# TOWN OF KILL DEVIL HILLS

*Land Where Flight Began*

MEMORANDUM May 27, 2020

TO: KDH Board of Commissioners

FROM: Debora P. Diáz, Town Manager

REF: New Business

**3. Outer Banks Regional Hazard Mitigation Plan adoption (Attached NB-3)**

The Town of Kill Devil Hills participates in a hazard mitigation plan program, which maintains the Town's eligibility for federal and state hazard mitigation grant funding and disaster assistance. It is also a major component in gaining credit towards Kill Devil Hills' Community Rating System (CRS) and associated discounts on flood insurance for property owners.

Since 2015, the Town has been part of the Albemarle Regional Hazard Mitigation Plan, which includes nine counties. A new plan must be developed and approved by the Federal Emergency Management Agency (FEMA) every five years to remain in good standing. As a part of this update, the Town, along with other Dare County local governments, has transitioned to a plan that covers only Dare and Currituck Counties, which have very similar hazards and mitigation strategies. Planning Director Meredith Guns' accompanying memorandum details the Town-specific aspects of the plan, and notes the strong community stakeholder input utilized in its development.

Staff recommends the Board of Commissioners approve the Outer Banks Regional Hazard Mitigation Plan by adopting the attached *Resolution of Adoption: Outer Banks Regional Hazard Mitigation Plan.* A motion will be in order.

Director of
Planning and Inspections
MEREDITH GUNS

Building Inspector
MARTY SHAW
CHARLES THUMAN

Code Enforcement Officer
JORDAN BLYTHE

# THE TOWN OF KILL DEVIL HILLS
NORTH CAROLINA

## PLANNING DEPARTMENT

Assistant Director of
Planning and Inspections
CAMERON RAY

Senior Planner
RYAN LANG

Zoning Administrator
DONNA ELLIOTT

May 27, 2020

Memorandum

To: Debbie Diaz

From: Meredith Guns, Planning Director MBG

Subject: Outer Banks Regional Hazard Mitigation Plan- Resolution to Adopt

Over the past year Dare County, Currituck County and all incorporated municipalities have been working with the Wood, LLC consultant group to update the Hazard Mitigation Plan. In addition to Town staff, Kill Devil Hills had dedicated citizen stakeholders, Doug Styons, Michael Osteen and Skip Jones, attend each meeting and provide input for the plan.

Attached to this memorandum are key sections of the Outer Banks Regional Hazard Mitigation Plan for your review/consideration. The other pages of the plan provide details on Currituck, Dare and our five towns along with information needed to meet FEMA requirements. If you would like to review the entire plan it can be found here: https://www.kdhnc.com/DocumentCenter/View/12351/Outer-Banks-Hazard-Mitigation-Plan-FEMA-Review-Draft

The information in the attachment includes:

1. The Table of Contents so you can see the entire scope of the plan.
2. Section 1 of the plan, to provide you an introduction to hazard mitigation and the Outer Banks Regional Hazard Mitigation Plan to include: Background, Purpose and Authority, Scope, References and Plan Organization.
3. Section 2 of the plan, to provide your insight on the planning process that was used to include: Purpose and Vision, What's Changed in the Plan, Preparing the Plan, the Hazard Mitigation Planning Committee, Meetings and Workshops, Involving the Public, Outreach Efforts, Involving the Stakeholders, and Documentation of Plan Progress.
4. Part of Section 4 including hazard identification, and risk assessment and methodology and conclusion of hazard risk.
5. Annex D of the plan, which is the Kill Devil Hills-specific portion of the plan.

**ATTACHMENT NB-3**

Consultants, David Stroud and Abigail Moore, from Wood, LLC were impressed with the level of community engagement. Citizen survey results and in-person participation was the highest they had ever seen, even higher than large metropolitan areas across North Carolina. State officials also attended meetings and were also impressed at the level of committee and community involvement they rarely see in hazard mitigation planning. Significant work was also done to ensure the new plan could be used to pursue additional Community Rating System points that may reduce flood insurance cost in the future.

The effort will allow us to transition from being part of the nine county "Albemarle Regional Hazard Mitigation Plan" that the board adopted in 2015, to a plan that covers two counties with very similar hazards and mitigation strategies.

Adopting the plan will: maintain our eligibility for FEMA disaster grants for the next five years; help ensure North Carolina remains an enhanced hazard mitigation state with reduced grant cost shares; provide guidance as we work to improve community resilience by mitigating hazards; provides crucial CRS points for our citizens.

Staff recommends adoption of the attached resolution which will adopt the Outer Banks Regional Hazard Mitigation Plan in its entirety.

# TOWN OF KILL DEVIL HILLS

*Land Where Flight Began*

## RESOLUTION OF ADOPTION:
## OUTER BANKS REGIONAL HAZARD MITIGATION PLAN

**WHEREAS,** the Town of Kill Devil Hills 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 Kill Devil Hills 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 Kill Devil Hills 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 Kill Devil Hills 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 Roger 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 Kill Devil Hills; and

**WHEREAS**, the Town of Kill Devil Hills, in coordination with the local governments of Duck, Southern Shores, Kitty Hawk, Nags Head, Manteo, and Dare and Currituck Counties, has prepared a regional hazard mitigation plan with input from the appropriate local and state officials; and

**WHEREAS**, the North Carolina Division of Emergency Management and the Federal Emergency Management Agency have reviewed the Outer Banks Regional Hazard Mitigation Plan for legislative compliance and have approved the plan pending completion of local adoption procedures;

**THEREFORE, BE IT RESOLVED**, that the Kill Devil Hills Board of Commissioners hereby adopts the Outer Banks 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.

Adopted this 27th day of May 2020.

SEAL

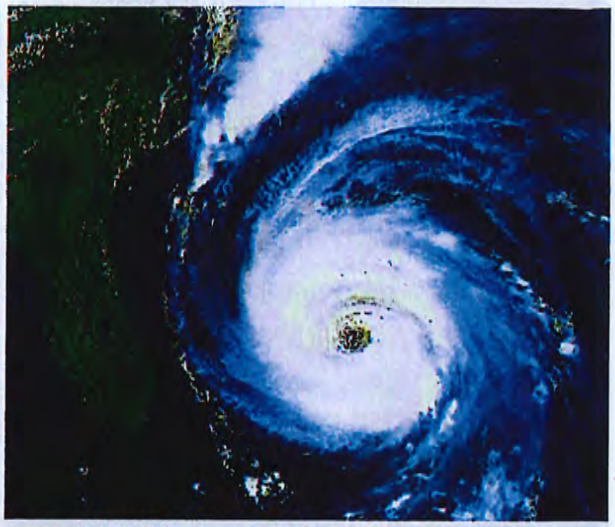
_____

Ben Sproul, Mayor

_____

James Michael O'Dell, Deputy Town Clerk

# Outer Banks Regional Hazard Mitigation Plan



wood.

## TABLE OF CONTENTS

**1 Introduction** ..... **1**
1.1 Background ..... 1
1.2 Purpose and Authority ..... 2
1.3 Scope ..... 2
1.4 References ..... 3
1.5 Plan Organization ..... 3
**2 Planning Process** ..... **4**
2.1 Purpose and Vision ..... 4
2.2 What's Changed in the Plan ..... 5
2.3 Preparing the Plan ..... 6
2.3.1 Phase I – Planning Process ..... 7
2.3.2 Phase II – Risk Assessment ..... 8
2.3.3 Phase III – Mitigation Strategy ..... 8
2.3.4 Phase IV – Plan Maintenance ..... 9
2.4 Hazard Mitigation Planning Committee ..... 9
2.5 Meetings and Workshops ..... 11
2.6 Involving the Public ..... 12
2.7 Outreach Efforts ..... 13
2.8 Involving the Stakeholders ..... 15
2.9 Documentation of Plan Progress ..... 15
**3 Planning Area Profile** ..... **34**
3.1 Geography and Environment ..... 34
3.2 Population and Demographics ..... 42
3.3 Historic Properties ..... 46
3.4 Housing ..... 47
3.5 Infrastructure ..... 49
3.5.1 Transportation ..... 49
3.5.2 Utilities ..... 49
3.6 Current and Future Land Use ..... 49
3.7 Employment and Industry ..... 52
3.7.1 Wages and Employment ..... 52
**4 Risk Assessment** ..... **54**
4.1 Overview ..... 54
4.2 Hazard Identification ..... 54
4.3 Risk Assessment Methodology and Assumptions ..... 59
4.4 Asset Inventory ..... 63

4.4.1 Population ..... 63
4.4.2 Property ..... 63
4.4.3 Critical Facilities ..... 64
4.5 Hazard Profiles, Analysis, and Vulnerability ..... 70
4.5.1 Coastal Hazards (Erosion, Rip Current, and Sea Level Rise) ..... 70
4.5.2 Drought ..... 94
4.5.3 Earthquake ..... 102
4.5.4 Extreme Heat ..... 114
4.5.5 Flood ..... 120
4.5.6 Hurricane and Tropical Storm ..... 149
4.5.7 Severe Weather (Thunderstorm Winds, Lightning & Hail) ..... 176
4.5.8 Severe Winter Storm ..... 191
4.5.9 Tornado ..... 198
4.5.10 Wildfire ..... 211
4.5.11 Hazardous Materials Incident ..... 229
4.5.12 Radiological Emergency ..... 241
4.5.13 Cyber Threat ..... 246
4.5.14 Terrorism ..... 249
4.5.15 Transportation Infrastructure Failure ..... 256
4.6 Conclusions on Hazard Risk ..... 260
**5 Capability Assessment ..... 262**
5.1 Overview ..... 262
5.2 Conducting the Capability Assessment ..... 262
5.3 Capability Assessment Findings ..... 263
5.3.1 Planning and Regulatory Capability ..... 263
5.3.2 Administrative and Technical Capability ..... 270
5.3.3 Fiscal Capability ..... 272
5.3.4 Education and Outreach Capability ..... 273
5.3.5 Mitigation Capability ..... 274
5.3.6 Political Capability ..... 274
5.3.7 Local Self-Assessment Rating ..... 275
5.4 Conclusions on Local Capability ..... 276
**6 Mitigation Strategy ..... 277**
6.1 Goals and Objectives ..... 277
6.1.1 Coordination with Other Planning Efforts ..... 277
6.1.2 Goal Setting ..... 277
6.1.3 Resulting Goals and Objectives ..... 278
6.2 Identification and Analysis of Mitigation Activities ..... 279
6.2.1 Prioritization Process ..... 280
**7 Mitigation Action Plans ..... 281**

**8 Plan Maintenance ..... 303**
8.1 Implementation ..... 303
8.2 Monitoring, Evaluation, and Enhancement ..... 304
8.2.1 Role of HMPC in Implementation, Monitoring and Maintenance ..... 304
8.2.2 Maintenance Schedule ..... 304
8.2.3 Maintenance Evaluation Process ..... 304
8.3 Continued Public Involvement ..... 306
**9 Plan Adoption ..... 307**
**Annex A Currituck County Unincorporated Areas ..... 314**
A.1 Planning Process ..... 314
A.2 Community Profile ..... 314
A.3 Risk Assessment ..... 262
A.3.1 Drought ..... 262
A.3.2 Coastal Hazards ..... 262
A.3.3 Flood ..... 264
A.3.4 Wildfire ..... 270
A.4 Capability Assessment ..... 275
A.4.1 Overall Capability ..... 275
A.4.2 Floodplain Management ..... 275
A.5 Mitigation Strategy ..... 277
**Annex B Dare County Unincorporated Areas ..... 262**
B.1 Planning Process ..... 262
B.2 Community Profile ..... 262
B.3 Risk Assessment ..... 262
B.3.1 Coastal Hazards ..... 262
B.3.2 Flood ..... 265
B.3.3 Wildfire ..... 269
B.4 Capability Assessment ..... 274
B.4.1 Overall Capability ..... 274
B.4.2 Floodplain Management ..... 274
B.5 Mitigation Strategy ..... 276
**Annex C Town of Duck ..... 279**
C.1 Planning Process ..... 279
C.2 Community Profile ..... 279
C.3 Risk Assessment ..... 287
C.3.1 Coastal Hazards ..... 287
C.3.2 Flood ..... 289
C.3.3 Wildfire ..... 293
C.4 Capability Assessment ..... 298

C.4.1 Overall Capability ..... 298
C.4.2 Floodplain Management ..... 298
C.5 Mitigation Strategy ..... 300
**Annex D Town of Kill Devil Hills ..... 304**
D.1 Planning Process ..... 304
D.2 Community Profile ..... 304
D.3 Risk Assessment ..... 312
D.3.1 Coastal Hazards ..... 312
D.3.2 Flood ..... 314
D.3.3 Wildfire ..... 318
D.4 Capability Assessment ..... 323
D.4.1 Overall Capability ..... 323
D.4.2 Floodplain Management ..... 323
D.5 Mitigation Strategy ..... 325
**Annex E Town of Kitty Hawk ..... 328**
E.1 Planning Process ..... 328
E.2 Community Profile ..... 328
E.3 Risk Assessment ..... 336
E.3.1 Coastal Hazards ..... 336
E.3.2 Flood ..... 338
E.3.3 Wildfire ..... 342
E.4 Capability Assessment ..... 347
E.4.1 Overall Capability ..... 347
E.4.2 Floodplain Management ..... 347
E.5 Mitigation Strategy ..... 349
**Annex F Town of Manteo ..... 350**
F.1 Planning Process ..... 350
F.2 Community Profile ..... 350
F.3 Risk Assessment ..... 359
F.3.1 Flood ..... 359
F.3.2 Wildfire ..... 363
F.4 Capability Assessment ..... 368
F.4.1 Overall Capability ..... 368
F.4.2 Floodplain Management ..... 368
F.5 Mitigation Strategy ..... 370
**Annex G Town of Nags Head ..... 372**
G.1 Planning Process ..... 372
G.2 Community Profile ..... 372
G.3 Risk Assessment ..... 380

G.3.1 Coastal Hazards ..... 380
G.3.2 Flood ..... 382
G.3.3 Wildfire ..... 386
G.4 Capability Assessment ..... 392
G.4.1 Overall Capability ..... 392
G.4.2 Floodplain Management ..... 392
G.5 Mitigation Strategy ..... 394
**Annex H Town of Southern Shores ..... 397**
H.1 Planning Process ..... 397
H.2 Community Profile ..... 397
H.3 Risk Assessment ..... 404
H.3.1 Coastal Hazards ..... 404
H.3.2 Flood ..... 406
H.3.3 Wildfire ..... 409
H.4 Capability Assessment ..... 414
H.4.1 Overall Capability ..... 414
H.4.2 Floodplain Management ..... 414
H.5 Mitigation Strategy ..... 416
**Appendix A Plan Review Tool ..... A.1**
**Appendix B Planning Process Documentation ..... B.1**
**Appendix C Mitigation Alternatives ..... C.1**
C.1 Categories of Mitigation Measures Considered ..... C.1
C.2 Alternative Mitigation Measures per Category ..... C.1
C.2.1 Preventative and Regulatory Measures ..... C.1
C.2.2 Property Protection Measures ..... C.5
C.2.3 Natural Resource Protection ..... C.8
C.2.4 Emergency Services Measures ..... C.12
C.2.5 Structural Projects ..... C.15
C.2.6 Public Information ..... C.17
**Appendix D References ..... D.1**

# 1 Introduction

Section 1 provides a general introduction to hazard mitigation and an introduction to the Outer Banks 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 Outer Banks Region of North Carolina.

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

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

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

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

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

## 1.2 PURPOSE AND AUTHORITY

This plan was developed in a joint and cooperative manner by members of 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 Outer Banks remain eligible for federal disaster assistance including the FEMA HMGP, PDM, and the FMA programs.

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

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

## 1.3 SCOPE

The planning area for the Outer Banks Region includes all incorporated municipalities and unincorporated areas in Currituck and Dare Counties. All participating jurisdictions are listed in Table 1.1.

**Table 1.1 – Participating Jurisdictions in the Outer Banks Regional Hazard Mitigation Plan**

| |
|---|
| **Currituck County** |
| **Dare County** |
| Town of Duck |
| Town of Kill Devil Hills |
| Town of Kitty Hawk |
| Town of Manteo |
| Town of Nags Head |
| Town of Southern Shores |

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 Outer Banks Region followed the planning process prescribed by FEMA, and this plan was developed under the guidance of an HMPC comprised of representatives of County, City, and Town departments; citizens; and other stakeholders. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the planning area, assessed the planning area's vulnerability to these hazards, and examined each participating jurisdiction's capabilities in place to mitigate them. The hazards profiled in this plan include:

- Coastal Hazards (Erosion, Rip Current, and Sea Level Rise)
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hurricane & Tropical Storm
- Severe Weather (Thunderstorm Wind, Lightning, & Hail)

- Severe Winter Storm
- Tornado
- Wildfire
- Hazardous Materials Incident
- Radiological Emergency
- Cyber Threat
- Terrorism
- Transportation Infrastructure Failure

## 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 Outer Banks 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 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 Outer Banks Regional Hazard Mitigation Plan. It consists of the following sub-sections:

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

## 2.1 PURPOSE AND VISION

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

The purpose of the Outer Banks Regional Hazard Mitigation Plan is to identify, assess, and mitigate hazard risk to better protect the people and property within Currituck and Dare Counties 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 Counties and participating jurisdictions will use to decrease vulnerability and increase resiliency.

The Outer Banks Region Hazard Mitigation Planning Committee (HMPC) met on June 4th and June 5th and representatives discussed their vision for the planning area 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 Outer Banks 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 that they agreed should define and guide the planning process and the planning area's approach to hazard mitigation.

**The Outer Banks Region will maintain its unique quality of life and sense of place while planning and preparing for resilience in the face of future hazards. The Region will be prepared for and adaptable to hazards, and when confronted with disaster, the Region will recover stronger and smarter in a planned, balanced, sustainable manner that acknowledges the dynamic nature of hazard risks in a changing climate. Through innovation and collaboration, the Outer Banks Region will ensure a thriving, safe environment for residents and visitors.**

## 2.2 WHAT'S CHANGED IN THE PLAN

Currituck and Dare Counties and their incorporated jurisdictions were participants in the previously approved Albemarle Regional Hazard Mitigation Plan. This plan was approved by FEMA on June 11, 2015.

For this plan update, Currituck and Dare Counties and their incorporated jurisdictions decided to separate from the Albemarle planning region and create their own Outer Banks Regional Plan in order to better focus on the unique risks, vulnerabilities, and needs of their communities.

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 2015 Albemarle Regional plan and provides the final decision made by the HMPC as to which hazards should be included in the new 2020 Outer Banks Regional Hazard Mitigation 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 Outer Banks 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;
2) Risk Assessment;
3) Mitigation Strategy; and
4) Plan Maintenance.

