# CRAVEN COUNTY

# MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

*Participating Jurisdictions: Bridgeton, Cove City, Dover, Havelock, New Bern, River Bend, Trent Woods, and Vanceboro*

Adopted by the Craven County Board of Commissioners: July 6, 2010

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# SECTION 1. INTRODUCTION AND PLANNING PROCESS

## A. Introduction

When a major natural event strikes our built environment, it is deemed a "natural disaster." Hazard mitigation is simply about preventing natural disasters. The idea of preventing natural disasters at first seems counterintuitive, if not impossible. We certainly cannot prevent natural events, like hurricanes and tornadoes. Yet the impacts of natural events – who and what gets hurt – are largely determined by what, where, and how we build and function. Thus, some impacts of natural hazards on our population, and economic, social, and physical environment are, in the bigger picture, self-inflicted. As citizens and local government entities, we have not inherited a perfectly planned and resilient community. Due to this fact, we must assess current vulnerabilities resulting from past decisions relating to development design and location in an effort to reduce the harmful impacts of natural, and in some cases man-made, hazards.

The North Carolina Statewide Plan summarizes hazard mitigation as follows:

> "Hazard mitigation involves the use of specific measures to reduce the impact of hazards on people and the built environment. Measures may include both structural and non-structural techniques, such as protecting buildings and infrastructure from the forces of nature or wise floodplain management practices. Actions may be taken to protect both existing and/or future development. It is widely accepted that the most effective mitigation measures are implemented before an event at the local government level, where decisions on the regulation and control of development are ultimately made."

## B. What is Hazard Mitigation and Why is it Important to Craven County?

### 1. What is Hazard Mitigation?

Hazard mitigation is the practice of reducing risks to people and property from natural disasters. Hazard mitigation involves recognizing and adapting to natural forces, and is defined by the Federal Emergency Management Agency (FEMA) as any sustained action taken to reduce long-term risk to human life and property from natural hazards. A fundamental premise of hazard mitigation is that current dollars invested in mitigation will significantly reduce the demand for future expenditures by reducing the extent of emergency recovering, repair, and reconstruction following a disaster.

2. Why is Hazard Mitigation Important to Craven County?

Hazard mitigation offers multiple benefits to Craven County and the participating jurisdictions of Bridgeton, Cove City, Dover, Havelock, New Bern, River Bend, Trent Woods, and Vanceboro. The goals for this plan are stated in Section 7 on pages 7-22 and 7-23.

Hazard mitigation planning is intended to construct a framework for the prevention and reaction to disasters if and when they may occur. The framework created by this plan will help to instill an ongoing effort to lessen the impact that disasters have on citizens and property within Craven County. The above listed items are only a few of the many complex issues that the formulation of such a process will ultimately address.

## *C. Planning Process and Plan Format*

1. Planning Process

Craven County received a 2009 North Carolina Pre-Disaster Mitigation Planning Grant of $37,350 to assist with the preparation of this plan. The grant was matched with $12,450 in local funds. All municipal jurisdictions participating in the update adopted a resolution of participation. Each participating jurisdiction contributed to the overall cost of the plan update as well.

Primary responsibility for development of the Craven County Hazard Mitigation Plan Update was placed in the hands of the Craven County Planning Department under the direction of Donald R. Baumgardner, Craven County Planning Director. Mr. Baumgardner worked closely with all County departments, as well as the County's planning consultant, Holland Consulting Planners, Inc., throughout the planning process to develop this plan.

Subsequent to establishing a work authorization with the planning consultant, Craven County held an initial scoping meeting with the project consultant. This meeting involved a general discussion of how the project should be carried out, including issues related to establishing a Mitigation Advisory Committee (MAC) to oversee the update. It was determined that the MAC would be comprised of county staff members, as well as a representative from each participating municipal jurisdiction. All sections of this plan have been reviewed and approved by the MAC.

Dealing with natural or man-made hazards and disasters is rarely the responsibility of one employee or official in any community. Rather, it is a team effort, often comprised of representatives from administration, planning/zoning, public works, fire/police, and other offices.

