version can be found at: <https://www.surveymonkey.com/r/NortheasternHMP>

Bertie, Hyde, Martin, Tyrrell, and Washington Counties, along with their local jurisdictions, are updating the Northeastern NC 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 3<sup>rd</sup> and returning it to:**

Abby Moore, Wood  
4021 Stirrup Creek Drive, Suite 100, Durham, NC 27703  
Or by email to: [abigail.moore@woodplc.com](mailto:abigail.moore@woodplc.com)

This survey can also be completed online at: <https://www.surveymonkey.com/r/NortheasternHMP>

If you have any questions about this survey or want to learn about more ways to participate in the Northeastern NC Regional Hazard Mitigation Plan update, please contact one of the planning consultants for the project: Landin Holland with Holland Consulting Planners at [lholland@hcpplanning.com](mailto:lholland@hcpplanning.com), or Abby Moore with Wood at [abigail.moore@woodplc.com](mailto:abigail.moore@woodplc.com). You can also visit the project website at [www.NortheasternHMP.com](http://www.NortheasternHMP.com).

#### BACKGROUND INFORMATION

1. Where do you live?  
 Bertie County  
 Hyde County  
 Martin County  
 Tyrrell County  
 Washington County  
 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

**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"/> Coastal Erosion   | <input type="checkbox"/> Severe Weather (Thunderstorm/Lightning/Hail) |
| <input type="checkbox"/> Dam/Levee Failure | <input type="checkbox"/> Sinkhole                                     |
| <input type="checkbox"/> Drought           | <input type="checkbox"/> Severe Winter Storm                          |
| <input type="checkbox"/> Earthquake        | <input type="checkbox"/> Tornado                                      |
| <input type="checkbox"/> Extreme Heat      | <input type="checkbox"/> Wildfire                                     |
| <input type="checkbox"/> Flood             | <input type="checkbox"/> Other _____                                  |
| <input type="checkbox"/> Hurricane         |   |

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: \_\_\_\_\_

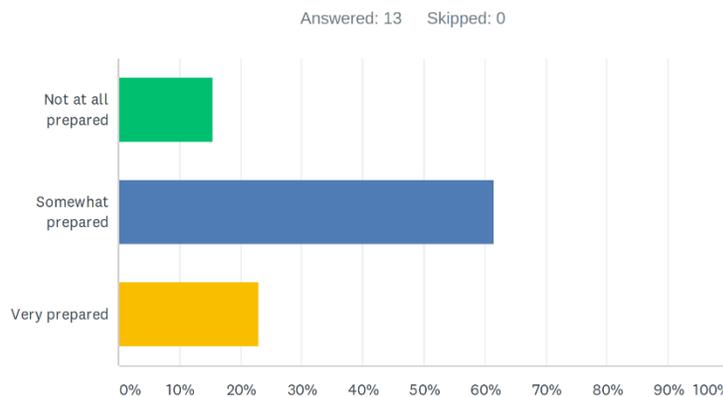
## APPENDIX B: PLANNING PROCESS DOCUMENTATION

The Region received 13 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.7.

- ▶ 15.4% of respondents say they feel not at all prepared for a hazard event; 61.5% feel somewhat prepared.
- ▶ 61.5% of respondents do know where evacuation centers or storm shelters are located; additionally, 100% 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.
- ▶ Over 20% 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, and extreme heat. Earthquake was rated the least significant hazard, followed by drought and sinkhole.
- ▶ Residents responded that flooding, and issues relating to flooding, were important for the planning committee to consider. Specific mention was made of flood control and drainage improvements.
- ▶ 81.8% of respondents feel structural projects, such as storm drain improvements and hazardous tree removal, would be most effective. This is most closely followed by property protection and public information at 36.4% each.
- ▶ Residents who reported taking action to mitigate hazard risk individually have obtained necessary equipment, such as generators, and prepared emergency food and water supplies. Others have planned to remove trees.