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

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

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

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

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

**Table 2.2 – Community Wildfire Protection Plan Process Reference**

| CWPP Process | CRS Step | Fulfilling Plan Section |
|---|---|---|
| Convene decision makers | Step 1 | Section 2 – HMPC |
| Involve Federal agencies | Step 3 | Section 2 – Involving Stakeholders |
| Engage interested parties (such as community representatives) | Step 1, 2, and 3 | Section 2 – HMPC, Involving the Public, Involving Stakeholders |
| Establish a community base map | Step 4 | 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<br>Section 5 – Capability |

| CWPP Process | CRS Step | Fulfilling Plan Section |
|---|---|---|
| Establish community hazard reduction priorities and recommendations to reduce structural ignitability | Step 6, 7, and 8 | Section 6 – Mitigation Strategy<br>Section 7 – Mitigation Action Plans |
| Develop an action plan and assessment strategy | Step 8 and 10 | Section 7 – Mitigation Action Plans<br>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:

### 2.3.1 Phase I – Planning Process

**Planning Step 1: Organize to Prepare the Plan**

With the Counties' 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 Counties' effort to reorganize and coordinate for the plan update was led by Dare County Emergency Management Director, Drew Pearson, and the Currituck County Emergency Management Director, Mary Beth Newns. Consultants from Wood Environment and Infrastructure Solutions, Inc. assisted by leading the Counties 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**

As this plan is a the first for the newly established Outer Banks planning region, the participating communities had to establish a new HMPC to lead the planning effort. More details on the HMPC are provided in Section 2.4. Stakeholder coordination was incorporated into the formation of the HMPC and was sought through additional outreach methods. These efforts are detailed in Section 2.8 and documentation of additional stakeholder outreach is provided in Appendix B.

***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. Communities in the Outer Banks Region use a variety of planning mechanisms, such as Comprehensive Plans, subdivision regulations, building codes, and ordinances to guide growth and development. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. As detailed in Table 2.3, the development of this plan incorporated information from existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

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

**Table 2.3 – Summary of Existing Studies and Plans Reviewed**

| Resource Referenced | Use in this Plan |
|---|---|
| Local Comprehensive Plans (Dare County Land Use Plan, Currituck County Land Use Plan, jurisdictional land use/comprehensive plans, etc.) | The Currituck and Dare County land use plans 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 6. They are also referenced in individual jurisdictional annexes. |
| Local Ordinances (Flood Damage Prevention Ordinances, Subdivision Ordinances, Zoning Ordinances, etc) | Local ordinances were referenced in the Capability Assessment in Section 6 and where applicable for updates or enforcement in Mitigation Action Plans in Section 7. |
| Dare County and Incorporated Jurisdictions (09/20/2006) and Currituck County and Incorporated Jurisdictions (12/21/2018) Flood Insurance Studies (FIS), Revised | The FIS reports were referenced in the preparation of the flood hazard profile in Section 4. |
| Albemarle Hazard Mitigation Plan, 2015 | The previous plan was referenced in compiling the Hazard Identification and Risk Assessment in Section 4 and in reporting on implementation status and developing the Mitigation Action Plans in Section 2 and Section 7, respectively. |

### 2.3.2 Phase II – Risk Assessment

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

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

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

### 2.3.3 Phase III – Mitigation Strategy

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

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

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

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

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

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

## 2.4 HAZARD MITIGATION PLANNING COMMITTEE

This Hazard Mitigation Plan was developed under the guidance of a HMPC. The Committee's representatives included representatives of County and Town departments, federal and state agencies, citizens, and other stakeholders.

To form the planning committee, the Currituck and Dare County Emergency Managers coordinated with County and Town officials to designate representatives for each jurisdiction. Each community was asked to designate a primary and secondary contact for the HMPC. Communities were also asked to identify local stakeholder representatives to participate on the HMPC alongside the County and Town officials to improve the integration of stakeholder input into the plan. The HMPC was comprised of a CRS Steering Committee and a Working Group. Table 2.4 and Table 2.5 detail 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 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 Outer Banks Regional HMPC, "participation" meant the following:

- Providing facilities for meetings;
- Attending and participating in the HMPC meetings;
- Collecting and providing requested data (as available);
- 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 Section 2.5 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. Additionally, draft documents were distributed via the plan website so that the HMPC members could easily access and review them and provide comments.

The HMPC was comprised of two groups, a CRS Steering Committee, which led the planning and decision-making efforts throughout the planning process, and a Working Group comprised of additional local staff, which provided information to the CRS Steering Committee.

**Table 2.4 – CRS Steering Committee**

| Jurisdiction | Representative | Agency | Position/Title |
|---|---|---|---|
| Currituck County | Mary Newns | Currituck County Emergency Management | Emergency Management/ Communications Director |
| Currituck County | Jason Litteral, CFM | Currituck County Planning and Community Development Department | Planner II |
| Currituck County | Lora Eddy | The Nature Conservancy | Coastal Engagement Coordinator |
| Currituck County | Warren Eadus | Quible and Associates, P.C. | President |
| Currituck County | Anthony Dickinson | Farm Bureau Insurance Group | Agent |
| Currituck County | Jason Summerton | Twiddy & Company, 4WD Area | Broker-in-Charge |
| Dare County | Drew Pearson | Dare County Emergency Management | Director |
| Dare County | Donna Creef | Dare County Planning & Zoning | Planning Director |
| Dare County | Noah Gillam | Dare County Planning & Zoning | Planner |
| Dare County | Pat Weston | N/A | Citizen Stakeholder – Hatteras Island |
| Dare County | Glenn Rainey | N/A | Citizen Stakeholder – Colington |
| Dare County | Buddy Shelton | N/A | Citizen Stakeholder – Mainland Dare |
| Dare County | John Finelli | N/A | Citizen Stakeholder – Martin Point |
| Duck | Joe Heard | Department of Community Development | Director |
| Duck | Sandy Cross | Department of Community Development | Permit Coordinator/CAMA LPO/CZO/CFM |
| Duck | Matt Price | -- | Community Developer |
| Duck | Jim Braithwaite | -- | Community Developer |
| Kitty Hawk | Rob Testerman | Kitty Hawk Planning & Inspections | Director |
| Kitty Hawk | Mike Talley | Kitty Hawk Fire Department | Fire Chief |
| Kitty Hawk | Mark Bissel | N/A | Citizen Stakeholder |
| Kill Devil Hills | Meredith Guns | Kill Devil Hills Planning & Inspections | Planning Director |
| Kill Devil Hills | Cameron Ray | Kill Devil Hills Planning & Inspections | Senior Planner |
| Kill Devil Hills | Doug Styons | N/A | Citizen Stakeholder |
| Kill Devil Hills | Mike O'Steen | N/A | Citizen Stakeholder |
| Kill Devil Hills | Skip Jones | N/A | Citizen Stakeholder |

| Jurisdiction | Representative | Agency | Position/Title |
|---|---|---|---|
| Nags Head | Holly White | Nags Head Planning & Development | Principal Planner |
| Nags Head | Shane Hite | Nags Head Fire Rescue | Deputy Fire Chief |
| Nags Head | Meade Gwinn | N/A | Citizen Stakeholder |
| Nags Head | Megan Lambert | N/A | Citizen Stakeholder |
| Manteo | Melissa Dickerson | Manteo Planning & Zoning | Planner |
| Manteo | Casey Howell | Manteo Finance Department | Finance Officer |
| Manteo | Malcolm Fearing | N/A | Citizen Stakeholder |
| Manteo | Taldage Jones | N/A | Citizen Stakeholder |
| Southern Shores | Wes Haskett | Southern Shores Administration/Planning & Code Enforcement | Interim Town Manager/Planning Director |
| Southern Shores | Dabni Shelton | Southern Shores Planning & Code Enforcement | Permit Officer |
| Southern Shores | Andy Ward | N/A | Citizen Stakeholder |

**Table 2.5 – Working Group**

| Jurisdiction | Representative | Agency | Position/Title |
|---|---|---|---|
| Currituck County | Rebecca Gay* | Currituck County Emergency Management | Deputy Emergency Management Coordinator |
| Currituck County | Steven Pyle | Currituck County Emergency Management | Deputy Emergency Management Coordinator |
| Currituck County | Laurie LoCicero | Currituck County Planning and Community Development Department | Director |
| Currituck County | Jennie Turner, CFM, CZO | Currituck County Planning and Community Development Department | Planner II |
| Currituck County | Randall Edwards | Currituck County Public Information Department | Information and Communications Officer |
| Currituck County | Chandler Sawyer | Engineering | Engineer |
| Currituck County | Eric Weatherly | Engineering | Engineer |
| Nags Head | Michael Zehner | Nags Head Planning & Development | Planning Director |
| Nags Head | Ed Snyder | Nags Head Planning & Development | Code Enforcement |

*Vacated position during the planning process

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

Public meetings are summarized in subsection 2.6.

**Table 2.6 – Summary of HMPC Meetings**

| Meeting Title | Meeting Topic | Meeting Date | Meeting Location |
|---|---|---|---|
| HMPC Mtg. #1 (Kickoff) – Dare County Group | 1) Introduction to DMA, CRS, and FMA requirements and the planning process<br>2) Review of HMPC responsibilities and the project schedule. | March 5, 2019 | Dare County Emergency Operations Center, 370 Airport Road, Manteo |
| HMPC Mtg. #1 (Kickoff) – Currituck County Group | | March 6, 2019 | Historic Currituck County Courthouse, 2826 Caratoke Hwy, Currituck |
| HMPC Mtg. #2 – Currituck County Group | 1) Review and update plan goals<br>2) Brainstorm a vision statement<br>3) Report on status of actions from the 2015 plan<br>4) Complete the capability self-assessment | June 4, 2019 | Lower Currituck Fire Department, 6323 Caratoke Hwy, Grandy |
| HMPC Mtg. #2 – Dare County Group | | June 5, 2019 | Dare County Emergency Operations Center, 370 Airport Road, Manteo |
| HMPC Mtg. #3 | 1) Review Draft Hazard Identification & Risk Assessment (HIRA)<br>2) Draft objectives and Mitigation Action Plans | July 24, 2019 | Dare County Emergency Operations Center, 370 Airport Road, Manteo |
| HMPC Mtg. #4 – Currituck County Group | 3) Review the Draft Hazard Mitigation Plan<br>4) Solicit comments and feedback | January 7, 2020 | Currituck Courthouse 153 Courthouse Rd, Currituck, NC 27929 |
| HMPC Mtg. #4 – Dare County Group | | January 8, 2020 | Dare County Emergency Operations Center, 370 Airport Road, Manteo |

## 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, and 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 2.7.

**Table 2.7 – Summary of Public Meetings**

| Meeting Title | Meeting Topic | Meeting Date | Meeting Location |
|---|---|---|---|
| Public Meeting #1 (Kick-Off) – Dare County | 1) Introduction to DMA, CRS, and FMA requirements and the planning process<br>2) Review of HMPC responsibilities and the project schedule.<br>3) Review of Hazard Identification<br>4) Explanation of Mitigation Categories | March 5, 2019 | Dare County Admin Building, 954 Marshall C. Collins Drive, Room 168, Manteo, NC, 27954 |
| Public Meeting #1 (Kick-Off) – Currituck County | | March 6, 2019 | Currituck County Senior Center, 130 Community Way, Barco, NC 27917 |
| Public Meeting #2 – Currituck County | 1) Introduction to DMA, CRS, and FMA requirements and the planning process<br>2) Review of HMPC responsibilities and the project schedule.<br>3) Review of Hazard Identification<br>4) Explanation of Mitigation Categories | June 4, 2019 | Wildlife Center, 1160 Village Lane, Corolla, NC 27927 |
| Public Meeting #2 – Dare County | | June 5, 2019 | Fessenden Center Annex, 47017 Buxton Back Road, Buxton, NC 27920 |
| Public Meeting #2 – Dare County | | June 6, 2019 | 102 Town Hall Drive, Commissioners Meeting Room, Kill Devil Hills, NC 27948 |
| Public Meeting #3 – Currituck County | 1) Review "Draft" Hazard Mitigation Plan<br>2) Solicit comments and feedback | January 7, 2020 | Currituck Courthouse 153 Courthouse Rd, Currituck, NC 27929 |
| Public Meeting #3 – Dare County | | January 8, 2020 | Fessenden Center 47017 Buxton Back Road, Buxton, NC 27920 |
| Public Meeting #3 – Dare County | | January 9, 2020 | Jockey's Ridge State Park Auditorium 300 W. Carolista Drive, Nags Head, NC 27959 |

## 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 2.8 – 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 | Ongoing | Public Meeting announcements posted; Link to the plan website shared to expand reach; Requests for comments on the draft plan |

| Location | Date | Event/Message |
|---|---|---|
| Public survey | January 2019 – July 2019 | Survey hosted online, made available via shareable link, and shared on the plan website; hard copies made available in local offices |
| Mitigation Flyer | June 2019 | Developed a Mitigation Flyer summarizing the planning process; made available at public meetings |
| Plan website – Vision and Goals | July 2019 | Final visions and goals posted to plan website for review |
| Plan website – HIRA draft | July 2019 | Draft HIRA made available for review and comment online |
| Plan website – Draft Plan | January 2020 | Full draft plan made available for review and comment online |
| Local newspaper article | March 2019 | Description of the planning process, link and invitation to participate in the public survey, link to the plan website |
| Social media posts | March 2019, June 2019, January 2020 | Public meeting announcements posted; link to the plan website shared; link to the public survey shared |
| Local community newsletters | March 2019, June 2019, January 2020 | Direct email to residents on an email distribution list requesting public comment on the draft plan |

AS detailed above, 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. Documentation of these activities is provided in Appendix B.

A public outreach survey was made available on March 5, 2019 and remained open for response until June 14, 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, 853 responses were received.

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

- Over 92% of respondents own their home, which indicates ability of those engaged in the mitigation process to implement mitigation on their own properties.
- Only 8% of respondents say they feel not at all prepared for a hazard event; 63.4% feel somewhat prepared and 28.6% feel very prepared.
- 56.8% of respondents do not know where evacuation centers or storm shelters are located; however, 96.6% 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.
- One quarter 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, tornado, severe weather, and erosion. Earthquake was rated the least significant hazard, followed by drought.
- Many respondents who reported having taken steps to mitigate risk at home reported preparedness actions such as generators, evacuation plans, and emergency kits and supplies as well as home maintenance actions such as removing yard debris and trimming trees. Fewer respondents also noted prevention or property protection actions such as installing storm shutters, addressing localized drainage issues, or even elevating their homes; these may be important ideas to promote in outreach.

- Respondents favored structural projects and emergency services for mitigation; the mitigation category with the least support was property protection. Continued outreach on the importance of individual property protection may be beneficial.

Detailed survey results are provided in Appendix B.

## 2.8 INVOLVING THE STAKEHOLDERS

In addition to representatives of each participating jurisdiction, the Hazard Mitigation Planning Committee included a variety of stakeholders. Stakeholders on the HMPC included representatives from the Nature Conservancy, Farm Bureau Insurance Group, Quible and Associates, and Twiddy & Company. Input from additional stakeholders, including neighboring communities, was solicited through an invitation to attend the public meetings and review the draft plan. Documentation and details of this effort are provided in Appendix B. Stakeholders could also participate in the public survey; however, whether or not stakeholders participated 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 2.9 below details the status of mitigation actions from the previous plan. More detail on these actions is provided in Section 7: Mitigation Action Plans.

**Table 2.9 – Status of Previous Mitigation Actions**

| Jurisdiction | Completed | Deleted | Carried Forward |
|---|---|---|---|
| Currituck County | 14 | 14 | 29 |
| Dare County | 25 | 2 | 9 |
| Town of Duck | 2 | 15 | 19 |
| Town of Kill Devil Hills | 0 | 12 | 24 |
| Town of Kitty Hawk | 3 | 11 | 5 |
| Town of Manteo | 0 | 11 | 7 |
| Town of Nags Head | 15 | 68 | 16 |
| Town of Southern Shores | 1 | 9 | 18 |
| **Total** | **60** | **142** | **127** |

Table 2.10 on the following pages details all completed and deleted actions from the 2015 plan.