The County convened the MAC in order to efficiently address this "multi-disciplinary" aspect of hazard mitigation. MAC members were charged with the responsibility of working through the planning process, and assisting the consultant through compiling the information, input, and background required to develop the plan. The following are the MAC members:

| MAC Member | Jurisdiction/Agency |
|---|---|
| Donald R. Baumgardner, Planning Director | Craven County |
| Chad Strawn, Assistant Planning Director | Craven County |
| Elaine G. Bryan, Town Clerk | Town of Bridgeton* |
| Sonja Gaskins, Town Clerk | Town of Cove City* |
| Kathy New, Town Clerk | Town of Dover* |
| Robin Bloss, Zoning Administrator | City of Havelock* |
| Mike Avery, Planning Director | City of New Bern* |
| Drew Havens, Town Manager | Town of River Bend* |
| Mike Haber, Maintenance Director | Town of Trent Woods* |
| Renee Ipock, Town Clerk | Town of Vanceboro* |
| Robert Toler | American Red Cross |

*Denotes participating municipalities.

A series of meetings were held to develop the Hazard Mitigation Plan Update, each focusing on a specific aspect of the planning process. A total of five MAC meetings were held, and several additional meetings took place between staff and various interests involving plan development. Throughout the process, the MAC reviewed and, as appropriate, incorporated existing plans, studies, reports, and technical information. The following provides a brief summary of all meetings held and what was addressed at each:

- **September 2009** - MAC representatives convened for a scoping and overview meeting with the consultant. This meeting focused on the planning process, and what the County hoped to achieve in working through the development of a Hazard Mitigation Plan Update.

- **October 2009** - The second MAC meeting was held. The agenda for this meeting focused on MAC responsibilities, repetitive loss properties, CRS participation/ rating, and data collection, including review of existing plans, studies, and reports. The MAC discussed what been accomplished over the last five years with respect to the mitigation policy in the 2004 update.

- **November 2009** – The existing mitigation objectives and strategies were discussed by the MAC. The action statements were reviewed and potential changes discussed. Critical facilities and vulnerability assessments were also discussed. The results of this effort have been directly translated into the policy section of this document.

- **December 2009** - The fourth scheduled MAC meeting was held. The intent of this meeting was to finalize the draft strategies discussed at the October meeting. Additionally, on December 21, 2009, a public information meeting was held during the County's regularly scheduled Board of Commissioners meeting. At this session, an overview of the project was provided, and the public was given an opportunity to comment and ask questions regarding the overall process and plan update. This meeting was advertised in the local newspaper.

- **January 2010** – On January 20, 2010, the final MAC meeting for the plan update process was held to disseminate and review the draft plan. Subsequent to this date, a review period was established to allow adequate time for County, regional agencies, and NCEM review and comment. This meeting was advertised locally, and open to the public in an effort to provide an additional opportunity for community outreach regarding the plan update.

- **July 2010** – All jurisdictions scheduled and held a public hearing prior to considering the draft plan for adoption. The public hearings included an opportunity for the public to comment on the draft plan (insert comments).

The sign-in sheets for all MAC meetings, as well as copies of the advertisements for all publicly advertised meetings have been provided in Appendix B. The agencies/ stakeholder offices identified in Appendix I were notified of this draft plan and were given an opportunity to provide comments on the draft. The draft plan was posted on the Craven County Hazard Mitigation Plan website (http://www.cravencountymitigation.info). This site is dedicated to hazard mitigation planning and implementation. No stakeholder comments were received.

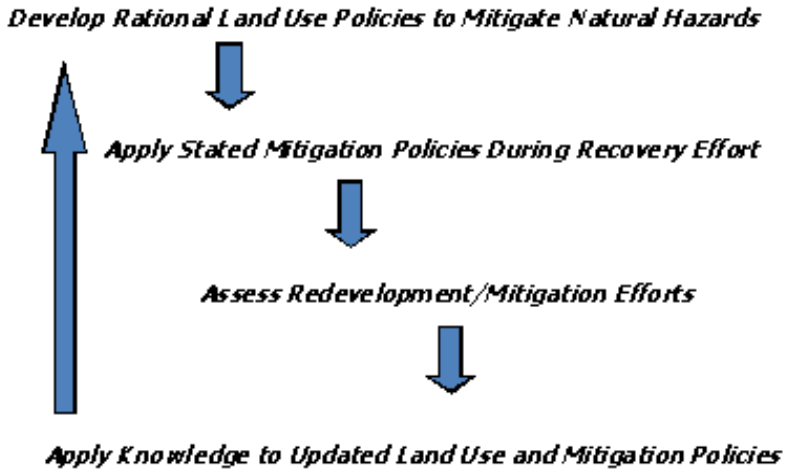
Review comments were received from NCEM on March 15, 2010, and revisions were made to the draft HMP update based on these NCEM comments (see Appendix C). The revised draft HMP update was submitted to NCEM on March 22, 2010.