**Figure B.1 – Survey Response, Preparedness**

### Q3 How prepared do you feel for a hazard event?

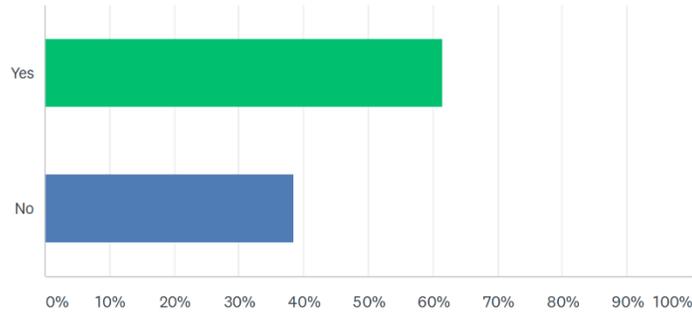


ANSWER CHOICES	RESPONSES	
Not at all prepared	15.38%	2
Somewhat prepared	61.54%	8
Very prepared	23.08%	3
<b>TOTAL</b>		<b>13</b>

**Figure B.2 – Survey Response, Evacuation Center/Shelter Awareness**

**Q4 Do you know where evacuation centers or storm shelters are?**

Answered: 13 Skipped: 0

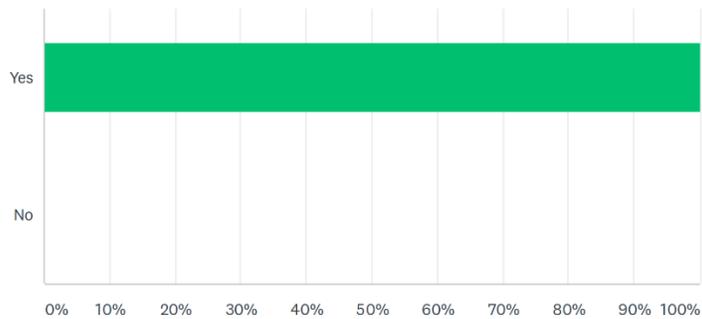


ANSWER CHOICES	RESPONSES	
Yes	61.54%	8
No	38.46%	5
TOTAL		13

**Figure B.3 – Survey Response, Ability to Evacuate/Take Shelter**

**Q5 Are you able to evacuate or take shelter if necessary?**

Answered: 13 Skipped: 0

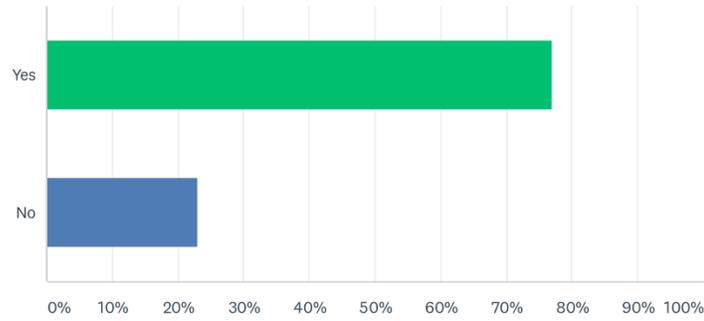


ANSWER CHOICES	RESPONSES	
Yes	100.00%	13
No	0.00%	0
TOTAL		13

**Figure B.4 – 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: 13 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	76.92%	10
No	23.08%	3
TOTAL		13

Figure B.5 – 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.