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

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

**Table 2.10 – Completed and Deleted Actions from the 2015 Outer Banks Regional Hazard Mitigation Plan**

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| | **Currituck County** | | |
| CUR2 | Routinely inspect and clear debris from drainage system | Completed | Soil & Water routinely inspects drainage. Soil & Water awarded approx. $170,000 from 2016 Disaster Relief Funds for clear and snag of ditches. Moyock Watershed Service District is spending $35,000 to conduct heavy maintenance (removing debris/sediment, unclogging culverts) on ditches within the district. |
| CUR3 | Prepare stormwater drainage studies and planning for mitigation of known problem areas. | Completed | **Whalehead:** Evaluation of current drainage system identified $2 million worth of improvements. Developing a capital improvement plan to implement recommendations. **Ocean Sands North, Crown Point:** 2 year ($300,000) report focusing on groundwater lowering systems should be completed in late 2018. Report recommends designing and implementing a groundwater lowering system that will provide for additional storage of stormwater within the underlying soils. Will require tax increase to fund project. **Guinea Mill Run Drainage Basin:** USACE hired in 2017 to complete $195,000 drainage modeling study looking at the ditches/drainage in the northwest portion of the county.Guinea Mill Run Planning Assistance to States Hydrology and Hydraulics Study completed in 2018. Working to identify funding source for study recommendations. **Moyock Watershed Service District:** Survey for potentially implementing a tax increase for drainage improvements collected April 2018. **Currituck Station:** Proposal of a regional drainage system that future developers would be required to adhere to. **Carova Service District:** working with advisory board on potentially implementing tax increase to fund improvements. **Nature Conservancy** is working on drainage basin study to determine flow patterns. |
| CUR4 | Determine the feasibility of stormwater districts in watersheds, townships, or problem flooding areas through a study to mitigate against future flooding. | Completed | See CUR3 for status |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| CUR12 | Maintain participation and membership in the National Flood Insurance Program and the Community Rating System Program. | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR13 | Support and continue NC Floodplain Mapping Program updates of flood and hazard maps as needed. | Completed | Flood map updates completed Maps effective date: December 21, 2018. |
| CUR14 | Investigate the feasibility of adopting higher standards such as protection of critical facilities that will benefit the County's CRS rating and increase the discount of flood insurance for home owners. | Completed | 1 foot of freeboard has been incorporated into the unified development ordinance which has been officially adopted. Coastal Resilience tool (maps.coastalresilience.org/northcarolina/#) will be valuable in determining risk and redirecting growth to areas with less risk. |
| CUR44 | Adopt appropriate land use or other regulatory policies/ordinances that assist in the mitigation of repetitive loss properties | Completed | The stormwater manual and unified development ordinance address this issue. We are currently updating our land use plan. |
| CUR60 | Encourage NC Building Code to strengthen building codes and incorporate those higher standards for hazard resistance to mitigate structure damage via sending delegation to the Code Council. | Deleted | Need status |
| CUR21 | Protect private and county assets, buildings, and critical facilities through implementation of cost-effective and technically feasible mitigation actions. | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR40 | Pursue mitigation of repetitive flood loss properties | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR68 | Survey County owned property to retrofit for hazards | Completed | EM / Fire Marshal completed county facility safety assessments in 2017 and provided recommendations to County Manager and Public Works. |
| CUR45 | Preserve and/or restore natural and coastal areas or the natural functions of floodplains (coastal and riverine) and watershed areas. | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR46 | Protect/enhance landforms through both public and private efforts that serve as natural mitigaiton features by promoting dune grass plantings, installation of sand fencing, importing sand, and other appropriate measures. | Completed | The County offers a yearly dune grass, share cost, grant program aimed at enhancing vegetative cover on the dune system. |
| CUR48 | Evaluate the adoption of a County ordinance address protection to the primary or frontal dune or damage to vegetation on the frontal dune | Completed | The unified development and CAMA regulations provide protection for primary frontal dunes. The subdivision ordinance provides protection of significant dunes by requiring a report from a licensed geologist. |
| CUR1 | Continue to improve stormwater drainage in order to prevent flooding. | Deleted | Not intended to be included in 2015 plan as an action. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| CUR7 | Work with NCDOT and neighboring communities to improve traffic flow throughout both mainland and the Outer Banks portion of Currituck County. | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR9 | Partner with NCDOT to evaluate areas on Hwy 12 and Caratoke Hwy and implement level of service standards for new development. | Deleted | Medians, improved intersections, improved access control, etc. are included in new development; however, no funding exists to retrofit existing problem areas. |
| CUR10 | Encourage NCDOT to continue with road improvements (stop lights, turn/deceleration lanes, etc.) | Completed | We continue to work with DOT on major projects that would effect traffic flow through the County. Improved intersections, access control, etc. are identifed in the STIP, but are not currently funded. South Mills Rd. widening project funded beginning FY2019. US158 widening from NC-34 in Camden to NC168 in Barco funded beginning FY2023. |
| CUR28 | Improve capability of the County to respond to hazards and improve the effectiveness of hazard mitigation strategies in regards to public safety response | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR31 | Improve water safety and water response through use agreements or easements with Homeowner Associations that have existing boat ramps with access to the sound. | Deleted | No progress |
| CUR33 | Develop a strategy to facilitate post-disaster and recovery plans with the private sector including homeowner associations and critical facilities | Deleted | No progress |
| CUR35 | Secure pumps for stormwater pumping prior to storm events | Completed | Engineering Department has contacts for stormwater pumps. Oceans Sand Emergency Pumping Plan approved by NCDEQ Div. of Water Resources; Currituck OBX Emergency Pumping Plan under review. |
| CUR38 | Continue to develop Community Emergency Response Teams (CERT) | Completed | Continuous - Knotts Island continues to maintain a robust CERT. |
| CUR16 | Continue to educate the public and increase awareness about hazards, how to develop and retrofit their properties against hazards, and individual responsibility for mitigating against hazard risk in order to protect public health, safety, and welfare. | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR23 | Educate, empower, and assist the most vulnerable populations from being impacted by potential hazards. | Deleted | Not intended to be included in 2015 plan as an action. |
| CUR24 | Expand publications to include other languages | Completed | Our IT department is working to include Spanish copies of federal documents on our website. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| CUR36 | Improve the dissemination of information to the public prior, during, and after events. | Completed | County continues to improve social media efforts. |
| CUR74 | Continue to work on requirement for a real estate disclosure statement for home buyers and renters | Deleted | Need status |
| | **Dare County** | | |
| DAR2 | Identify problem areas and prioritize projects to improve drainage systems throughout the county. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR3 | Enforce ordinances that prevent fill or structures without a drainage plan. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR4 | Assist property owners with safe and efficient clean up after storm events by implementing yearly contract with debris removal services | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR5 | Increase the number of properties that meet and exceed the published Base Flood Elevations. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR7 | Implement a repetitive loss plan to reduce the potential damage from future events. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR10 | Identify and prioritize funding to mitigate vulnerable structures and develop the repetitive loss plan | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR11 | Implementation and Enforcement of CAMA Use Standards for Coastal Wetland AECs as Identified under 15NCAC7H, Section 0205 and 0208 | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR12 | Continue to Administer the CAMA Local Enforcement Program and Maintain the Staff Necessary for this Work. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR13 | Refer Applicants to U.S. Army Corps of Engineers Permit Program, Specifically Section 404 | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR14 | Facilitate Implementation of Permit Program for Wetland Management | Delete | No one knew what this was. |
| DAR19 | Require Realtors to disclose flood zones. Develop and maintain relations with Real Estate Community and provide outreach and educational opportunities. Provide access to floodplain maps and floodplain information for the Real Estate Community. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR20 | Enhance NFIP information by distributing NFIP brochures and including up to date flood maps on the County website. | Delete | Action was already completed |
| DAR22 | Continue to participate in the Community Rating System. Look for additional activities to implement to improve Class rating. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR23 | Continue participation in Storm Ready program. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| DAR24 | Develop Emergency Response Plan for Road/Bridge Loss | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR25 | Advocate for Beach Replacement | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR26 | Circulate brochures on all hazards identified in the risk assessment to educate the public on protective actions that they can prepare for in their disaster plans. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR27 | Conduct annual outreach activities to increase awareness of all potential hazards that affect Dare County. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR29 | Educate the public with assistance with safe and efficient clean up after storm events. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR30 | Fund and implement assistance to property owners with safe and efficient clean up after storm events. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR31 | Develop plan to increase the number of properties that meet and exceed Base Flood Elevation (BFE). | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR32 | Prioritize funding to increase the number of properties that meet and exceed BFE. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR34 | Lobby local realtors board to require realtors to disclose flood zones | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR35 | Circulate Brochure on NFIP to enhance NFIP information. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR36 | Put Flood Maps on the County's Website to enhance NFIP information. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR37 | Continue to Participate in CRS Activities to enhance NFIP information. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| DAR38 | Update FIRM to enhance NFIP information. | Complete | Ongoing effort that does not require any additional effort or is an already well established policies/procedures. |
| **Town of Duck** | | | |
| DCK11 | Research the use and storage of propane and develop an ordinance to regulate these storage tanks | Delete | Since the use and storage of propane is regulated by the NC Dept. of Agriculture it was the consensus of the OBX multi-jurisdictional CRS users group to remove this from proposed changes to model floodplain ordinance and therefore we are recommending removal of this action item. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| DCK15 | Develop/Update policies to deal with encroaching development on the Town beaches and to preserve the Towns dune system. | Complete | The Town has adopted an ordinance to limit the encroachment of structures on the beach. Additionally, new setbacks have been adopted for accessory structures such as pools and dune decks to provide additional protection to the dune system. The Town has also prohibited sandbags. Following the completion of the Town's 1.7 mile beach nourishment project, the Town adopted standard minimizing the use of stairways and beach walkway structures in the nourished beach. |
| DCK17 | Work with and support efforts by CAMA concerning beach re-nourishment and maintenance | Delete | Merged with action DCK16 |
| DCK21 | Develop an emergency communications network. Maintain a roster of business owners and homeowners associations. | Complete | |
| DCK22 | Continue effective public information program to disseminate data on all hazards. | Delete | Merged with action DCK23 |
| DCK24 | Provide funding for stormwater improvements. | Delete | Merged with action DCK20 |
| DCK25 | Develop good construction materials information. | Delete | Merged with action DCK9 |
| DCK26 | Identify available property for open space. | Delete | Merged with action DCK13 |
| DCK27 | Develop and maintain the open space. | Delete | Merged with action DCK13 |
| DCK28 | Lobby the NC Board of Transportation and the NC Department of Transportation. | Delete | Merged with action DCK20 |
| DCK30 | Continue to identify who needs natural hazards information. | Delete | Merged with action DCK29 |
| DCK31 | Continue to develop/disseminate this information (dune protection, wind, erosion). | Delete | Merged with action DCK29 |
| DCK32 | Continue to research methods to get information to citizens. | Delete | Merged with action DCK29 |
| DCK33 | Develop/disseminate hurricane information to provide to tourists. | Delete | Merged with action DCK29 |
| DCK34 | Continue to disseminate the information through realtors and businesses. | Delete | Merged with action DCK29 |
| DCK35 | Develop and maintain a database of contact information for oceanfront and sound-front property owners where storm damage is likely to occur. | Delete | Merged with action DCK29 |
| DCK36 | Develop a method to post storm damage information on the Town website including property specific damage information. | Delete | Merged with action DCK29 |
| **Town of Kill Devil Hills** | | | |
| KDH1 | Continue to enforce the zoning ordinance and amend when necessary | Delete | Daily Function of the Department - Ongoing |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| KDH2 | Provide technical assistance to customers/citizens and continue to enforce current flood hazard ordinance | Delete | Daily Function of the Department - Ongoing |
| KDH4 | Continue to implement the storm water management plan | Delete | Daily Function of the Department - Ongoing |
| KDH6 | Monitor changes to the State Building Code and modify local regulations as necessary to minimize damage | Delete | Daily Function of the Department - Ongoing |
| KDH9 | Continue enforcing the base flood elevation requirement of the Town's Flood Damage Prevention Ordinance | Delete | Daily Function of the Department - Ongoing |
| KDH13 | Continue to support coastal barrier protection efforts by the State | Delete | Town does not control this. |
| KDH15 | Support local CAMA officer with compliance efforts within AECs | Delete | Day to day but staff attend training to enforce State regulations. |
| KDH22 | Work with NCDOT Strategic Office of Planning to enhance and construct infrastructure for evacuation | Delete | Town has no control over this task other than asking. |
| KDH27 | Use beach nourishment as a storm protection measure and search for funding | Delete | Addressed through KDH11 |
| KDH30 | Technical Assistance - Continue to utilize technical assistance from state and federal agencies and private consultants to provide appropriate technical assistance to citizens and customers | Delete | Day to day |
| KDH32 | Outreach Projects - Work with print, radio, and television media to effectuate outreach efforts in cooperation with Dare county and neighboring municipalities to educate the public on additional hazards identified in the risk assessment. | Delete | Covered by other outreach actions |
| KDH33 | Develop updated floodplain map for public dissemination. | Delete | Covered by other outreach actions |
| **Town of Kitty Hawk** | | | |
| KHK1 | Implement beach and dune renourishment projects | Completed | Renourishment on the horizon |
| KHK3 | Revise the storm preparedness, response, and recovery plan | Delete | Done every year |
| KHK4 | Educate homeowners on various mitigation techniques and resources available to them | Delete | Part of typical duties |
| KHK5 | Provide homeowners with the resources necessary to individually hazard proof their own homes. | Delete | Part of typical duties |
| KHK6 | Encourage homeowners to conduct an inventory of their assests to assist with damage claims. | Delete | Part of typical duties |
| KHK7 | Encourage mitigation of Reptitive Loss Properties | Delete | Part of typical duties |
| KHK8 | Educate citizens about dune vegetation | Delete | Part of typical outreach information |
| KHK11 | Collect beach erosion data annually | Delete | Part of typical duties |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| KHK13 | Work w/ Dare Co. Control Group to prepare the provision of needed equipment and services to persons and businesses in need of assistance. | Delete | Part of typical recovery duties |
| KHK15 | Define procedures and practices to maintain critical facilities and services to the maximum extent possible during and after a storm event. | Delete | Part of emergency preparedness, response and recovery plan. |
| KHK16 | Implement beach and dune renourishment projects as funding becomes available. | Completed | Duplicate. |
| KHK17 | Encourage NCDOT to elevate KH's roadway to Kitty Hawk Landing | Delete | Not necessarily an action. |
| KHK18 | Maintain updated flood map information for citizens and customers | Delete | Part of every day duties |
| KHK19 | Initiate outreach projects to inform the public on Town and County initiatives that will reduce hazard related losses of property and life. | Completed | Outreach material sent out twice a year, ongoing. |
| | **Town of Manteo** | | |
| MAN1 | Making use of Dare County's flood plan, parcel data and aerial photographs in digital format | Delete | |
| MAN2 | Maintains documents about flood insurance, flood protection, flood plain management, and the natural and beneficial functions of floodplains | Delete | These are required by CRS and already happen |
| MAN3 | Assist local real estate agents with information handouts that will advise potential buyers to investigate the flood hazard for the property they are considering purchasing | Delete | This is a daily function of the Town's Planning Department |
| MAN6 | Continue our policy controlling the development of critical public facilities in the 100-year flood plain in cases where viable alternatives exist. | Delete | These are required by CRS and already happen |
| MAN7 | Continue to actively pursue state and federal grant funds to assist in the hazard mitigation recommendations included in the plan. | Delete | This is the whole purpose of having a well-intended plan |
| MAN13 | The Town Planner will actively research and identify mitigation initiatives for grant applications and establish target dates for completion. | Delete | By way of this process we will identify mitigation initiatives and include them as action items in this plan |
| MAN14 | Building inspector/Planner to enforce Town codified ordinances which include NFIP approved Flood Ordinance. | Delete | This is required to participate in NFIP and does not need to be listed as an action in the HMP |
| MAN15 | The Town Planner to file for grant applications. | Delete | |
| MAN16 | Building inspector/Planner to enforce Town codified ordinances which include NFIP approved Flood Ordinance. | Delete | Same as MAN14 - repeat |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| MAN17 | Continue to acquire and maintain back-up generators for lift stations and to supply electricity to critical Town facilities during periods of power outage. | Delete | Delete but combine with "and to supply electricity to critical Town facilities during periods of power outage" with existing MAN9 |
| MAN18 | Public Works Director to have regularly scheduled maintenance of stormwater system. | Delete | This is a requirement of CRS |
| **Town of Nags Head** | | | |
| NGH1 | Continue participation in the National Flood Insurance Program. This includes updating town ordinances and flood maps as revisions and changes in FEMA and State requirements are made available. | Delete | Daily Duty |
| NGH2 | Maintain the town's freeboard requirement and consider additional measures for flood damage reduction recognized by FEMA and the CRS program to reduce flood losses | Delete | Daily Duty |
| NGH3 | Support the continued education and training of the Town's Building Inspectors and planning staff in inspections and mitigation activities related to flood. This shall include maintaining staff as certified floodplain managers. | Delete | Daily Duty |
| NGH4 | Develop a program to identify businesses and material storage areas where significant amounts of toxic or hazardous products are stored which would be subject to flooding. | Completed | |
| NGH5 | Continue to identify properties in repetitive loss areas and inform property owners in these areas of flood mitigation actions they can take to reduce flood losses. | Delete | Daily Duty |
| NGH7 | Continue Town participation in the Community Rating System program and seek ways to improve the town's class six (6) rating. | Delete | Daily Duty |
| NGH8 | Train town staff on the 2013 CRS Manual. | Delete | Daily Duty |
| NGH9 | Following a severe storm or hurricane, evaluate reconstruction and repairs efforts for compliance with the adopted zoning ordinance, CAMA regulations, and all other applicable local, state and federal regulations. | Delete | Daily Duty |
| NGH10 | Continue to maintain, enforce and evaluate the effectiveness of the comprehensive stormwater management ordinance adopted in 2014. | Completed | |
| NGH11 | Evaluate methods to improve the effectiveness and property owner participation in the Town's Septic Health Program. This may include additional measures to monitor septic system operations with routine inspections. | Delete | Daily Duty |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH13 | The Town shall take a proactive approach to educating citizens on the negative implications of using a septic system that has suffered storm damage. The Town will develop educational materials informing homeowners on the proper care of a system impacted by floodwaters. | Delete | Daily Duty |
| NGH15 | Continue to pursue funding and permitting for the Town's beach nourishment program from Dare County and other levels of government | Delete | This action was combined with a newly revised action. 2019- With the adoption of the Fiscal Year 2018-2019 budget in June 2018, Nags Head's Board of Commissioners adopted the following tax rates: - The town-wide rate, levied on all properties in Nags Head, is $0.307, while an additional tax of $.175 (same rate as the previous year) has been levied in the Municipal Service District (MSD) which is comprised of all properties east of South Virginia Dare Trail and South Old Oregon Inlet Road. -One penny of revenue in the MSD generates $79,548. In addition to this revenue, Dare County has committed to at least half, or $12,573,356 million, of the estimated $25,546,711 million project cost. The contribution from the County, along with the funds from the Town's existing capital reserve fund, enables the Town to cover the debt service for the project with a lower MSD tax rate than what was established for the original project. |
| NGH17 | Develop and implement a shoreline management plan to assist with stabilization of the beach between nourishment cycles. This may include a town program to provide planting and sand fencing based on a set of criteria for evaluating shoreline and dune conditions. | Delete | This action was combined with a newly revised action. The Town has been conducting shoreline management activities and establishing policies and strategies. However, there is not a long term plan in place at this time. |
| NGH19 | Monitor and evaluate changing shoreline conditions on an annual basis as part of an overall shoreline management strategy. | Delete | This action was combined with a newly revised action. The Town is monitoring shoreline conditions on an annual basis as well as pre and post storm event. |
| NGH22 | Maintain an emergency transportation route parallel to US 158. This may include Wrightsville Avenue, Memorial Avenue and even the Nags Head Woods Road as needed. | Completed | |
| NGH23 | Comprehensively review and improve the Town's drainage system through the budget and CIP process. | Delete | The Town continue to review and improve the Town's drainage system through the budget and CIP process. Most recently, a stormwater master planning effort has been underway. The Town is devoting more staff time and funding for dedicated drainage and maintenance. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH25 | Continue to develop and implement a strategically prioritized list of stormwater projects as part of the Town's Capital Improvement Program. | Delete | The Town continue to review and improve the Town's drainage system through the budget and CIP process. Most recently, a stormwater master planning effort has been underway. The Town is devoting more staff time and funding for dedicated drainage and maintenance. The Town converted the Stormwater Utility into a dedicated 2 cent tax which is generating more revenue for stormwater projects and maintenance. Yearly it generates approximately $460,000.00. |
| NGH26 | Collect necessary survey data and asset information to evaluate and program drainage and transportation projects as well as maintenance activities. | Delete | Daily Duty |
| NGH28 | Perform annual maintenance of the Town's drainage system including vegetation removal, sediment removal, culvert cleaning and the re-establishment of drainage grade lines to improve drainage flow. | Delete | Daily Duty |
| NGH30 | Incorporate drainage improvements into roadway, pathway, and related development projects in an effort to eliminate impediments, improve flow and enhance hydraulic capacity which can effectively result in an increased level of service and system efficiency. Examples include the continued development of the W. Side MultiUse Path, Holy Trinity Catholic Church, Flicker St. and Moongate Subdivision located in the Village of Nags Head. | Delete | Daily Duty |
| NGH32 | Maintain public safety communications with Hospital, Colony Ridge staff and other special needs populations to assist with evacuation procedures prior to an event | Delete | Daily Duty |
| NGH33 | Conduct a study to determine future impacts of recurring flooding associated with sea level rise on town infrastructure including streets, waterlines, electric power utilities, and wastewater systems. | Delete | This action was combined with a newly revised action. This project was initiated this as part of regional grant funded project. However, it was determined that the scale of tool proposed for the work was not appropriate for small communities like Nags Head. Staff is still seeking opportunities to complete this work. |
| NGH34 | Continue to evaluate the need for and maintain fire breaks in wild land urban interface areas including residential communities adjacent to Nags Head Woods and the Cape Hatteras National Seashore as part of the ongoing evaluation of the Nags Head Urban Wild Fire Interface Plan. | Delete | This effort was combined into a new action. The Town is continuing to work with the Nature Conservancy and National Parks Services to evaluate and maintain fire breaks in these areas. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH35 | Plan and participate in controlled burn activities as necessary to strategically reduce fuel loads in Nags Head Woods and other areas to mitigate the impact of wild land urban interface fires. | Delete | This effort was combined into a new action.<br>2013- burned proximately 100 acres of marsh<br>2014- burned firebreak blocks proximately 8 acres<br>2015- maintained of firebreaks areas no burning<br>2016- wildfire event in marsh proximately 200 acres burned<br>2017- 11 acres burned in firebreak blocks<br>2018- burned proximately 100 acres of marsh. |
| NGH36 | Continue the program to remove dead wood in critically fire prone areas. | Delete | This effort was combined into a new action. In addition, homeowners may access the fire prevention staff to determine an optimal way to create fire safe landscaping. |
| NGH39 | Continue cooperation with the US Forest Service and Dare County for mutual aid fire protection. | Delete | Daily Duty |
| NGH40 | Continue to inventory, recommend and implement improvements to fire hydrants, water distribution infrastructure, and other town infrastructure in support of fire planning efforts as part of the annual CIP process. | Delete | Daily Duty |
| NGH41 | Update the Water Supply Shortage Plan and evaluate recommendations to implement water restrictions during periods of drought. | Completed | |
| NGH42 | Continue to cooperate with Dare County on the development of additional water supply well facilities. | Delete | Daily Duty |
| NGH44 | Continue to coordinate recovery and post storm response activities with Dare County, State and Federal Government on issues of mutual concern. | Delete | Daily Duty |
| NGH45 | Continue to maintain and improve emergency operations and communications infrastructure including the EOC, backup EOC and mobile command center. | Delete | This effort was combined into a new action. Staff maintains and updates the Emergency Operation Plan that establishes the location of the EOC, back up EOC, and mobile command center. |
| NGH46 | Following a severe storm the Town shall establish an information center staffed with Town, County, State and Federal employees who are available to assist property owners in the reentry and recovery process. | Delete | Daily Duty |
| NGH47 | Following a declared emergency storm event, only those areas where damage assessment is complete and that have been declared relatively secure shall be open to the public. | Delete | Daily Duty |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH48 | Identify and implement methods to streamline the damage assessment process to provide information to Dare County, the state, and any other agencies assisting the town with recovery efforts. This shall also include methods to expedite the availability of damage and condemnation information to Town staff and the public. | Delete | Daily Duty |
| NGH49 | Pre-position debris removal and monitoring agreements on a yearly basis and seek pre-approved temporary disaster-debris management sites with NC DENR. | Delete | Daily Duty |
| NGH50 | Obtain pre-storm authorization from the NC Department of Transportation (DOT) to clear DOT maintained roads after storm events. | Delete | Daily Duty |
| NGH51 | Maintain mutual aid agreements and reevaluate as necessary to continue post-storm assistance with building inspections, damage assessment, utilities repair public facilities maintenance and additional public safety personnel. The Town shall continue participate in the Statewide Mutual Aid Compact. | Completed | |
| NGH52 | Maintain a well trained staff level damage assessment team and staff knowledgeable in public disaster assistance policies. | Delete | Daily Duty |
| NGH53 | Follow the Incident Command Structure and maintain a designated Emergency Management Coordinator and Deputy Emergency Management Coordinator. | Delete | This effort was combined into a new action. Staff continues to receive appropriate NIMS training to comply with the Incident Command Structure. |
| NGH54 | Update emergency plans annually to include changes or modifications to critical facilities and include these in the Town's Emergency Operations Plan. | Delete | This effort was combined into a new action. The Emergency Operations Plan is updated annually to includes to critical facilities and other necessary updates. |
| NGH55 | Continue to improve methods of providing public information both pre and post storm. This shall include an automated voice messaging system with storm damage and re-entry information, a Mayor's radio broadcast, email broadcasts, improved real-time website information with relevant local contact information, available information at traffic stops, and designation of a poststorm public information officer. | Completed | |
| NGH56 | Communicate post-storm recovery and operations policies and procedures to residents and property owners prior to hurricane season. This includes providing this information through email the Local Government Access Channel, Town Website, and through social media. | Delete | Daily Duty |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH57 | In its Emergency Operations Plan, the Town shall detail the process for distributing information internally and externally to the public before and after storms. | Delete | Daily Duty |
| NGH58 | Continue the fire education program. This includes dissemination of information via newspaper articles, website or social media on fire protection, prescribed burns, fuel reduction activities and grants available from the State Division of Forestry for fire education. | Completed | |
| NGH59 | The Town shall request authorization to extend any ocean outfall, which will be affected by any renourishment project. | Delete | The Town's CAMA permit for Beach Nourishment was modified to permit the extension of the outfalls to be affected by the widened beach. There is currently an extension underway and is being managed by NC DOT in South Nags Head. |
| NGH60 | The Town will sponsor studies designed to determine the financial contribution the beach makes to the Outer Banks and the region. | Delete | Daily Duty |
| NGH61 | Following a severe storm the Town shall consider purchasing land in damage prone areas. | Delete | This effort was combined with a newly revised action. The Town will consider purchasing land in damage prone areas as opportunities arise and on a case by case basis. |
| NGH62 | The Town shall consider the applicability of requiring "V Zone" structural certification for structures in the 100year (A) flood zone. | Delete | Daily Duty |
| NGH63 | The Town will actively work with FEMA and the State during the Statewide floodplain mapping project. | Delete | Daily Duty |
| NGH64 | The Town shall develop regulations to require fuel tanks, including LP tanks to be adequately anchored to prevent flotation or submersion in the event of flooding. | Delete | Daily Duty |
| NGH65 | During a hurricane the Town maintains a staff of essential personnel and elected officials within Town Hall, using the Town Hall building as the Emergency Operations Center of "EOC." When available the Town shall consider acquiring or building a command facility. Essential components may include a mobile radio transmission tower, satellite internet capability and enhanced telephone service. | Delete | Daily Duty |
| NGH66 | Following a hurricane the Town shall establish an information center staffed with Town, State and Federal employees who are available to assist property owners in the reentry and recovery process. | Delete | Daily Duty |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH67 | The Town leases space to mobile phone service providers on the Town's two water tanks. Cellular phone service provides an essential form of communication after a storm. The Town shall consider requiring cellular phone service providers to structurally design their tower mounted equipment to withstand greater wind loads than is required by the State building code. | Delete | Daily Duty |
| NGH68 | The Town shall designate a Staff level Director and Deputy Director of Emergency Management. | Completed | |
| NGH69 | The Town will develop regulations requiring a greater street standard (dimensional and construction) where it can be reasonably demonstrated that nearby streets may be destroyed by a storm or other natural event and that the proposed street may be required to accept greater amounts of traffic. | Delete | |
| NGH70 | Prior to a flooding event, the Town's Street Department shall assemble the necessary traffic barricades and equipment to address flooding conditions noted in this plan. | Delete | Daily Duty. Carry forward into EOP. |
| NGH71 | The Town shall identify alternative means of ingress and egress to the Outer Banks Hospital site and Colony Ridge Nursing Home facility. | Completed | Carry froward into EOP to ensure access is maintained. |
| NGH72 | The Town shall extend the "Red Drum" outfall (most northern outfall) to efficiently drain the NCDOT conveyance system. NDOT is currently in design. | Completed | |
| NGH73 | The Town Department of Public Works continually works to mitigate the impacts of flooding within identified areas of repetitive flooding within residential neighborhoods. | Delete | Daily Duty |
| NGH74 | The Town has restructured the portion of the stormwater management ordinance as it relates to the use of fill. This approach is to treat runoff as the source and reduce the burden of Town drainage infrastructure from managing runoff originating from single-family development. | Delete | Daily Duty |
| NGH75 | The Town shall continue aggressive monitoring of entry into condemned homes to prevent safety hazards. | Delete | Daily Duty |
| NGH76 | Town shall create a policy that damaged Town infrastructure be built back to established Town standards only if it can be demonstrated that there is a reasonable and they have a reasonable expectation to survive future hazard events. | Delete | Daily Duty |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH77 | Storm damage reconstruction shall reflect pre-storm conditions to the extent possible. Redevelopment shall comply with the Land Use Classification Map and the zoning ordinance. | Delete | Daily Duty |
| NGH78 | As the amount of available vacant oceanfront land diminishes, the Town can expect redevelopment of existing sites. It is the Town's position that the existing oceanfront development regulations adequately address concerns such as building height and density, and that currently permitted uses adequately represent the desired uses for the oceanfront. | Delete | Daily Duty |
| NGH79 | The Town shall require Hurricane Evacuation plans from sensitive, vulnerable or critical facilities which are likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a flood or hurricane, including, but not limited to: hospitals, nursing homes, police stations and fire stations | Delete | Daily Duty |
| NGH80 | The design of the proposed elementary school shall address flooding and hurricane resistant construction. | Completed | |
| NGH81 | It is strongly urged that evacuation drills and tornado drills be conducted at the proposed elementary school. | Completed | |
| NGH84 | The Town shall continue to acquire land for open space and recreational purposes. | Delete | This action was combined with a revised action. The Town continues to acquire land for open space and recreation purposes as need arise. |
| NGH85 | The Town shall continue the program to remove dead wood in critically fire prone areas. | Delete | This action is a repeat |
| NGH86 | The Town shall continue to review the water system throughout the Town for fire protection capabilities and prioritize capital improvements as necessary. | Delete | This action is a repeat |
| NGH87 | With the installation of the new water tank, the Town shall install a new 12 inch water line from the Public Works facility to Barnes Street. This will increase fire flow to north end neighborhoods. | Completed | |
| NGH88 | The Town shall research available data on underground storage tanks and leaking underground storage tanks. | Delete | Daily Duty |
| NGH89 | The Town shall coordinate with Kill Devil Hills regarding fencing around their portion of the Fresh Pond. | Delete | Daily Duty |
| NGH90 | The Town shall continue to evaluate the implementation of water restrictions during periods of drought. | Delete | Daily Duty |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| NGH91 | The Town of Nags Head shall continue to monitor develop and the installation of onsite septic systems with the Fresh Pond Area of Environmental Concern. | Delete | Daily Duty |
| NGH57 #2 | Enter into an agreement prior to storm events to secure the helipad at the hospital for pre and post event needs. | Delete | Daily Duty. Carry forward into EOP. |
| NGH58 #2 | Partner with the County, State and local agencies to develop a special needs registry list. | Delete | Daily Duty. Carry forward into EOP. |
| NGH59 #2 | Investigate the development of a protocol and secure a location for the offsite storage (i.e. internet based storage or facility outside Town and County jurisdiction), back-up and recovery of important Town data. | Delete | Daily Duty. Carry forward into EOP. |
| NGH60 #2 | Explore the feasibility of developing a Local Emergency Preparedness Committee (LEPC). | Delete | Daily Duty. Carry forward into EOP. |
| NGH61 #2 | Development of a plan with procedures to address an active shooter/mass casualty situation within Town facilities. | Completed | |
| NGH62 #2 | Research, evaluate and execute an internal emergency alert system. | Completed | |
| NGH65 #2 | Partner with Dare County's Joint Information Section and other neighboring municipalities to establish a process and protocol for informing visitors, residents and special needs population of potential hazard events prior, during, and after events. This includes storm-related information as well as evacuation and re-entry. The policy should explore alternative non-traditional methods of information dissemination. | Delete | Daily Duty. Carry forward into EOP. |
| NGH69 #2 | Proactively educate citizens on the negative implications of using a septic system that has suffered storm damage through development of education materials on the proper care of a system impacted by floodwaters. | Delete | This action is a repeat |
| **Town of Southern Shores** | | | |
| SOS6 | Continue the periodic controlled burns of marshland to reduce wildfire fuels | Delete | Cannot occur since 2009 as a result of piers/docks being built over the marsh areas. |
| SOS7 | Continue the testing of fire hydrants once a year and recording data | Delete | The Southern Shores Volunteer Fire Department continues to test fire hydrants once a year and records data. |