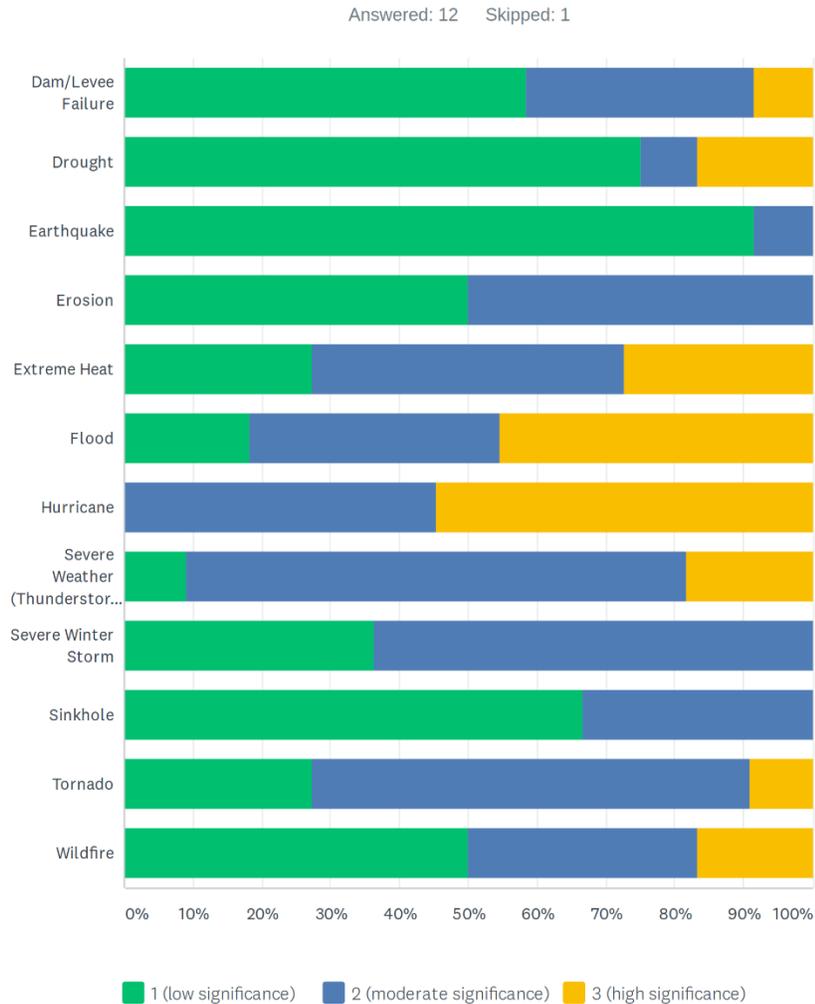
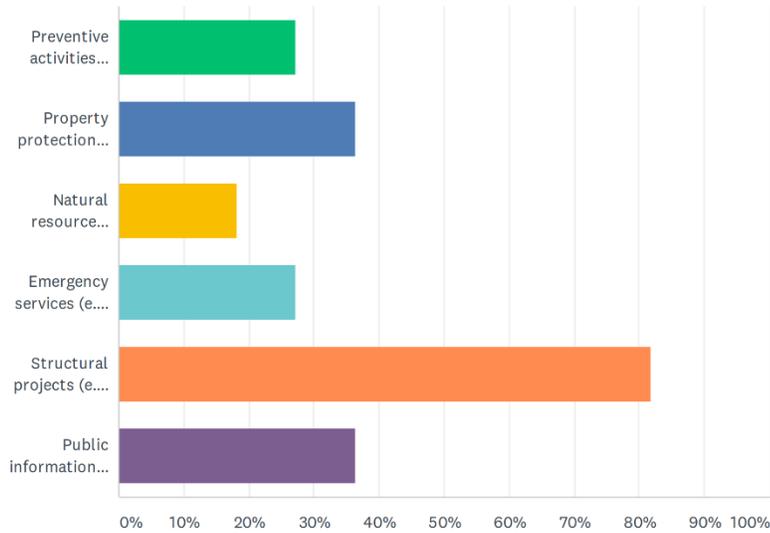


Figure B.6 – Survey Response, Preferred Mitigation Categories

Q10 Which categories of mitigation actions do you feel would be most effective?

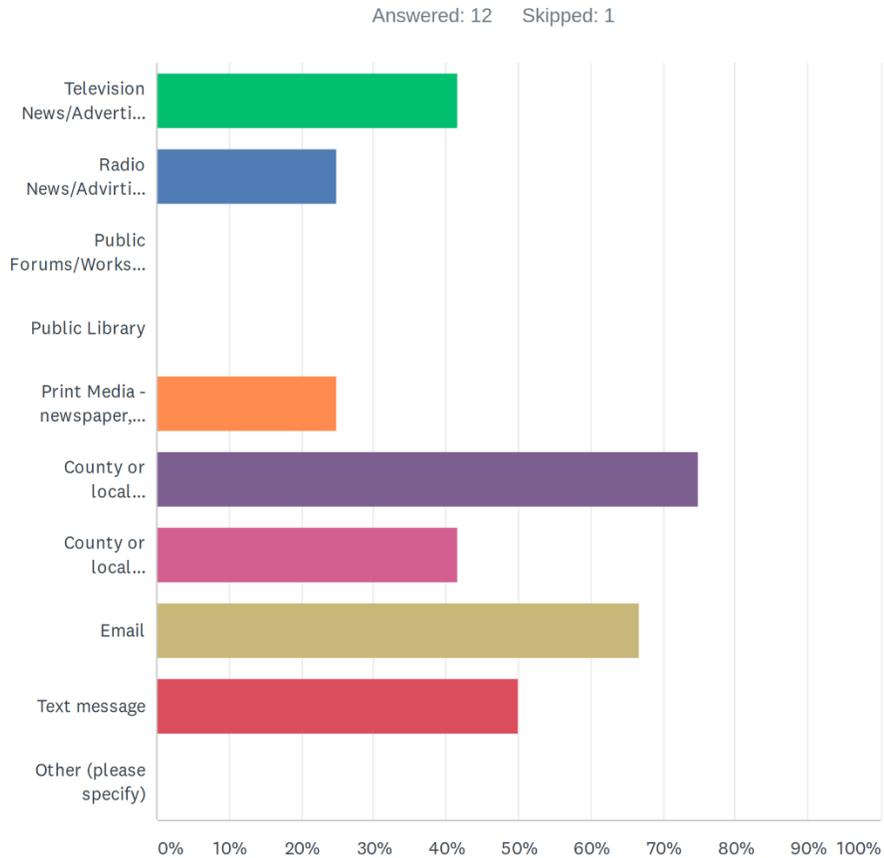
Answered: 11 Skipped: 2



ANSWER CHOICES	RESPONSES	
Preventive activities (e.g. planning and zoning, building codes)	27.27%	3
Property protection (e.g. retrofitting, insurance, flood prone property buyout)	36.36%	4
Natural resource protection (e.g. wetlands protection, erosion control, forest health protection)	18.18%	2
Emergency services (e.g. hazard threat recognition, hazard warning systems, critical facilities protection)	27.27%	3
Structural projects (e.g. storm drain improvements, hazardous tree removal,	81.82%	9
Public information (e.g. outreach projects, environmental education, public education)	36.36%	4
Total Respondents: 11		

Figure B.7 – 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@hcplanning.com>  
**Sent:** Tuesday, March 3, 2020 5:00 PM  
**To:** cally.edwards@redcross.org; director@albemarleareauw.org; lmason@eicinc.org; cedmonds@bertie.k12.nc.us; cmansfield@martin.k12.nc.us; ymann@wscnc.org; oholley@tycomail.net; sbasnigh@hyde.k12.nc.us; kismet.matthews@martincc.edu; drew.pearson@darenc.com; lisa.williams@co.beaufort.nc.us; james.rhodes@pittcountync.gov; mwalters@edgecombeco.com; ricksp@halifaxnc.com; ronnie.storey@nhcnh.net; chris.smith@hertfordcountync.gov; brandon.shoaf@chowan.nc.gov; 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; director@martincountync.com; chamber@washconc.org; windsorbertie@gmail.com; hydecocc@embarqmail.com  
**Cc:** Moore, Abigail; Stroud, David A  
**Subject:** Northeastern NC Regional Hazard Mitigation Plan

Good afternoon,

The Counties of Bertie, Hyde, Martin, Tyrrell, and Washington are in the process of developing an update to the 2017 Northeastern NC 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, March 10, 2020, at 5:30 PM**, at the **Bertie County Commissioners’ Room, 106 Dundee Street, Windsor, NC 27983**. 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.northeasternhmp.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](mailto: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@hcplanning.com](mailto:canderson@hcplanning.com)