| 2015 Action # | Description | 2019 Status | Status Comments/Explanation |
|---|---|---|---|
| SOS8 | Continue implementation of the Waterways and Beaches Ordinance | Delete | This is a duty. The Planning and Code Enforcement Department continues to implement the Waterways and Beaches Ordinance. The Town Community Resource Officer and contracted lifeguard service conduct patrols of the beach to ensure compliance. All development along Town waterways is approved following demonstration of compliance. The Town continues to send Notices of Violation for canal obstructions when warranted. |
| SOS17 | Communicate with citizens about plans and the problems of providing services after a storm event | Delete | The Town utilizes a website, social media, and a bi- weekly newsletter to disseminate information regarding storm events and their effects. |
| SOS18 | Develop a better flood warning system | Delete | The Town utilizes a website, social media, and a bi- weekly newsletter to disseminate information regarding storm events and their effects. Information from the State, FEMA, and Dare County Emergency Management can be shared with all three sources. |
| SOS20 | Encourage food stores and pharmacies within the town to have alternative power supplies during and after storm events | Delete | Most, if not all, food stores and pharmacies in the Town have alternative power sources/supplies. |
| SOS24 | Continue current public information outreach efforts regarding flooding | Delete | The Town utilizes a website, social media, and a bi-weekly newsletter to disseminate information regarding flooding. The Town also completes an annual outreach project containing flood information as part of the CRS program. |
| SOS25 | Continue email and website services | Delete | Addressed in other actions |
| SOS26 | Provide property owners and developers with information regarding the construction of FEMA "Safe Rooms" from the effects of tornadoes and severe storms | Delete | Addressed in other actions |
| SOS27 | Develop guidelines for reconstruction efforts. | Complete | The Town's Emergency Operations Plan and Article XVI of the Town's Zoning Ordinance contain guidelines for reconstruction efforts. |

# 4 Risk Assessment

## 4.1 OVERVIEW

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

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

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

## 4.2 HAZARD IDENTIFICATION

To identify hazards relevant to the planning area, the HMPC began with a review of the list of hazards identified in the 2018 State Hazard Mitigation Plan and the 2015 Albemarle Regional Hazard Mitigation Plan, which the Outer Banks region participated in before becoming its own region. 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.

**Table 4.1 – Full Range of Hazards Evaluated**

| Hazard | Included in 2018 State HMP? | Included in 2015 Albemarle Regional HMP? |
|---|---|---|
| Flooding | Yes | Yes |
| Hurricanes and Coastal Hazards (Rip Currents, Nor'easters) | Yes | 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 (Tornados evaluated as a separate hazard) |
| Landslide | Yes | Yes |
| Sinkholes | Yes | Yes |
| Erosion | Yes | Yes |
| Rip Currents | No | Yes |
| Tsunami | No | Yes |
| Hazardous Materials Incident | Yes | No |
| Radiological Emergency | Yes | No |
| Terrorism | Yes | Yes |
| Infectious Disease | Yes | Yes (as Public Health Events and Pandemic Events) |
| Cyber Threat | Yes | Yes |
| Electromagnetic Pulse | Yes | No |
| Active Shooter/Mass Casualty | No | Yes |
| Transportation Infrastructure Impacts | No | Yes |

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

One significant resource in this effort was the National Oceanic and Atmospheric Administration's National Center for Environmental Information (NCEI), which has been tracking various types of severe weather since 1950. Their Storm Events Database contains an archive by county of destructive storm or weather data and information which includes local, intense and damaging events. NCEI receives storm data from the National Weather Service (NWS). The NWS receives their information from a variety of sources, which include but are not limited to: county, state and federal emergency management officials, local law enforcement officials, SkyWarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public, among others. Due to its reliance on reporting from a variety

of sources, the accuracy of NCEI data can be limited. However, it still provides a good starting point for assessing the occurrence of various hazard events in the planning area. The NCEI database contains 455 records of severe weather events that occurred in Currituck and Dare Counties in the 20-year period from 1999 through 2018. Table 4.2 summarizes these events.

**Table 4.2 – NCEI Severe Weather Reports for Currituck and Dare Counties, 1999 – 2018**

| Type | # of Events | Property Damage | Crop Damage | Deaths | Injuries |
|---|---|---|---|---|---|
| Blizzard | 2 | $0 | $0 | 0 | 0 |
| Coastal Flood | 26 | $18,835,000 | $0 | 0 | 0 |
| Cold/Wind Chill | 0 | $0 | $0 | 0 | 0 |
| Drought | 6 | $0 | $0 | 0 | 0 |
| Extreme Cold/Wind Chill | 0 | $0 | $0 | 0 | 0 |
| Excessive Heat | 2 | $0 | $0 | 0 | 0 |
| Flash Flood | 14 | $0 | $0 | 0 | 0 |
| Flood | 13 | $500,000 | $0 | 0 | 0 |
| Hail | 58 | $0 | $0 | 0 | 0 |
| Heat | 2 | $0 | $0 | 0 | 0 |
| Heavy Rain | 19 | $0 | $0 | 0 | 0 |
| Heavy Snow | 6 | $0 | $0 | 0 | 0 |
| High Wind | 54 | $595,000 | $0 | 0 | 0 |
| Hurricane | 26 | $371,413,000 | $19,850,000 | 0 | 0 |
| Ice Storm | 0 | $0 | $0 | 0 | 0 |
| Lightning | 12 | $84,000 | $0 | 3 | 6 |
| Strong Wind | 3 | $11,000 | $0 | 0 | 0 |
| Thunderstorm Wind | 96 | $619,000 | $0 | 0 | 8 |
| Tornado | 16 | $1,347,000 | $0 | 0 | 5 |
| Tropical Storm | 31 | $18,744,000 | $0 | 0 | 0 |
| Wildfire | 0 | $0 | $0 | 0 | 0 |
| Winter Storm | 42 | $0 | $0 | 0 | 0 |
| Winter Weather | 27 | $0 | $0 | 0 | 0 |
| **Total:** | **455** | **$412,148,000** | **$19,850,000** | **3** | **19** |

Source: National Center for Environmental Information Events Database, accessed January 2019
Note: Losses reflect totals for all impacted areas for each event.

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

Records of designated counties for FEMA major disaster declarations start in 1964. Since then, Currituck and Dare Counties have been designated in 12 different major disaster declarations, of which 11 affected Dare County and 7 affected Currituck County. These declarations are detailed in Table 4.3.