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**APPENDIX B: PLANNING PROCESS DOCUMENTATION**

**Table B.3 – Stakeholder List**

<b>First Name</b>	<b>Last Name</b>	<b>Organization</b>
<i>Non-Profit Organizations</i>		
Cally	Edwards	American Red Cross, Northeastern North Carolina Chapter, Executive Director
Bill	Blake	Albemarle Area United Way
Dr. Landon	Mason	Economic Improvement Council, Executive Director
<i>Educational Institutions</i>		
Dr. Catherine	Edmonds	Bertie County Schools, Superintendent
Dr. Chris	Mansfield	Martin County Schools, Superintendent
Yanisha	Mann	Washington County Schools, Superintendent
Oliver	Holley	Tyrrell County Schools, Superintendent
Stephen	Basnight III	Hyde County Schools, Superintendent
Dr. Paul	Hutchins	Martin Community College, President
<i>Surrounding Municipalities</i>		
Drew	Pearson	Dare County Emergency Management, Director
Lisa	Williams	Beaufort County Emergency Management, Planning & Mitigation Specialist
James	Rhodes	Pitt County Planning Director
Mark	Walters	Edgecombe County Emergency Services, Director
Phil	Ricks	Halifax County Emergency Services, Director
Ronnie	Storey, Jr.	Northampton Emergency Management Coordinator
Christopher	Smith	Hertford County Emergency Management, Director
Brandon	Shoaf	Chowan County Planning Department, Director
<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
<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>		
David	Whitely	Martin County Chamber of Commerce, Executive Director
Lewis	Hoggard	Windsor Bertie Chamber of Commerce, Director
Sherri	Carawan	Hyde County Chamber of Commerce, President

## 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 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

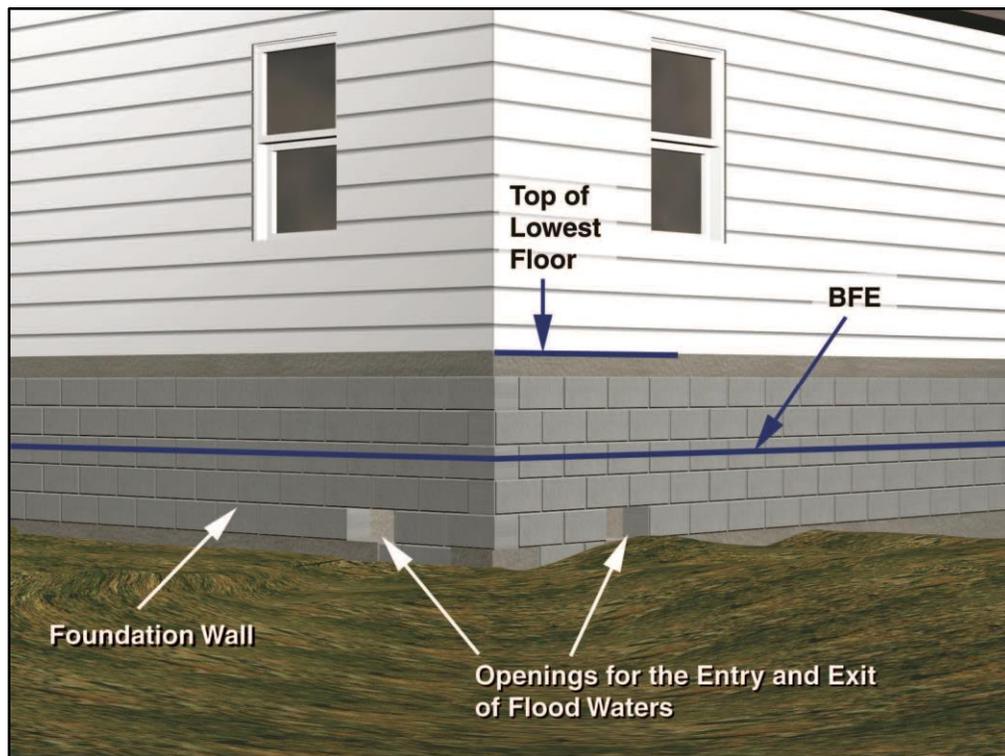
Preventative measures are designed to keep a problem - such as flooding - from occurring or from getting worse. The objective of preventative measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning 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

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space or recreation. Communities in the Northeastern NC 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 Northeastern NC 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. The HMPC did not recommend any changes to the City’s Comprehensive Plan, Zoning Ordinance, or Subdivision Ordinance, but did agree that an annual review should consider higher standards for the Flood Damage Prevention Ordinance.

**Table C.1 – Prevention Mitigation Options and Recommended Projects**

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
<b>Prevention Measures Considered by HMPC and Not Recommended</b>			
-	Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA). 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	This measure has been completed since the last plan and is now considered a normal day to day function.	n/a

**APPENDIX C: MITIGATION ALTERNATIVES**

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
	submittal of the required elevation certificate.		
-	Continue to monitor drainage conditions throughout both the mainland and barrier island portions of the county. Additionally, the county will continue to enforce and support the following programs relating to stormwater management: <ul style="list-style-type: none"> <li>• NCDEQ Coastal Stormwater Rules</li> <li>• NCDEQ Sedimentation &amp; Erosion Control Regulations</li> <li>• NCDEQ Statewide Stormwater Regulations</li> <li>• NCDEQ CAMA Regulations</li> <li>• US Army Corps of Engineers Non-Coastal Wetland Regulations</li> </ul>	This measure has been completed since the last plan and is now considered a normal day to day function.	n/a
-	Continue to enforce all regulations outlined under the NC State Building Code. Although not a requirement, the county will encourage the use of wind resistant design techniques for all new residential construction.	This measure has been completed since the last plan and is now considered a normal day to day function.	n/a
<b>Prevention Measures and Funding Recommended for Implementation</b>			
H9	Continue to support the efforts of Tideland Electric and NCDOT in maintaining the county's right-of-way and utility easements. This effort involves the trimming and pruning of trees that pose an imminent threat to the county's limited infrastructure system. Maintaining clear access into and out of the county, as well as protection of the county's electrical and communications networks, is critical to effective response during natural hazard events.	Hyde County continues to work closely with all utility providers to ensure that right of ways and utility easements are properly maintained in an effort to minimize damage associated with natural hazard events.	General Fund, Electric Service Providers
H16	Work to implement all recommendations outlined within the Hurricane Matthew Resilient Redevelopment Plan.	Implementing recommendations from this plan will ensure better-built buildings that are more likely to protect people and hold up against future hurricanes and storms.	General Fund, NCDPS, NCDOT, NCDEQ
W3	Monitor all land development codes, including the county and town Flood Damage Prevention Ordinances, on an annual basis to ensure that they are up-to-date and address current issues and concerns. This review will also be conducted following substantial natural hazard events.	Washington County continues to closely monitor the impacts that natural hazards have on the County's built environment. These factors will be incorporated into decisions regarding amendment to the County's land development regulations.	General Fund, 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.

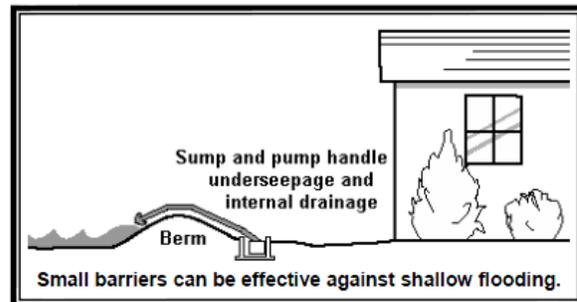
The latter three approaches are the most effective types to consider for the planning area.

#### 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 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.

### **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 Northeastern NC Region could receive credit for Activity 520 – Acquisition and Relocation, for acquiring and relocating buildings from the SFHA. The HMPC recommended pursuing the purchase of repetitive loss buildings and other buildings which are subject to flood damage in order to reduce future losses and return this land to open space. At minimum, the committee recommended property protection mitigation strategies for these properties, such as elevation or floodproofing, as funding becomes available.

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 Northeastern NC Region could receive credit for Activity 330 – Outreach Projects. The HMPC has recommended outreach to property owners on the availability of flood insurance, including ICC coverage, which provides additional funds to repetitive loss properties and substantially damaged properties to offset the cost of

## APPENDIX C: MITIGATION ALTERNATIVES

improvements needed to bring these properties up to code. This information will be provided in the county library and given to local contractors.