**Table 4.3 – FEMA Major Disaster Declarations, Currituck and Dare Counties**

| County* | Disaster # | Date | Incident Type | Event Title |
|---|---|---|---|---|
| D | 4412 | 1/31/2019 | Hurricane | Tropical Storm Michael |
| D | 4393 | 9/14/2018 | Hurricane | Hurricane Florence |

| County* | Disaster # | Date | Incident Type | Event Title |
|---|---|---|---|---|
| C, D | 4285 | 10/10/2016 | Hurricane | Hurricane Matthew |
| C, D | 4019 | 8/31/2011 | Hurricane | Hurricane Irene |
| C | 1969 | 4/19/2011 | Severe Storm(s) | Severe Storms, Tornados, and Flooding |
| D | 1608 | 10/7/2005 | Hurricane | Hurricane Ophelia |
| C, D | 1490 | 9/18/2003 | Hurricane | Hurricane Isabel |
| C, D | 1292 | 9/16/1999 | Hurricane | Hurricane Floyd Major Disaster Declarations |
| D | 1291 | 9/9/1999 | Hurricane | Hurricane Dennis |
| C, D | 1240 | 8/27/1998 | Hurricane | Hurricane Bonnie |
| D | 1200 | 1/15/1998 | Severe Storm(s) | Severe Storms and Flooding |
| D | 1003 | 9/10/1993 | Hurricane | Hurricane Emily |
| C, D | 881 | 12/2/1988 | Tornado | Severe Storms & Tornados |

Source: FEMA Disaster Declarations Summary, updated March 15, 2019
*County code: C = Currituck, D = Dare

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 4.4 summaries the determination made for each hazard.

**Table 4.4 – Hazard Evaluation Results**

| Hazard | Included in this plan update? | Explanation for Decision |
|---|---|---|
| Flood | Yes | The 2018 State plan and 2015 Albemarle plan identify this as a high priority hazard. Several past disaster declarations were for flooding events. |
| Hurricane and Tropical Storm | Yes | The 2018 State plan and 2015 Albemarle plan identify hurricane as a high priority hazard. The region is vulnerable to hurricane winds, rains, and storm surge. The majority of the region's past disaster declarations have been for hurricane events. |
| Coastal Hazards (Erosion, Rip Current, Sea Level Rise) | Yes | The 2018 state plan addressed this along with hurricanes. The 2015 Albemarle plan addressed erosion and rip currents. Due to the number of coastal threats the region faces, the HMPC found it necessary to evaluate them as separate hazards. For the purposes of this plan, coastal hazards will include erosion, rip currents, and sea level rise. |
| Nor'easters | Yes (Addressed with Hurricanes and Flood) | The Albemarle plan found nor'easters to be a moderate-high priority hazard. However, the impacts of nor'easters mirror those of hurricanes and tropical storms. Therefore, nor'easters will be addressed within the hurricane and flood hazards profile. |
| Severe Winter Weather | Yes | The 2015 Albemarle plan and 2018 State plan addressed this hazard, and the region identifies it as a moderate priority hazard. |
| Extreme Heat | Yes | The 2015 Albemarle plan and the 2018 State plan addressed this hazard. NCEI reports 4 heat events for the region. |
| Earthquake | Yes | The 2015 Albemarle plan and the State HMP addressed this hazard. Earthquake is a low priority hazard but still merits study. |
| Wildfire | Yes | The 2015 Albemarle plan identified wildfire as a moderate-high priority hazard. |
| Dam Failure | No | The 2015 Albemarle plan did not identify any dams in Currituck or Dare Counties. NC Dam Inventory does not list dams in either county. |
| Levee Failure | No | The 2015 Albemarle plan addressed this hazard in conjunction with dam failure but did not list any levees or historical levee failures in the region. |

| Hazard | Included in this plan update? | Explanation for Decision |
|---|---|---|
| | | The USACE's National Levee Database does not identify any USACE or non-USACE levees in the region. |
| Drought | Yes | The 2015 Albemarle plan addressed this hazard. The 2018 State Plan notes that drought occurrence is lower in the northeastern region of the state, but it is still a relevant hazard to the planning area. |
| Severe Thunderstorm, Lightning, and Hail | Yes | The 2015 Albemarle plan and 2018 State plan addressed this hazard. NCEI reports 223 severe weather-related events in the past 20 years. |
| Tornado | Yes | The 2015 Albemarle plan and the 2018 State plan addressed this hazard. NCEI reports 16 tornado segments that have passed through the region. The region has received two major disaster declarations for tornados. |
| Landslide | No | The 2015 Albemarle plan and 2018 State plan addressed this hazard, however the regional plan found minimal risk and the State plan notes that risk is concentrated in the western portions of the state. |
| Sinkholes | No | The 2015 Albemarle plan and 2018 State plan addressed this hazard, however the regional plan found minimal risk. USGS data does not indicate any geological basis for sinkhole risk in the region. If sinkholes occur, they are generally the result of human development. |
| Erosion | Yes (under Coastal Hazards) | The 2015 Albemarle plan addressed this hazard and found it to be a high priority hazard. The 2018 State plan also addressed this hazard for coastal areas, including the Outer Banks region. |
| Rip Currents | Yes (under Coastal Hazards) | The State plan does not address this hazard, but the 2015 Albemarle plan finds this to be a moderate priority hazard. The vulnerability to rip currents given the region's coastal location and prominence as a tourist destination warrant inclusion in this plan. Rip currents will be addressed under the Coastal Hazards profile. |
| Tsunami | Yes (under Earthquake) | The 2015 Albemarle plan addressed this hazard but found it unlikely. There were no past events in or near the planning area. |
| Hazardous Materials Incident | Yes | The 2018 State plan addressed this hazard, but the 2015 Albemarle plan did not. However, the HMPC believes this hazard is significant enough to warrant inclusion in the plan. |
| Radiological Emergency | Yes | The 2015 Albemarle plan did not address this hazard. The 2018 State plan does not identify significant radiological hazard for Currituck or Dare Counties. However, the HMPC felt it should be included in this update. |
| Terrorism (Active Shooter/Mass Casualty) | Yes | The 2015 Albemarle plan addressed this hazard and found it to be a low priority hazard to the planning area. There have not been any instances of terrorism in Currituck or Dare Counties. However, the HMPC felt this threat warrants inclusion in the plan. |
| Infectious Disease/Pandemic/ Public Health Events | No | The State HMP reports the entire State is equally at risk, but vulnerability is low across all but one impact category. The 2015 Albemarle plan found this to be a low priority hazard. |
| Cyber Threat | Yes | This threat was mentioned in the previous plan. The HMPC felt this hazard should continue to be discussed. |
| Electromagnetic Pulse | No | The region considers this hazard more appropriately addressed at the State level. |
| Transportation Infrastructure Impacts | Yes | This hazard is not addressed in the State plan. Infrastructure vulnerability will be evaluated relative to each natural hazard that may impact it. However, the HMPC also wanted to consider Infrastructure Failure that may occur due to accidental damages unrelated to other hazards. |

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

- Coastal Hazards (Erosion, Rip Current, and Sea Level Rise)
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hurricane & Tropical Storm
- Severe Weather (Thunderstorm Wind, Lightning, & Hail)
- Severe Winter Storm
- Tornado
- Wildfire
- Hazardous Materials Incident
- Radiological Emergency
- Cyber Threat
- Terrorism
- Transportation Infrastructure Failure

## 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 Outer Banks Region.

### Location

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

### Extent

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

### Past Occurrences

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

### Probability of Future Occurrence

This section gauges the likelihood of future occurrences based on past events and existing data. The frequency is determined by dividing the number of events observed by the number of years on record and multiplying by 100. This provides the 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:

- ***Highly Likely*** – A 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 Outer Banks Regional Hazard Mitigation Plan.
- Exposure and vulnerability estimates provided by the North Carolina Emergency Management IRISK database.

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 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 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 Outer Banks 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 Outer Banks 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 4.5.

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

**Table 4.5 – Priority Risk Index**

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

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

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

The purpose of the PRI is to categorize and prioritize all potential hazards for the Outer Banks planning area as high, moderate, or low risk. The summary hazard classifications generated through the use of the PRI allows for the prioritization of those high and moderate hazard risks for mitigation planning purposes.

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

**Table 4.106 – Summary of PRI Results**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Coastal Hazards: Erosion[1] | Likely | Limited | Moderate | More than 24 hrs | More than 1 week | 2.6 |
| Coastal Hazards: Rip Current[1] | Highly Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 3.1 |
| Coastal Hazards: Sea Level Rise[1] | Likely | Critical | Moderate | More than 24 hrs | More than 1 week | 2.9 |
| 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 | Limited | Large | More than 24 hrs | Less than 1 week | 3.0 |
| Flood | Likely | Critical | Moderate | 6 to 12 hours | Less than 1 week | 3.0 |
| Hurricane & Tropical Storm | Likely | Catastrophic | Large | More than 24 hrs | Less than 1 week | 3.3 |
| Severe Weather: Hail[2] | Highly Likely | Minor | Small | Less than 6 hrs | Less than 6 hrs | 2.4 |
| Severe Weather: Lightning[2] | Highly Likely | Minor | Negligible | Less than 6 hrs | Less than 6 hrs | 2.2 |
| Severe Weather: Thunderstorm Winds[2] | 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 | Negligible | Less than 6 hrs | Less than 6 hrs | 2.5 |
| Wildfire | Possible | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.5 |
| Hazardous Materials Incident | Likely | Minor | Negligible | Less than 6 hrs | Less than 24 hrs | 2.0 |
| Radiological Emergency | Unlikely | Limited | Small | Less than 6 hrs | More than 1 week | 2.1 |
| Cyber Attack | Possible | Minor | Small | Less than 6 hrs | More than 1 week | 2.1 |
| Terrorism | Unlikely | Catastrophic | Small | Less than 6 hrs | More than 1 week | 2.7 |
| Transportation Infrastructure Failure | Possible | Critical | Small | Less than 6 hrs | More than 1 week | 2.7 |

[1]Note: Coastal Hazards average to a score of 2.9 and are therefore considered together as a high-risk hazard.
[2]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 4.107:

- **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.
- **Medium 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 negligible or nonexistent. This is not a priority hazard for mitigation projects.

**Table 4.107 – Summary of Hazard Risk Classification**

| | |
|---|---|
| **High Risk (> 2.4)** | Hurricane & Tropical Storm<br>Extreme Heat<br>Flood<br>Coastal Hazards<br>Severe Winter Storm<br>Terrorism<br>Transportation Infrastructure Failure<br>Severe Weather<br>Tornado<br>Wildfire |
| **Moderate Risk (2.0 – 2.4)** | Drought<br>Radiological Emergency<br>Cyber Attack<br>Hazardous Materials Incident |
| **Low Risk (< 2.0)** | Earthquake |

Note: Low risk hazards are not prioritized for mitigation.

# Annex D Town of Kill Devil Hills

## D.1 PLANNING PROCESS

The table below lists the HMPC members who represented the Town of Kill Devil Hills.

**Table D.1 – HMPC Members**

| Representative | Agency/Department | Position or Title |
|---|---|---|
| Meredith Guns | Planning & Inspections | Planning Director |
| Cameron Ray | Planning & Inspections | Senior Planner |
| Doug Styons | Citizen | Business owner, Citizen, licensed land surveyor, stakeholder on KDH PPI Committee & Damage Assessment Team member |
| Mike O'Steen | Citizen | Local business owner, Professional Engineer, stakeholder for KDHPPI Committee |
| Skip Jones | Citizen | Local business owner, Licensed Contractor, former President Homebuilders Association, stakeholder for KDH PPI Committee |

## D.2 COMMUNITY PROFILE

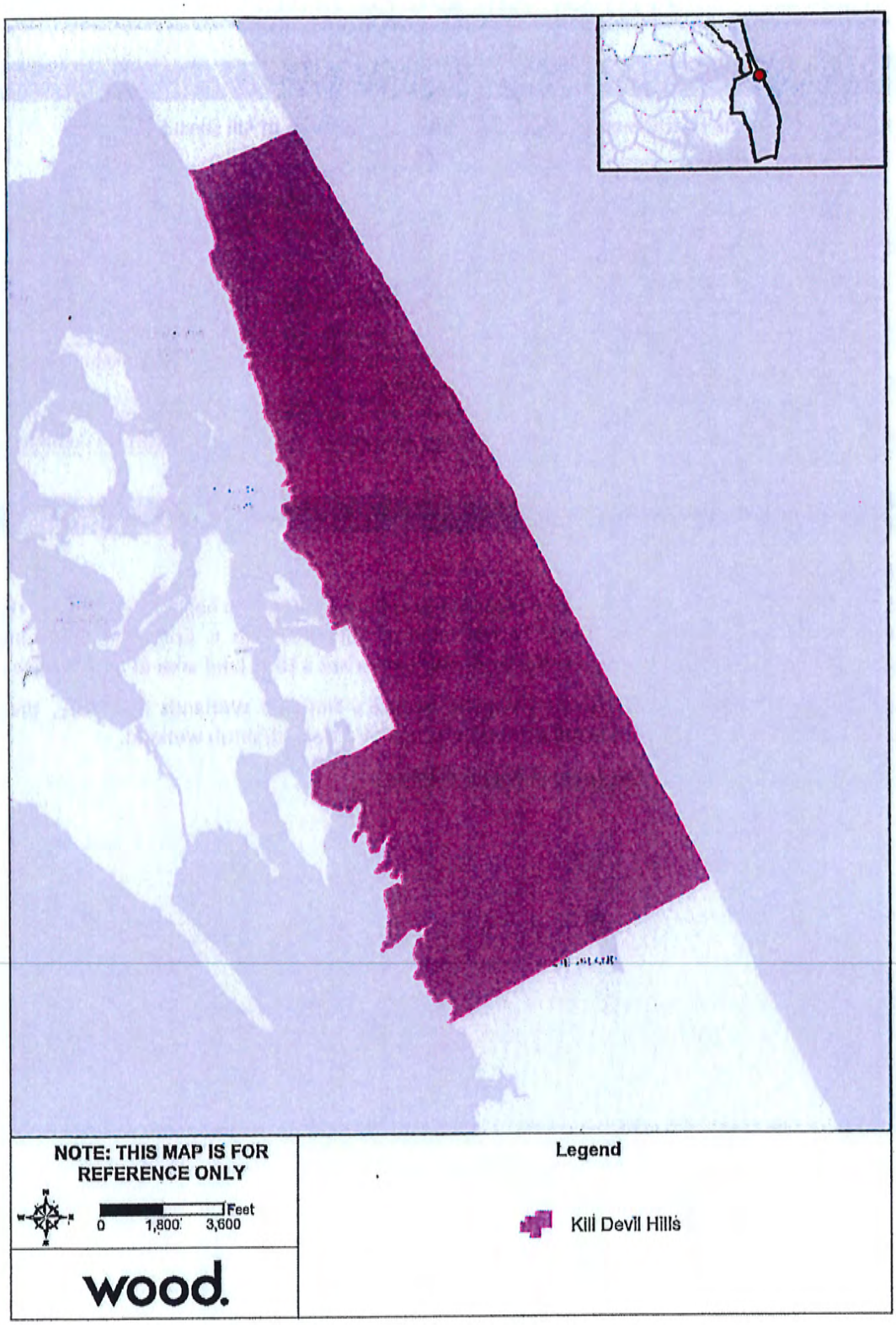
### Geography

The Town of Kill Devil Hills is a barrier island community in Dare County. It is neighbored by Kitty Hawk to the north and Nags Head to the south. To the west of Kill Devil Hills is Colington Creek and the unincorporated community of Colington. Kill Devil Hills comprises a total land area of 5.62 square miles.

According to data from the U.S. Fish and Wildlife Service's National Wetlands Inventory, there are approximately 69 acres of wetlands in Kill Devil Hills, primarily forested/shrub wetland.

Figure D.1 shows a base map of the Town of Kill Devil Hills.

**Figure D.1 – Location Map, Town of Kill Devil Hills**




Source: U.S. Census Bureau

## Population and Demographics

Table D.2 provides population counts and growth estimates for the Town of Kill Devil Hills as compared to the Region overall. Table D.3 provides demographic information for Kill Devil Hills as compared to the Region.

**Table D.2 – Population Counts, Kill Devil Hills, 2010-2017**

| Jurisdiction | 2000 Census Population | 2010 Census Population | 2017 ACS Population Estimate | Total Change 2010-2017 | % Change 2010-2017 |
|---|---|---|---|---|---|
| **Region Total** | **48,157** | **57,467** | **60,659** | **3,192** | **5.55%** |
| Town of Kill Devil Hills | 5,897 | 6,683 | 6,978 | 295 | 4.41% |

Source: US Census Bureau Decennial Census 2000, Decennial Census 2010; American Community Survey 2013-2017 5-Year Estimates

**Table D.3 – Racial Demographics, Kill Devil Hills, 2017**

| Jurisdiction | White, % | Black, % | Asian, % | Other Race, % | Two or More Races, % | Persons of Hispanic or Latino Origin*, % |
|---|---|---|---|---|---|---|
| **Region Total** | **91.0** | **3.5** | **0.5** | **2.2** | **2.7** | **5.7** |
| Town of Kill Devil Hills | 90.4 | 1.8 | 0.7 | 5.0 | 2.1 | 12.2 |

Source: US Census Bureau, American Community Survey 2013-2017 5-Year Estimates
*Persons of Hispanic origin may be of any race, so also are included in applicable race categories

## Asset Inventory

The following tables summarize the Critical Infrastructure and Key Resources (CIKR) and high potential loss facilities identified in IRISK for the Town of Kill Devil Hills. Critical facilities, which include a subset of identified assets form the CIKR dataset as well as facilities identified by the HMPC, are shown in Figure D.2 on the following page and summarized in Table D.6. The County provided information is not included in IRISK vulnerability assessments. Note that the IRISK counts are by building; where a critical facility identified by IRISK comprises a cluster of buildings, each building is counted and displayed.

**Table D.4 – Critical Infrastructure & Key Resources by Type**

| Jurisdiction | Food and Agriculture | Banking and Finance | Chemical & Hazardous | Commercial | Communications | Critical Manufacturing | EM | Healthcare | Government Facilities | Nuclear Reactors, Materials and Waste | Postal and Shipping | Transportation Systems | Energy | Emergency Services | Water | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Town of Kill Devil Hills | 1 | 11 | 0 | 249 | 4 | 45 | 0 | 12 | 10 | 1 | 0 | 29 | 4 | 1 | 5 | **372** |

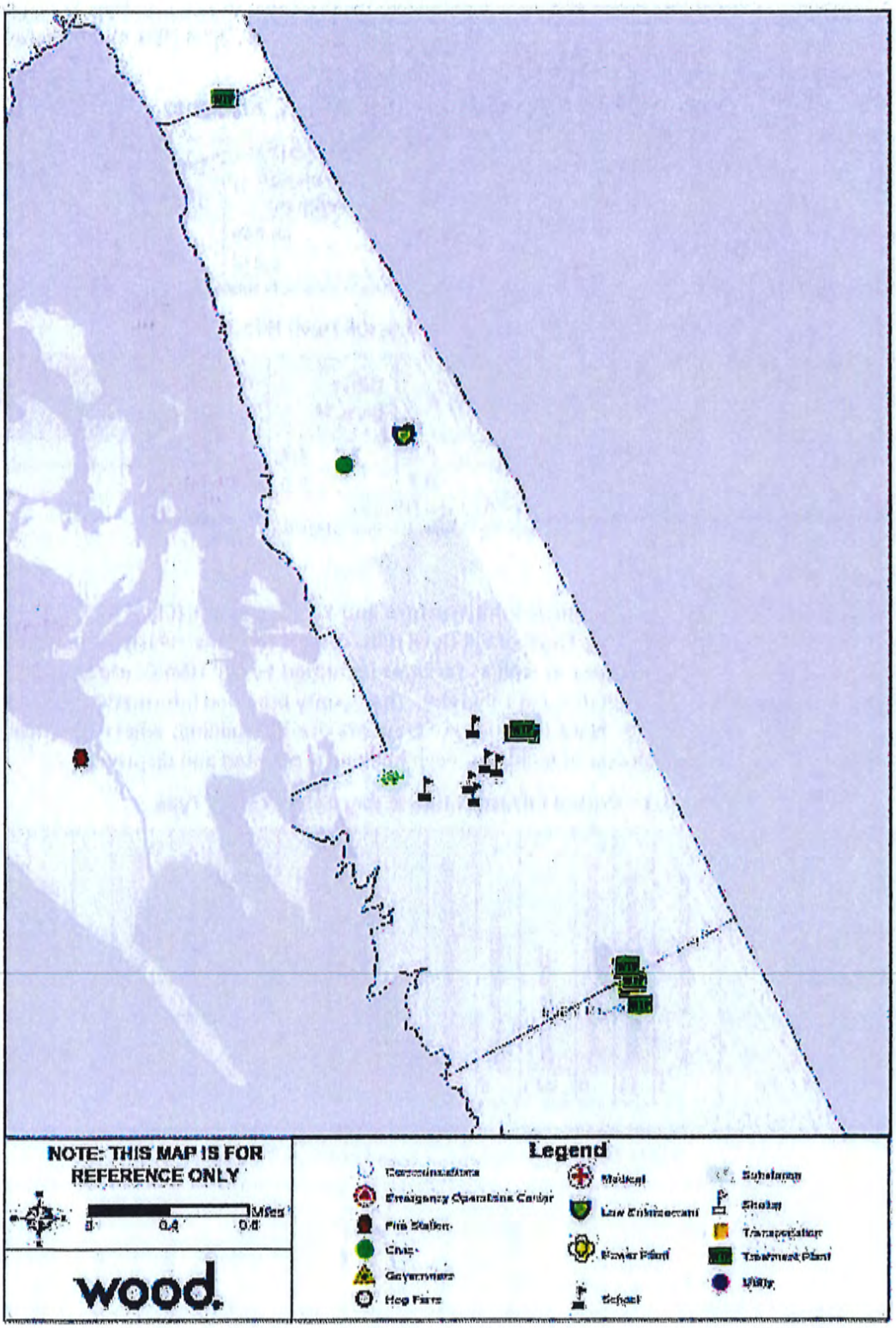
Source: NCEM Risk Management Tool

**Table D.5 – High Potential Loss Facilities by Use**

| Jurisdiction | Residential | Commercial | Industrial | Government | Agricultural | Religious | Utilities | Total |
|---|---|---|---|---|---|---|---|---|
| Town of Kill Devil Hills | 40 | 28 | 0 | 3 | 0 | 0 | 2 | **73** |

Source: NCEM Risk Management Tool

**Figure D.2 – Critical Facilities, Town of Kill Devil Hills**




Source: NCEM IRISK Database, HMPC Input, GIS Analysis

**Table D.6 – Critical Facilities List, Town of Kill Devil Hills**

| Facility Type | Count |
|---|---|
| Fire Station | 1 |
| Police Station | 1 |
| School | 6 |
| Substation | 2 |
| Treatment Plant | 6 |
| **Total** | **16** |

Source: NCEM IRISK Database, HMPC input, GIS Analysis

To supplement the asset inventory and provide a clearer picture of the current asset exposure in the Town of Kill Devil Hills, current parcel data was evaluated to identify recent development not included in NCEM's IRISK database. Per this assessment, since IRISK data was compiled the Town of Kill Devil Hills' building value exposure has increased by 9.6 percent.

| Recent Improved Parcels | | IRISK Buildings | | Percent Change | |
|---|---|---|---|---|---|
| Count | Value | Count | Value | Building Count | Building Value |
| 416 | $93,552,200 | 5,972 | $974,106,060 | 7.0% | 9.6% |

Source: County parcel data, retrieved November 2019; IRISK database building footprints

Note: This information is not incorporated into the risk assessment, which was prepared using IRISK. However, this summary of recent development provides some context to understand the degree to which the IRISK exposure and vulnerability numbers differ from current conditions.

There are two listings on the National Register of Historic Places for the Town of Kill Devil Hills. These sites are listed in the table below.

**Table D.7 – Historic Properties**

| Ref# | Property Name | Status Date | Category | City |
|---|---|---|---|---|
| 66000071 | Wright Brothers National Memorial | 10/15/1966 | District | Kill Devil Hills |
| 99000062 | Sam's Diner | 1/27/1999 | Building | Kill Devil Hills |

Source: National Parks Service, National Register of Historic Places, October 2018

## Housing

The table below details key housing statistics for Kill Devil Hills as compared to the Region overall.

**Table D.8 – Housing Statistics, Kill Devil Hills, 2010-2017**

| Jurisdiction | Housing Units (2010) | Housing Units (2017) | Housing Units Percent Change (2010-2017) | Owner-Occupied, % (2017) | Vacant Units, % (2017) | Median Home Value (2017) |
|---|---|---|---|---|---|---|
| **Region Total** | **47,945** | **49,616** | **3.5%** | **74.5** | **49.6** | **$285,000** |
| Town of Kill Devil Hills | 6,617 | 6,433 | -2.8% | 58.5 | 54.3 | $240,200 |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2013-2017 5-Year Estimates
Note: Owner-Occupied and vacant-unit measures are reported as a percent of the total number of housing units.

## Economy

The following tables present key economic statistics for Kill Devil Hills as compared to the Region overall.

**Table D.9 – Employment Statistics, Kill Devil Hills, 2017**

| Jurisdiction | Population in Labor Force | Percent Employed* (%) | Percent Unemployed* (%) | Percent Not in Labor Force* (%) | Unemployment Rate (%) |
|---|---|---|---|---|---|
| **Region Total** | **47,945** | **49,616** | **3.5%** | **74.5** | **49.6** |
| Kill Devil Hills | 4,288 | 70.7 | 5.3 | 24.1 | 7.0 |

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-Year Estimates
Note: This table reports only the civilian labor force. The labor force in armed services accounted for 0.6% of the population 16 and over across the region. *Population employed, population unemployed, and Population not in labor force are reported as a percent of the total population aged 16 years and older.

**Table D.10 – Percent of Employed Population by Occupation, Kill Devil Hills, 2017**

| Occupation | Management, business, science and arts (%) | Service (%) | Sales and Office (%) | Natural Resources, Construction, and Maintenance (%) | Production, transportation, and material moving (%) |
|---|---|---|---|---|---|
| **Region Total** | **30.6** | **18.7** | **27.8** | **14.0** | **8.9** |
| Kill Devil Hills | 28.3 | 26.4 | 25.1 | 12.5 | 7.7 |

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-Year Estimates

## Land Use and Future Development

The Town of Kill Devil Hills Planning and Inspections Department is responsible for land-use planning for the Town. The Town is currently reviewing the new 2019 CAMA Land Use Plan Update as of January 2020. The draft of this plan is available and information from it was used for this assessment of future development.

### Current Land Use

Since the County has island geography and narrow strips of land, much of the development is located around the main transportation corridors, US 158 and NC 12. The Town classifies their land into eight different categories. These categories are shown below with their total acreage in Table D.11. Acreages have been rounded to the nearest whole number as have percentages.

**Table D.11 – Land Use, Town of Kill Devil Hills**

| Land Use | Total Acres | Percent of Town (%) |
|---|---|---|
| Commercial | 199 | 6 |
| Industrial | 33 | 1 |
| Office and Institutional | 596 | 19 |
| Mixed Use | 6 | 1 |
| Multi-Family Residential | 97 | 3 |
| Single Family Residential | 1,154 | 37 |
| Recreational | 87 | 3 |
| ***Total Developed*** | ***2,172*** | ***70*** |
| Vacant/ Unimproved | 941 | 30 |
| **Total** | **3,113** | **100** |

Source: Town of Kill Devil Hills 2019 CAMA Land Use Plan Update

Recreational parcels include public parks, open space, and public beach access. Undeveloped land falls under the vacant/unimproved category. Most of the Town is developed (70%) with 37 percent of land classified as single family residential.

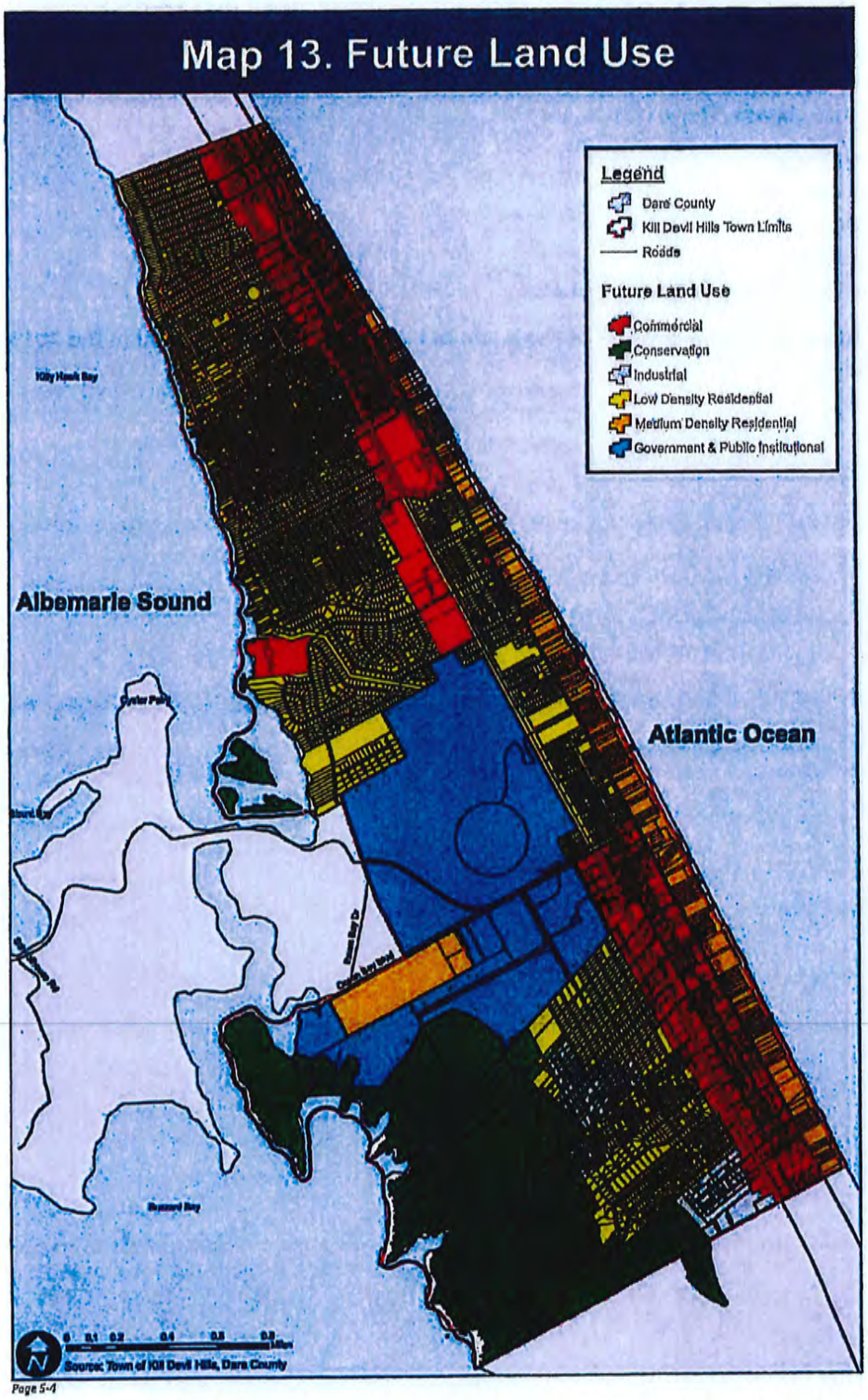
## Future Development

Even though 30 percent of land in the Town is deemed vacant/unimproved, there is not much vacant land available for development. However, re-development of some lots is an option when considering future development. Development will most likely continue to locate around the transportation corridors and will continue at a consistent pace. Future development within the Town will use a new classification system with five classes. These classes are

- Commercial
- Residential
- Conservation
- Industrial
- Government and Public Institutional

Figure D.3 shows the future land use of the Town of Kill Devil Hills as envisioned in the 2019 CAMA Land Use Plan Update.

**Figure D.3 – Town of Kill Devil Hills Future Land Use Map**




Source: Town of Kill Devil Hills 2019 CAMA Land Use Plan Update

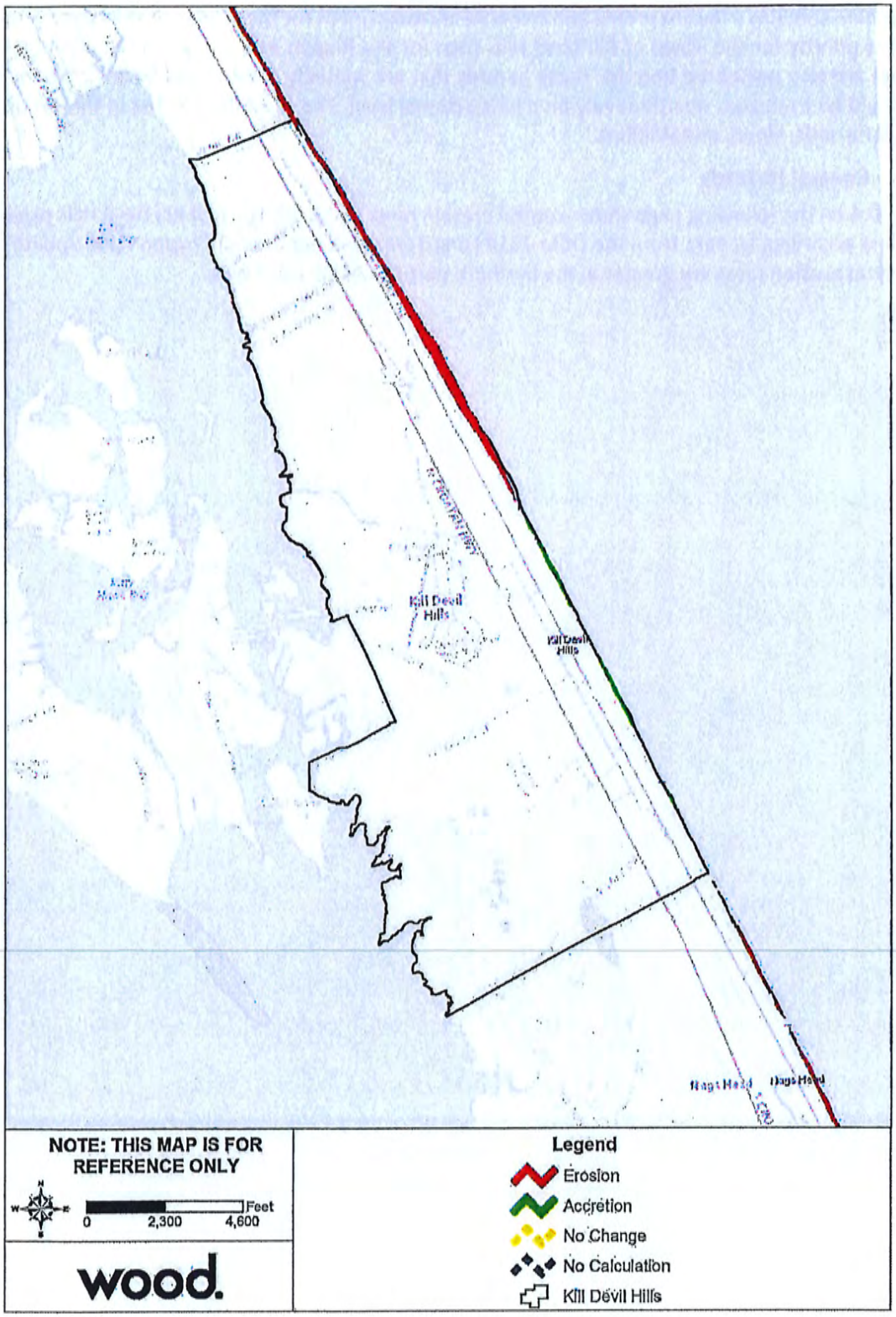
## D.3 RISK ASSESSMENT

This section contains a hazard profile and vulnerability assessment for those hazards that were rated with a higher priority for the Town of Kill Devil Hills than for the 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: Coastal Hazards, Flood, and Wildfire.

### D.3.1 Coastal Hazards

Figure D.4 on the following page shows coastal erosion rates along the Town of Kill Devil Hills oceanfront coastline according to data from the DCM 2019 Long-Term Average Annual Erosion Rate Update Study. Long-term erosion rates are greater in the northern portions of Kill Devil Hills.

**Figure D.4 – Erosion Rates, Town of Kill Devil Hills**




Source: North Carolina Division of Coastal Management

### D.3.2 Flood

Table D.12 details the acreage of the Town of Kill Devil Hills total area by flood zone on the effective DFIRM. Per this assessment, nearly 65 percent of the Town falls within the mapped 1%-annual-chance floodplains and the remainder is within the 0.2 percent annual chance floodplain.

**Table D.12– Flood Zone Acreage in the Town of Kill Devil Hills**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| Zone A | 13.36 | 0.4% |
| Zone AE | 2,090.81 | 57.7% |
| Zone VE | 260.48 | 7.2% |
| Zone X (500-year) | 1,255.87 | 34.7% |
| **Total** | **3,620.52** | -- |

Source: FEMA Effective DFIRM

Figure D.5 reflects the effective mapped flood hazard zones for the Town of Kill Devil Hills, and Figure D.6 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood.

To supplement the IRISK assessment of property at risk from the 1% annual chance flood event in Section 4 and provide a clearer picture of the current property at risk in the Town of Kill Devil Hills, recent development not included in IRISK was analyzed using GIS to determine additional exposure to flood risk. Improved parcels in contact with the SFHA were considered at risk to the 1 percent annual chance flood. The count and total value of these parcels are summarized below. Note that this assessment does not account for the degree of exposure, so the result is a maximum exposure estimate for the modeled 1 percent annual chance flood. According to this assessment, over 13 percent of recent development in the Town of Kill Devil Hills is located in or near the SFHA.

**Table D.13 – Recent Development at Risk to Flood, Town of Kill Devil Hills**

| Recent Development at Risk | | Percent of Total Recent Development | |
|---|---|---|---|
| Count of Parcels | Value of Parcels | Percent of Parcels | Percent of Values |
| 55 | $20,722,600 | 13.2% | 22.2% |

Source: Parcel data retrieved November 2019; FEMA 2006 DFIRM

This assessment does not evaluate flood impacts or provide damage estimates. However, this summary of recent development in or near the floodplain provides some context to understand the degree to which the IRISK exposure and vulnerability numbers differ from current conditions.

Table D.14 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector and flood event in the Town of Kill Devil Hills. Table D.15 provides counts and estimated damages for High Potential Loss Properties in the Town of Kill Devil Hills.