**Table C.2 – Property Protection Mitigation Options and Recommended Projects**

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
<b>Prevention Measures Considered by HMPC and Not Recommended</b>			
-	Review the county's Flood Damage Prevention Ordinance on an annual basis to assess whether any revisions and/or updates have been mandated by FEMA or NCEM.	Strategy addressed by H1	n/a
-	Continue to provide detailed information regarding properties located within flood hazard areas as outlined under CRS Manual Section 322.a through 322.g.	Strategy addressed by H12	n/a
<b>Prevention Measures and Funding Recommended for Implementation</b>			
H1	Consider revising the county's Flood Damage Prevention Ordinance to increase the current established two-foot freeboard requirement regarding base flood elevation for new structures developed within the Flood Hazard Area. This effort will also address any necessary updates required by the National Flood Insurance Program (NFIP).	Hyde County will continue to monitor the County's needs regarding required finished floor elevation. As flooding events occur, the County will assess current standards and adjust as necessary.	General Fund
W4	Through implementation of this plan, consider increasing the County's required freeboard within the county's FDPO.	Washington County will review the County's minimal design standards within the defined special flood hazard area to ensure that those standards are adequate to address the potential impacts of recently occurring flooding events.	General Fund, NCDPS
H3	Continue to maintain, operate, and carry out all activities outlined within the Swan Quarter Watershed Project Operation and Maintenance Checklist. This effort includes ensuring functionality of the Swan Quarter Dike.	Hyde County continues to monitor the status of the Swan Quarter flood control system and associated maintenance protocols. This will continue through implementation of this plan.	General Fund, NCDPS

### 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

## APPENDIX C: MITIGATION ALTERNATIVES

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- 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**

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.

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**

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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 Northeastern NC 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.

Credit is available for the Erosion and Sediment Control (ESC) element under Activity 450 for regulating activities throughout the watershed to minimize erosion on construction sites that could result in sedimentation and water pollution. The City of Raleigh could receive credit for soil and erosion control regulations under Activity 450 – Stormwater Management. The HMPC proposes developing a Comprehensive Water Management Plan to monitor water supplies.

**Table C.3 – Natural Resource Protection Mitigation Options and Recommended Projects**

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
<b>Natural Resource Protection Measures Considered by HMPC and Not Recommended</b>			
-	Enforce and support the US Army Corps of Engineers Non-Coastal Wetland Regulations	Hyde County already enforces these regulations and will continue to do so	n/a
<b>Natural Resource Protection Measures and Funding Recommended for Implementation</b>			
W18	Maintain a contract with a qualified post-disaster recovery service provider. This contract will include the provision of essential services and equipment, including generators, and will include documentation required for reimbursement from FEMA/NCEM.	By maintaining this contract, the County has plans in place to quickly and easily clean up after any disaster.	General Fund, NCDPS, FEMA

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Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
H14	Develop a Comprehensive Water Management Plan to monitor the County's water supply and impose water restriction measures as deemed necessary during extreme drought conditions.	The creation of a plan and implementation of restrictions will help protect health and safety of citizens.	General Fund

### 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 hazard event 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:

- 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 an 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.

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**

#### **Northeastern NC**

Regional Hazard Mitigation Plan  
2020

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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 Northeastern NC 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
<b>Emergency Services Measures Considered by HMPC and Not Recommended</b>			
-	Seek grant funding for mitigation reconstruction projects within the county's political boundaries. This action will be based upon the needs and willing participation of property owners in Hyde County.	Strategy addressed by H7	n/a
<b>Emergency Services Measures and Funding Recommended for Implementation</b>			
H7	Review the vulnerability of all critical facilities identified in this plan as a component of annual county Emergency Operations Plan updates. This effort will involve an assessment of whether facilities are readily accessible before, during, or after a natural hazard event has transpired. The county will also consider all information and data outlined in this plan when making determinations on the location of all future critical facilities.	Hyde County reviews the effectiveness and security of County shelter facilities on an annual basis through the County's annual review of its Emergency Operations Plan, as well as the annual tabletop exercise.	General Fund