**Table D.14 – Critical Facilities Exposed to Flooding, Town of Kill Devil Hills**

| Sector | Number of Buildings at Risk | Estimated Damages |
|---|---|---|
| Banking and Finance | 2 | $20,256 |
| Commercial Facilities | 62 | $1,584,322 |
| Communications | 1 | $629 |
| Critical Manufacturing | 10 | $215,316 |
| Healthcare and Public Health | 1 | $1,363 |
| Transportation Systems | 7 | $41,453 |
| **All Categories** | **83** | **$1,863,339** |

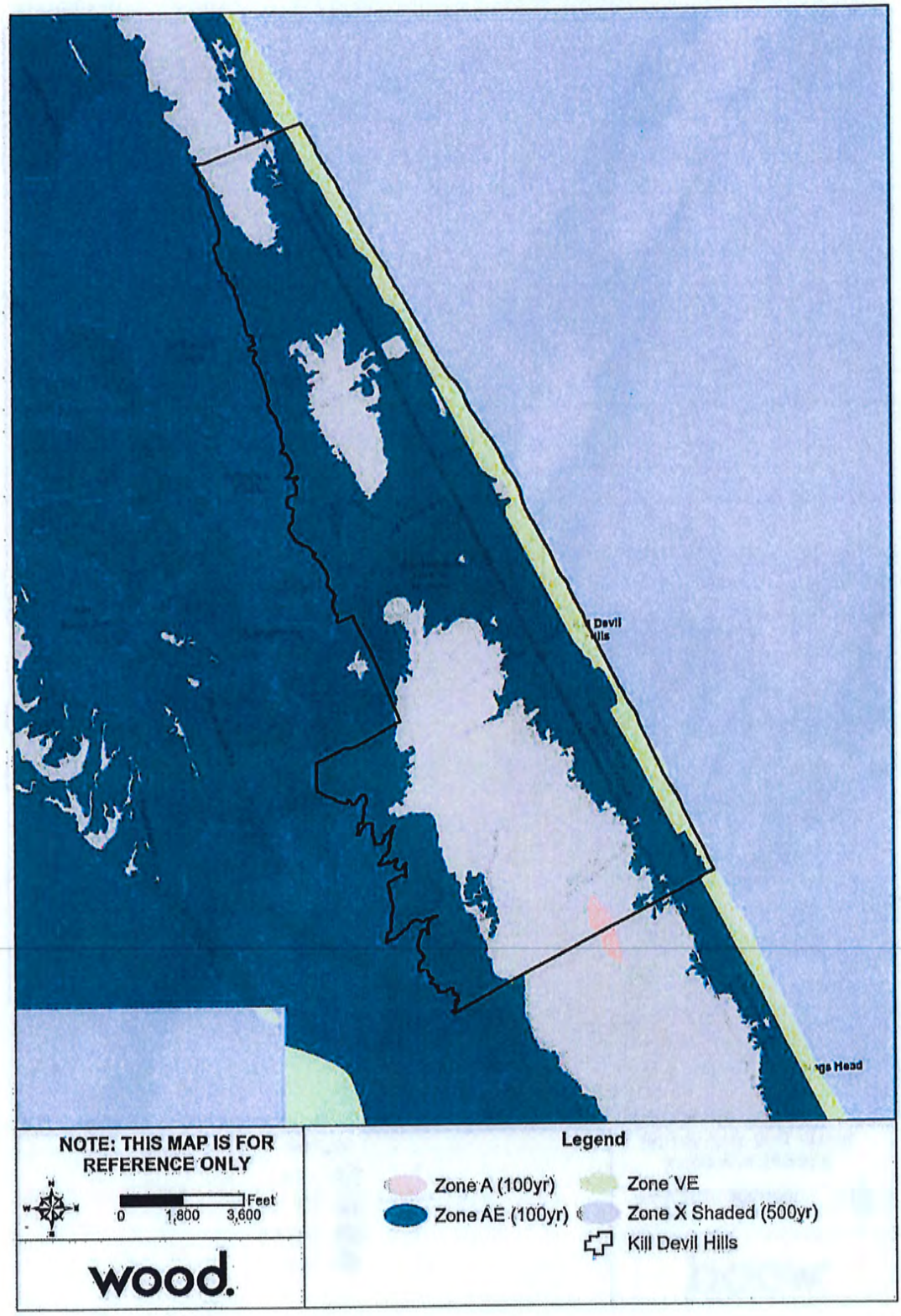
Source: NCEM Risk Management Tool

**Table D.15 – High Potential Loss Properties Exposed to Flooding, Town of Kill Devil Hills**

| Category | Number of Buildings at Risk | Estimated Damages |
|---|---|---|
| Commercial | 1 | $315,960 |
| Residential | 31 | $4,305,887 |
| **All Categories** | **32** | **$4,621,847** |

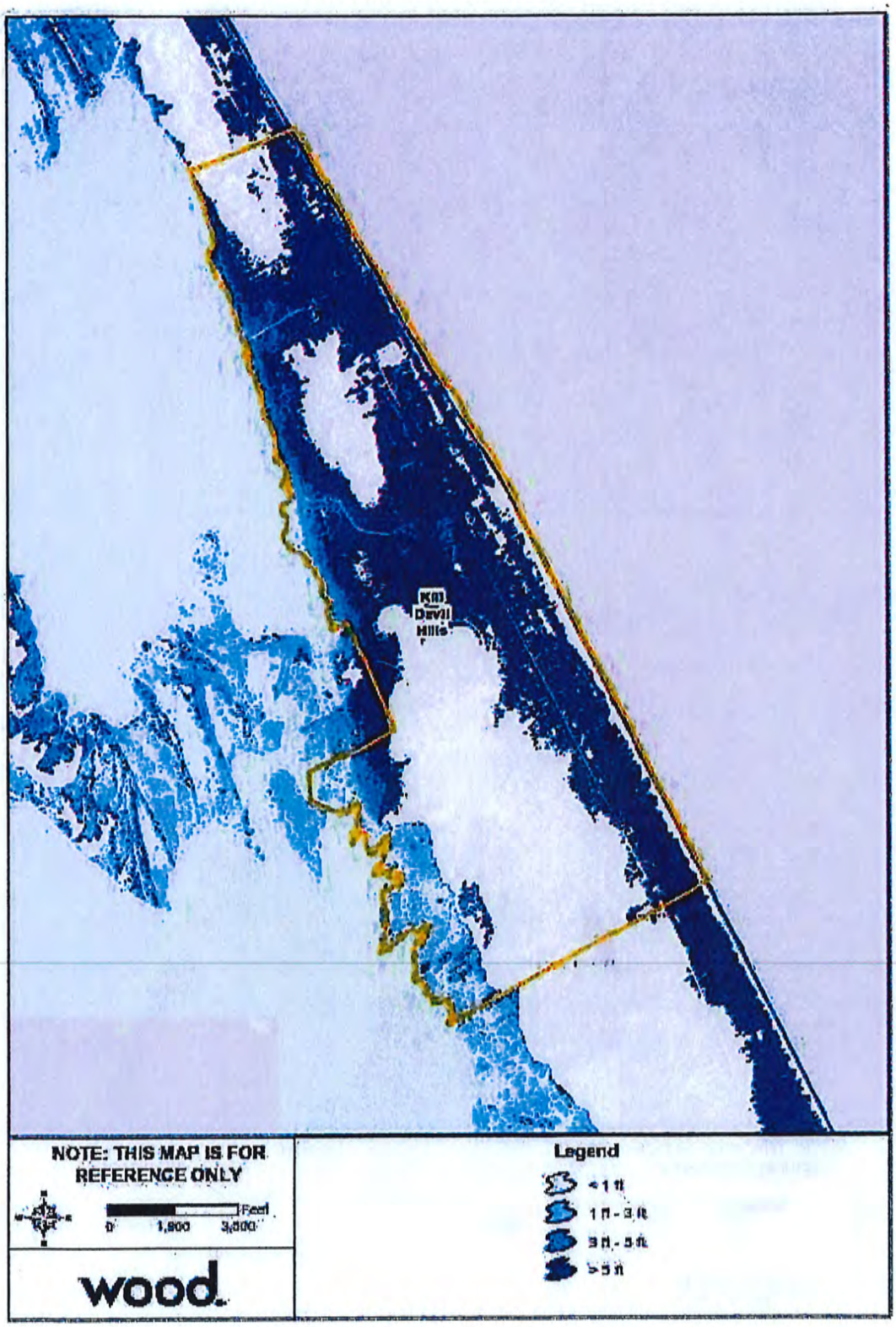
Source: NCEM Risk Management Tool

**Figure D.5 – FEMA Flood Hazard Areas, Town of Kill Devil Hills**




Source: FEMA Effective DFIRM

**Figure D.6 – Flood Depth, 1%-Annual-Chance Floodplain, Town of Kill Devil Hills**




Source: FEMA Effective DFIRM

### D.3.3 Wildfire

Table D.16 summarizes the acreage in the Town of Kill Devil Hills 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 44 percent of the Town of Kill Devil Hills is not included in the WUI.

**Table D.16 – Wildland Urban Interface Acreage, Town of Kill Devil Hills**

| | Housing Density | Total Acreage | Percent of Total Acreage |
|---|---|---|---|
| | *Not in WUI* | *1,610.5* | *44.4%* |
| | LT 1hs/40ac | 12.0 | 0.3% |
| | 1hs/40ac to 1hs/20ac | 25.1 | 0.7% |
| | 1hs/20ac to 1hs/10ac | 37.0 | 1.0% |
| | 1hs/10ac to 1hs/5ac | 46.1 | 1.3% |
| | 1hs/5ac to 1hs/2ac | 230.6 | 6.4% |
| | 1hs/2ac to 3hs/1ac | 945.1 | 26.0% |
| | GT 3hs/1ac | 724.5 | 20.0% |
| | **Total** | **3,630.9** | |

Source: Southern Wildfire Risk Assessment

Figure D.7 depicts the WUI for the Town of Kill Devil Hills. The WUI is the area where housing development is built near or among areas of vegetation that may be prone to wildfire. Figure A.10 depicts the Fire Intensity Scale, which indicates the potential severity of fire based on fuel loads, topography, and other factors. Figure D.9 depicts Burn Probability based on landscape conditions, percentile weather, historical ignition patterns, and historical prevention and suppression efforts. Data is not available on past acreage burned at the jurisdictional level.

Potential fire intensity is highest in the southwestern part of the Town of Kill Devil Hills. Much of this area falls outside the WUI; however, the eastern and northern fringes of this area contain the highest areas of risk in the Town, where housing, moderate to high fire intensity, and burn probability overlap.

Table D.17 provides building counts and estimated damages for Critical Infrastructure and Key Resources (CIKR) buildings by sector at risk to wildfire hazard.

Table D.18 summarizes the High Potential Loss Properties exposed to wildfire in the Town of Kill Devil Hills.

**Table D.17 – Critical Facilities Exposed to Wildfire, Town of Kill Devil Hills**

| Sector | Number of Buildings at Risk | Estimated Damages |
|---|---|---|
| Banking and Finance | 2 | $1,468,711 |
| Commercial Facilities | 45 | $32,245,983 |
| Communications | 1 | $155,900 |
| Critical Manufacturing | 18 | $6,392,358 |
| Emergency Services | 1 | $849,456 |
| Energy | 1 | $6,629,744 |
| Food and Agriculture | 1 | $393,798 |

| Sector | Number of Buildings at Risk | Estimated Damages |
|---|---|---|
| Government Facilities | 7 | $37,339,799 |
| Healthcare and Public Health | 4 | $8,902,119 |
| Transportation Systems | 10 | $4,818,293 |
| Water | 2 | $1,423,735 |
| **All Categories** | **92** | **$100,619,896** |

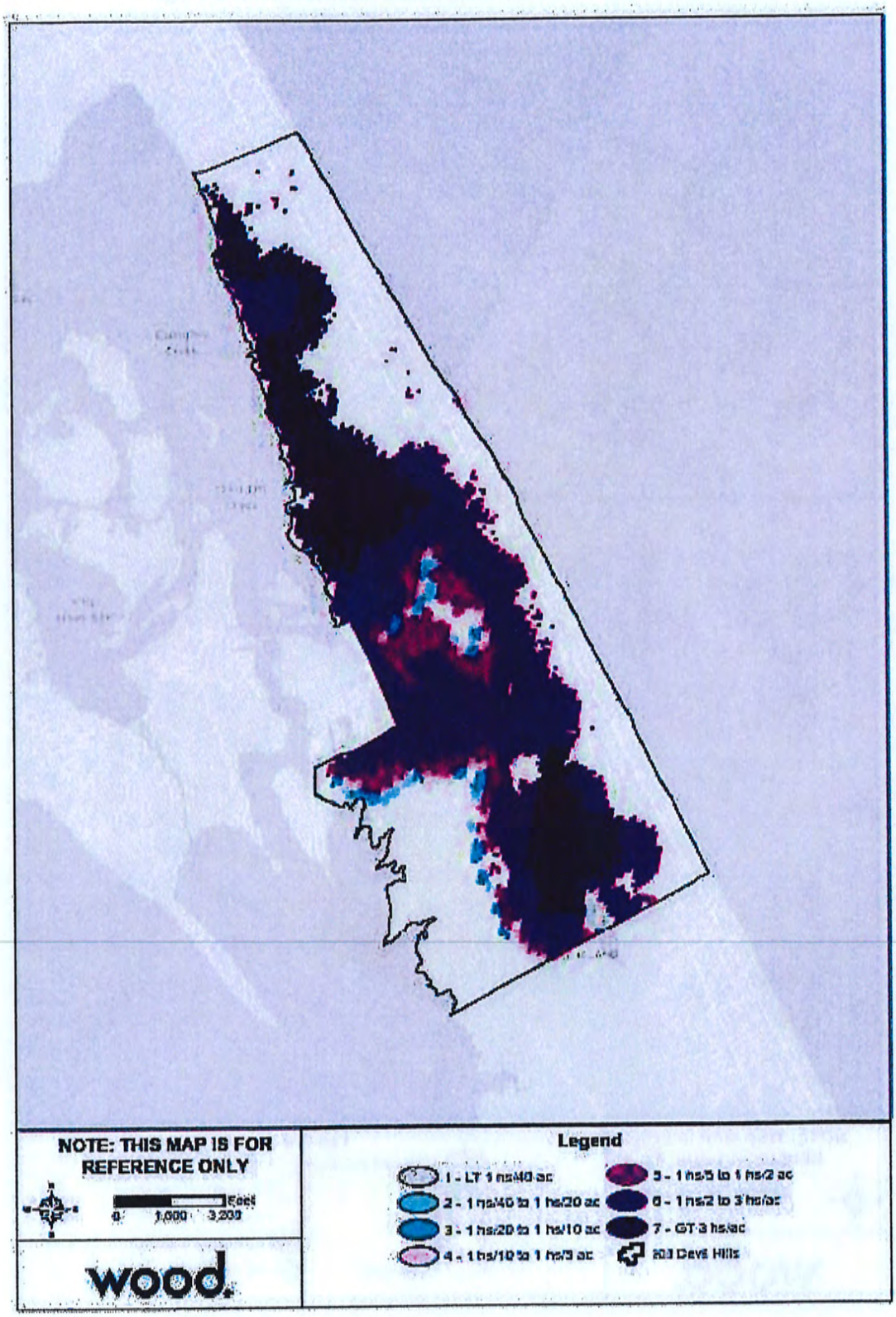
Source: NCEM Risk Management Tool

**Table D.18 – High Potential Loss Properties Exposed to Wildfire, Town of Kill Devil Hills**

| Category | Number of Buildings at Risk | Estimated Damages |
|---|---|---|
| Commercial | 6 | $19,631,741 |
| Government | 2 | $35,173,607 |
| Residential | 11 | $3,736,456 |
| Utilities | 1 | $6,629,744 |
| **All Categories** | **20** | **$65,171,548** |

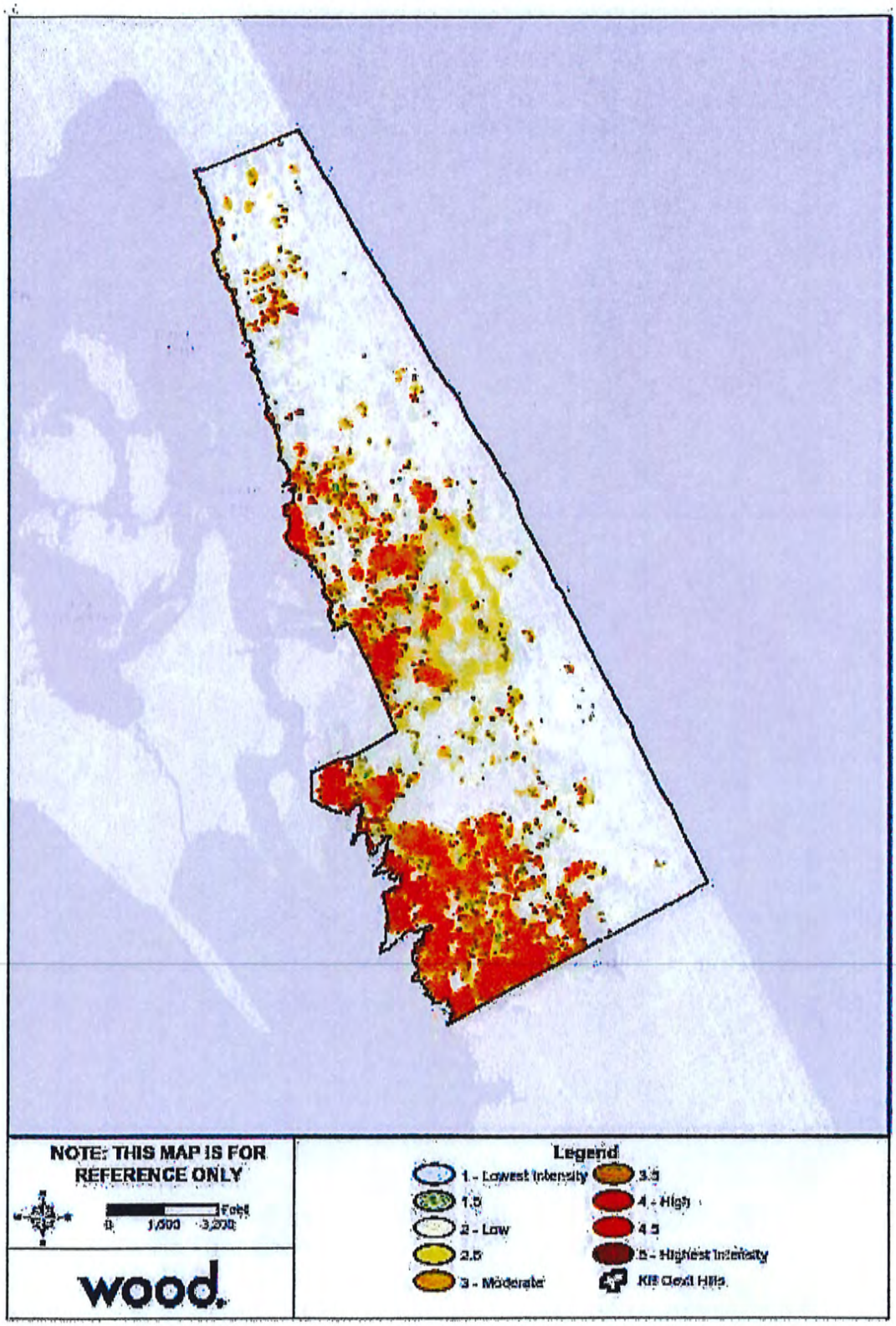
Source: NCEM Risk Management Tool

**Figure D.7 – Wildland Urban Interface, Town of Kill Devil Hills**



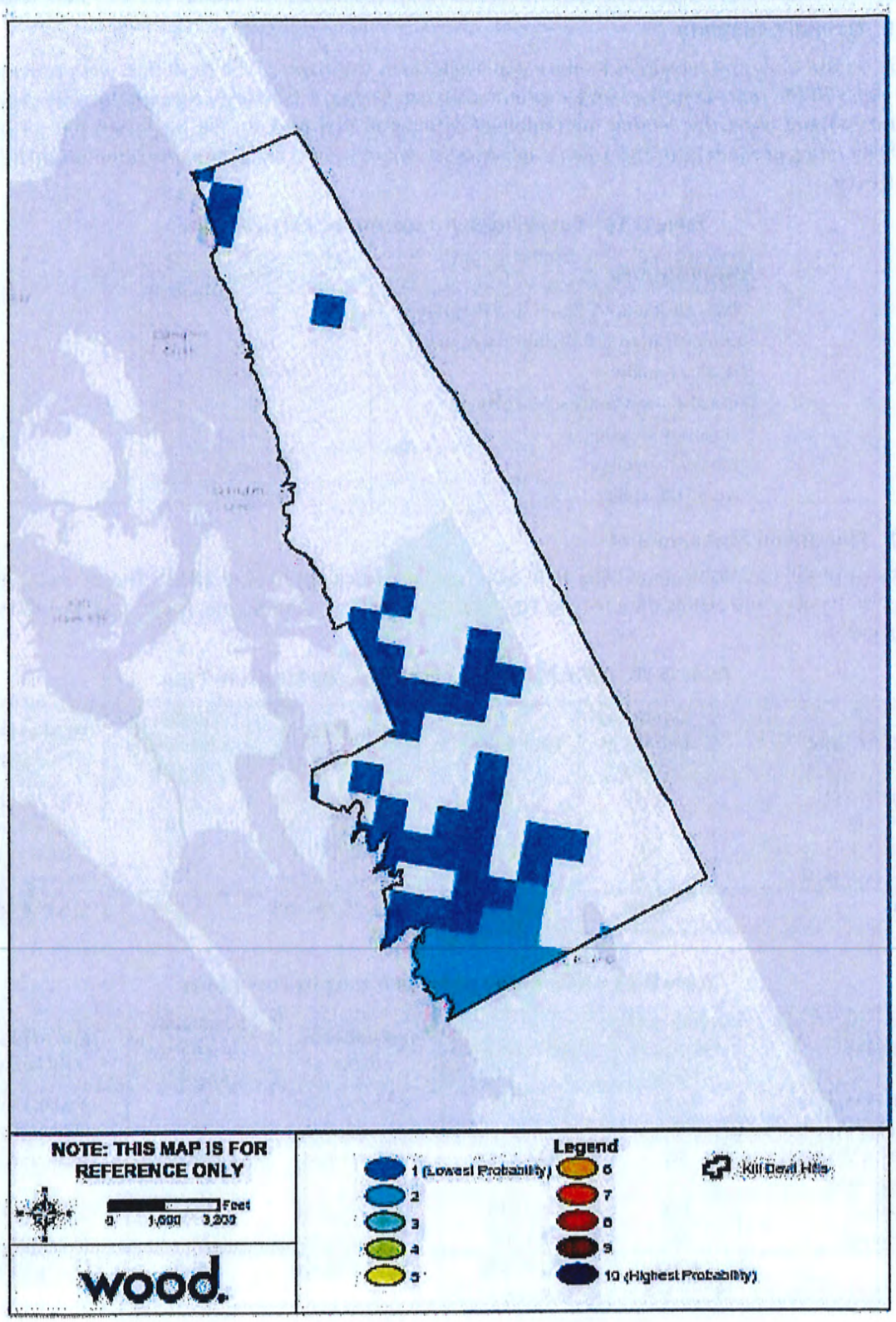

Source: Southern Wildfire Risk Assessment

**Figure D.8 – Fire Intensity Scale, Town of Kill Devil Hills**




Source: Southern Wildfire Risk Assessment

**Figure D.9 – Burn Probability, Town of Kill Devil Hills**




Source: Southern Wildfire Risk Assessment

## D.4 CAPABILITY ASSESSMENT

### D.4.1 Overall Capability

Details on the tools and resources in place and available to the Town of Kill Devil Hills were provided by the Town's HMPC representatives and are summarized in Section 5 Capability Assessment. Based on that information and using the scoring methodology detailed in that section, Kill Devil Hills has an overall capability rating of Moderate. The Town's Self-Assessment of key capability areas is summarized in Table D.19 below.

**Table D.19 – Capability Self-Assessment, Kill Devil Hills**

| Capability Area | Rating |
|---|---|
| Plans, Ordinances, Codes and Programs | High |
| Administrative and Technical Capability | High |
| Fiscal Capability | Moderate |
| Education and Outreach Capability | High |
| Mitigation Capability | Limited |
| Political Capability | Moderate |
| Overall Capability | Moderate |

### D.4.2 Floodplain Management

The Town of Kill Devil Hills joined the NFIP as a regular participant in May 1973. The following tables reflect NFIP policy and claims data for the Town categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table D.20 – NFIP Policy and Claims Data by Structure Type**

| Structure Type | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 3,140 | $2,091,007 | $760,149,000 | 1,070 | $9,576,424.18 |
| 2-4 Family | 117 | $57,539 | $23,242,100 | 79 | $867,378.65 |
| All Other Residential | 805 | $269,993 | $140,290,500 | 81 | $3,838,609.45 |
| Non-Residential | 202 | $427,137 | $102,113,500 | 106 | $3,976,238.39 |
| **Total** | **4,264** | **$2,845,676** | **$1,025,795,100** | **1,336** | **$18,258,650.67** |

Source: FEMA Community Information System, accessed December 2019

**Table D.21 – NFIP Policy and Claims Data by Flood Zone**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 3,423 | $1,956,447 | $814,882,400 | 752 | $8,680,332.85 |
| A Zones | 0 | $0 | $0 | 9 | $32,705.03 |
| V01-30 & VE Zones | 80 | $335,716 | $20,841,600 | 130 | $835,996.23 |
| B, C & X Zone | | | | | |
| Standard | 526 | $437,635 | $115,276,400 | 394 | $7,887,110.09 |
| Preferred | 232 | $114,078 | $74,690,000 | 51 | $822,506.47 |
| **Total** | **4,261** | **$2,843,876** | **$1,025,690,400** | **1,336** | **$18,258,650.67** |

Source: FEMA Community Information System, accessed December 2019

**Table D.22 – NFIP Policy and Claims Data Pre-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 422 | $539,560 | $88,932,800 | 355 | $5,894,728.34 |
| A Zones | 0 | $0 | $0 | 7 | $28,278.33 |
| V01-30 & VE Zones | 24 | $89,955 | $5,364,200 | 101 | $622,515.63 |
| B, C & X Zone | 97 | $121,974 | $26,300,900 | 209 | $3,461,887.59 |
| Standard | 75 | $111,413 | $18,795,900 | 201 | $3,369,452.76 |
| Preferred | 22 | $10,561 | $7,505,000 | 8 | $92,434.83 |
| **Total** | **543** | **$751,489** | **$120,597,900** | **672** | **$10,007,409.89** |

Source: FEMA Community Information System, accessed December 2019

**Table D.23 – NFIP Policy and Claims Data Post-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 3,001 | $1,416,887 | $725,949,600 | 393 | $2,777,768.79 |
| A Zones | 0 | $0 | $0 | 1 | $3,212.24 |
| V01-30 & VE Zones | 56 | $245,761 | $15,477,400 | 21 | $195,561.92 |
| B, C & X Zone | 661 | $429,739 | $163,665,500 | 236 | $5,247,728.97 |
| Standard | 451 | $326,222 | $96,480,500 | 193 | $4,517,657.33 |
| Preferred | 210 | $103,517 | $67,185,000 | 43 | $730,071.64 |
| **Total** | **3,718** | **$2,092,387** | **$905,092,500** | **651** | **$8,224,271.92** |

Source: FEMA Community Information System, accessed December 2019

## D.5 MITIGATION STRATEGY

| Action # | Action Description | Hazard(s) Addressed | Goal & Objective Addressed | Priority | Lead Agency / Department | Potential Funding Source | Implementation Timeline | 2020 Status | 2020 Implementation Status Comments |
|---|---|---|---|---|---|---|---|---|---|
| Prevention | | | | | | | | | |
| KDH1 | Drainage System Maintenance - Continue mowing draiange ditches and conduct normal maintenance and storm event driven maintenance | Flood, Hurricane & Tropical Storm, Coastal Hazards | 2.2 | High | Public Services, NCDOT | General Fund | Annually | Carry Forward | Continue to maintain ditches and other storm water systems to reduce/eliminate standing water. This is constantly updated and prioritized quarterly. |
| KDH2 | Erosion and Sediment Control - Continue to enforce local and state regulations | Flood, Coastal Hazards | 3.2 | High | Planning Department | General Fund | Annually | Carry Forward | Review and Enforcement of State Sedimentation regulations and staff serving as S&E inspector |
| KDH3 | Maritime Forest Environmental Zoning District - Continue to enforce the Maritime Forest Environmental Zoning District | Wildfire | 3.2 | High | Planning Department | General Fund | Annually | Carry Forward | Action modified. Participate in control burn of the marsh and other portion of Maritime forest to prevent forest fires. |
| KDH4 | Flood Response - Coordinate efforts to expedite reconstruction and rebuilding efforts in coopoeration with Dare County Emergency Management staff. | Flood, Hurricane & Tropical Storm, Coastal Hazards, Winter Storm | 3.1 | High | Planning Department | General Fund | 1-3 years | Carry Forward | In state of Emergency, offer no cost permits for damage repair and work with Dare County to coordinate mitigation grants. |
| KDH5 | Fire Protection - Implement Water Systems Master Plan | Wildfire | 3.3 | High | Public Services, Water Department | Water Fund | 1-5 years | Carry Forward | Continue replacing waterlines in accordance with the Water Master Plan. Require flow test for new development sites. |
| KDH6 | Storm water Management - Continue to implement the storm water management plan. Local Planning and Regulations. | Flood, Coastal Hazards | 3.3 | High | Public Services | General Fund | 6 months | Carry Forward | Development of regulatory requirements for maintenance. Develop regulations for onsite storm water management at large single family dwelling. Maintain and use staff BMP inspection certificates. |
| KDH7 | Map Information - Maintain updated flood map information for citizens and customers. Map Erosion areas annually to help inform the public of high erosion areas. | Flood, Hurricane & Tropical Storm, Coastal Hazards | 1.1 | High | NC Division of Emergency Management, Planning Department | NC Division of Emergency Management | 1 year | Carry Forward | Maintain current and historic flood maps. Provide education information to citizens annually. Map erosion prone areas to better regulate development. |
| KDH8 | Continue to participate in CRS | Flood, Hurricane & Tropical Storm, Coastal Hazards | 3.3 | High | Planning Department | General Fund | Annually | Carry Forward | Work to increase score in CRS program specifically for public outreach and education |
| KDH9 | Add freeboard to the Flood Damage Prevention Ordinance for development in and outside the SFHA | Flood, Hurricane & Tropical Storm, Coastal Hazards | 3.1 | High | Planning Department | General Fund | 1 year | New | Update the Flood Damage Prevention Ordinance in conjunction with updated flood maps. |
| Property Protection | | | | | | | | | |
| KDH10 | Relocation - Expedite permitting for the relocation of repetitive loss situations | Flood, Hurricane & Tropical Storm, Coastal Hazards | 1.2 | Medium | Planning Department | General Fund | 3-5 years | Carry Forward | Incomplete |
| KDH11 | Acquisition - Encourage repetitive loss properties to consider acquisition as a possible solution | Flood, Hurricane & Tropical Storm, Coastal Hazards | 1.2 | Low | Planning Director, Board of Commissioners | NC Division of Emergency Management, FEMA | 5+ years | Carry Forward | Incomplete by lack of funding |
| KDH12 | Critical Facilities Protection - Take appropriate actions to prevent and/or minimize damages to critical facilities. Use generators or other forms of redundant power to ensure that critical facilities and infrastructure remain operational. | All | 2.1/2.2 | High | Police, Fire & Rescue, Public Works, NC Dominion Power | General Fund | 1-3 years | Carry Forward | Utilize shutters on windows in municipal buildings. Test and fuel alternative power sources and install alternative energy sources on all Town buildings. |
| Natural Resource Protection | | | | | | | | | |

| Action # | Action Description | Hazard(s) Addressed | Goal & Objective Addressed | Priority | Lead Agency / Department | Potential Funding Source | Implementation Timeline | 2020 Status | 2020 Implementation Status Comments |
|---|---|---|---|---|---|---|---|---|---|
| KDH13 | Open Space Preservation - Support efforts to preserve natural areas | Flood, Hurricane & Tropical Storm, Coastal Hazards, Severe Weather | 3.3 | High | Planning Department | General Fund | 3-5 years | Carry Forward | Incomplete due to lack of funding |
| KDH14 | Wetlands Protection - Continue to utilize the zoning ordinance and the Land Use Plan to protect wetlands, implement and enforce CAMA AEC regulations and refer applicants to US Army Corps of Engineers for Section 404 wetlands. | Flood, Hurricane & Tropical Storm, Coastal Hazards | 3.2 | High | USACE, Planning Department, NCDEQ | General Fund | Annually | Carry Forward | Protect wetlands and look into living shorelines in public esturarine areas. |
| KDH15 | Reservoirs - 1. Continue protection efforts concerning the Fresh Pond. 2. Maintain liaison with NC Division of Coastal Management concerning the development of the Kill Devil Hills Land Use Plan | Flood, Hurricane & Tropical Storm, Coastal Hazards, Winter Storm | 3.1 | High | Planning Department, CAMA | General Fund | 1 year | Carry Forward | Updating CAMA Land Use Plan and Maintain AEC at Fresh Pond |
| KDH16 | Surface Water Quality - Preserve surface water quality and enhance water quality through storm water management and zoning. | Flood, Hurricane & Tropical Storm, Coastal Hazards | 3.2 | High | Planning Department, Public Services | General Fund | 3-5 years | Carry Forward | Continue to maintain storm water system and improve run off. Follow Town Storm water Master Plan to reduce dependency on NCDOT Ocean Outfalls for drainage. |
| | | | | Structural Projects | | | | | |
| KDH17 | Dune and Beach Maintenance - Continue ongoing beach nourishment efforts | Flood, Hurricane & Tropical Storm, Coastal Hazards | 3.2 | High | Planning Director, Board of Commissioners | General Fund | Monitor Annually, nourish every 5 years | Carry Forward | Initial Beach Nourishment Project completed in 2016. Ongoing stabilization and re-nourishment in accordance with the adopted Shore Protection Project Maintenance Plan. |
| | | | | Emergency Services | | | | | |
| KDH18 | Hazard Warning - Facilitate evacuation | All | 1.1 | High | Dare County Control Group | General Fund | Annually | Carry Forward | Utilize the Regroup Emergency Alert System to the fullest potential for all hazards and emergency information. |
| KDH19 | Health and Safety Maintenance - Develop ongoing protocols to assure the maintenance of critical public services | All | 2.1 | High | Police, Fire & Rescue, Public Works, Dare County Emergency Management | General Fund | Annually | Carry Forward | Conduct annual training session with all emergency response departments. Develop a plan for action. Develop a multi-jurisdictional response plan. |
| KDH20 | Emergency Services - Hurricane Exercises | Hurricane & Tropical Storm | 2.1 | High | Planning Department | General Fund | 1 year | New | Continue to participate in countywide emergency operation hurricane exercises. Update local plan accordingly. |
| | | | | Public Education & Awareness | | | | | |
| KDH21 | Hazard Recovery - Coordinate efforts to expedite recovery. | All | 1.1 | High | Planning Department, Board of Commissioners | General Fund | 1 year | Carry Forward | Work with Dare County Emergency Management on information dissemination after an event and develop a website for post hazard information |
| KDH22 | Insurance - Maintain outreach efforts and continue making flood insurance available to the Town's residents | Flood, Hurricane & Tropical Storm, Coastal Hazards | 1.1 | High | Planning Department, Town Clerk | General Fund | 1 year | Carry Forward | Update materials and distribute to property owners and residents and specialty groups |
| KDH23 | Compile and maintain current information in the Kill Devil Hills Floodplain Management Library | Flood, Hurricane & Tropical Storm, Coastal Hazards | 1.1 | High | CRS Coordinator | General Fund | Annually | Carry Forward | Scan current and past flood maps; scan elevation certificates for future reference and future property owners; scan building permits |
| KDH24 | Outreach Projects - Initiate outreach projects to inform the public on Town and County initiatives that will reduce hazard related losses of property and life | All | 1.1 | High | Planning Department, Dare County Emergency Management | General Fund | 1 year or Annually | Carry Forward | Provide printed educational materials for citizens regarding hazards. Create videos for hazard awareness and safety. Post education and prevention techniques on website. |

| Action # | Action Description | Hazard(s) Addressed | Goal & Objective Addressed | Priority | Lead Agency / Department | Potential Funding Source | Implementation Timeline | 2020 Status | 2020 Implementation Status Comments |
|---|---|---|---|---|---|---|---|---|---|
| KDH25 | Circulate brochure specifically on NFIP | Flood, Hurricane & Tropical Storm, Coastal Hazards | 1.1 | High | Planning Department | General Fund | Annually | Carry Forward | Work to increase score in CRS program specifically for public outreach and education |
| KDH26 | Conduct contractors meeting | All | 3.1 | High | Planning Department | General Fund | 1 year | Carry Forward | Work to increase score in CRS program specifically for public outreach and education |
| KDH27 | Outreach Projects - Hold annual outreach meeting for citizens to discuss hazards and how to protect themselves. Hold annual outreach to engineer and developers on how to construct to a higher standard to prevent damage. | All | 1.1 | High | Planning Department | General Fund | 1 year | New | Schedule annual meeting to discuss hazards and prevention |
| KDH28 | Create educational brochure on the dangers of extreme heat and cold and steps the public can take to protect themselves | Extreme Heat, Winter Storm | 1.1 | Medium | Planning Department | General Fund | 1-2 years | New | Develop education program |
| KDH29 | Mitigation education | All | 1.1 | Medium | Planning Department | General Fund | 2-3 years | New | Develop mitigation possibilities and present to governing board annually |