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Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
W1	Continue to seek funding for assistance in constructing a new dedicated EOC. The county's existing facility is adequate; however, there is a need for a new and dedicated facility.	Washington County has been working towards establishing a new EOC for many years. The County will continue to look for opportunities to move forward with this project.	General Fund, NCDPS, FEMA
H8	Continue to participate in and support the Disaster Assistance Working Group (DAWG). This effort includes maintaining a mutual aid agreement with DAWG, which makes all available Hyde County resources available to participating counties in the event of a disaster. Coordination of all county resources in concert with DAWG will be handled through the group's E-Plan web-based portal. All resources are updated as a component of the NC State Resource Management System.	Hyde County continues to support the efforts of the Disaster Assistance Working Group and the group's efforts to further emergency service effectiveness throughout the region.	General Fund, NCDPS

### 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
  - 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.

**Diversion**

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
<b>Structural Project Measures Considered by HMPC and Not Recommended</b>			
-	Monitor drainage changes throughout the county to determine if structural projects are needed.	Hyde County already does this on a regular basis.	n/a
<b>Structural Project Measures and Funding Recommended for Implementation</b>			
H6	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLP) from future flooding events. The county will continue maintaining a list of RLPs, and	Hyde County continues to utilize funding to address the treatment of repetitive loss properties through both annual funding cycles, as well as through post disaster funding.	General Fund, NCDPS, FEMA

## APPENDIX C: MITIGATION ALTERNATIVES

Action #	Mitigation Action	Reason for Pursuing / Not Pursuing	Funding
	on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The priority will be for the elevation of structures.		
W7	Mail a notice once annually to all property owners whose land is located within a special flood hazard area. The notice should clearly state that the recipient's property is susceptible to flooding and provide information pertinent to emergency evacuation and post-disaster recovery. Additionally, the county will notify all property owners once annually via mail, either through individual mailers or utility bill inserts, of the hazards associated with flooding and other hazards resulting from severe weather events.	This effort is currently underway and relates to the County's ongoing Community Rating System Program. These efforts will continue through implementation of his plan.	General Fund, NCDPS
H17	Hyde County will continue to work diligently on efforts to address the recovery of the Village of Ocracoke from the impacts of Hurricane Dorian. The County will exhaust all resources available to carry this effort out.	The health and safety of citizens and the tourism economy depend on recovery efforts post-disaster.	General Fund, NCDPS, NCDOT, NCDEQ

### 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.

#### 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
- 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

## APPENDIX C: MITIGATION ALTERNATIVES

### Local Implementation /CRS Credit

Communities in the Northeastern NC 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
<b>Public Information and Outreach Measures Considered by HMPC and Not Recommended</b>			
-	Provide flood-related information on the County's website.	Hyde County's website already has flood-related information posted.	n/a
<b>Public Information and Outreach Measures and Funding Recommended for Implementation</b>			
H4	Continue to maintain and map GIS-based data related to floodplain management and mitigation. These efforts will involve maintaining the most recent Flood Insurance Rate Maps (FIRMS), as well as GIS locations for each property either acquired or mitigated under through current and past Mitigation Grant Projects.	Hyde County will develop a GIS database, to work in concert with the information provided in this plan, to be utilized for guidance regarding development policy and regulation.	General Fund
W9	Work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The county will provide these agencies with brochures documenting the concerns relating to development located within flood-prone areas and ways that homeowners may make their homes more disaster-resistant to strong winds, lightning, and heavy rains.	This effort is integral to the County's Community Rating System Program and will continue through implementation of this plan. Maintaining a high CRS rating is a high priority for the County.	General Fund, Municipal Administrations
H5	Make a variety of materials related to flood insurance, flood protection, floodplain management, increased cost of compliance coverage, information on floodplains, and listings of qualified contractors familiar with floodproofing and elevation techniques, available through various methods including: <ul style="list-style-type: none"> <li>• Placing materials in the county library</li> <li>• Disseminating information to local contractors</li> </ul>	The Hyde County Building Inspections Department continues to maintain materials associated with floodplain protection that are available to County residents.	General Fund, NCDPS

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