Following receipt of a letter of preliminary approval from NCEM, the HMP update will be forwarded to all participating jurisdictions for adoption. Prior to adoption, however, a final public hearing shall be held for each participating jurisdiction in order to allow the

public and the above-identified stakeholder groups the opportunity to make comments on and provide input to the final plan. Public hearing notices, meeting minutes and adoption resolutions from these meetings have been provided as Appendix D. HMP adoption should take place in (Insert Estimated Month and Date), pending NCEM approval.

2. Plan Organization/Format

The planning process for the update of the Craven County Multi-Jurisdictional Hazard Mitigation Plan involved a comprehensive review of all components of the existing document. The Mitigation Advisory Committee (MAC) subscribed to the following strategic planning model:




Through the employment of this model, the MAC reviewed all efforts carried out since the adoption of the 2004 plan and decided whether these efforts proved effective based on an current risk assessment, prior occurrences of inclement weather activity, and the current political and budgetary climate. Through these discussions, revised strategies were developed based on the following factors:

- The implementing strategy will improve upon Craven County's and the participating municipalities' participation and role in the National Flood Insurance Program.
- The policy/goal meets at least one community mitigation goal.
- The policy/goal complies with all laws and regulations.
- The policy/goal is cost-beneficial.

- The community implementing the policy/goal has (or will have) the capability to do so.
- The policy/goal is environmentally sound.
- The policy/goal is technically feasible.

The format for the Craven County Hazard Mitigation Plan (HMP) Update follows the suggested format proposed in the July 1, 2008, version of the Local Multi-Hazard Mitigation Planning Guidance (also known as the "Blue Book"). This guide represents FEMA's latest official interpretation of the federal regulations that implement the Disaster Mitigation Act of 2000. The plan format is provided below:

**Section 1. Introduction**
This section of the HMP update provides the purpose of the plan, acknowledges the participants in the planning process, describes the planning process, and reviews the citizen participation and adoption process for the HMP update.

**Section 2. Community Profiles**
This section of the HMP update outlines the existing conditions within the County and the participating municipalities. These overviews address the following existing conditions: demographics, topography, climate, and other general information regarding the community.

**Section 3. Identification of Potential Natural Hazards**
This section of the HMP update provides relevant data and narrative descriptions of natural hazards that Craven County's citizens are subject to, based on interviews with local officials and on public data sources such as the National Climatic Data Center and FEMA, for example. The MAC, through the update process, reviewed the hazards outlined within the 2004 plan to ensure that they still pose a threat to the County. Additionally, this section was updated to reflect occurrences of each natural hazard type since adoption of the 2004 plan.

**Section 4. Community Capability Assessment**
This section of the HMP update provides an assessment of each community's current hazard mitigation practices, as well as its potential to engage in mitigation activities. The capability assessment has been reviewed by the MAC as part of the comprehensive update process. This effort involved the updating of information for Craven County as well as all participating jurisdictions relating to: administrative capabilities,

infrastructure resources, land development controls, and existing local and state policy programs.

**Section 5. Vulnerability Assessment**

This section of the HMP update identifies through narrative, data, and maps specific locations throughout the County vulnerable to natural hazards; establishes "Geographic Planning Areas," which are areas of particular vulnerability to natural hazards; and provides detailed data and analysis of these areas. As a component of the mitigation plan update, the vulnerability assessment was updated to reflect the 2009 development characteristics within Craven County. This effort also involved the review and update of the critical facilities inventory, initially established through the 2004 planning process.

**Section 6. Acceptability Assessment**

This section of the HMP update identifies high priority areas of focus for "action" sections of the plan by providing an overview of conclusions formed from the data and analysis provided in Sections 2 through 5. The acceptability assessment was reviewed by the MAC to ensure consistency with the current needs and demands of the County.

**Section 7. Mitigation Strategies and Policies**

This section of the HMP update provides each community's values and goals statements, and identifies specific strategies and policies what will "put into action" the mitigation values and goals. The MAC undertook a comprehensive review of the mitigation strategies outlined in the 2004 plan. This review led to the modification of all existing mitigation strategy statements as reflected in Section 7 of the plan update. Through this effort, the County is attempting to strengthen its existing multi-jurisdictional mitigation program. The MAC feels that the revised statements are more effective, and that they appropriately define how mitigation initiatives outlined within the plan should be carried out. Please note that the overhaul of the 2004 policies makes it difficult to cross-reference the updated strategies with those outlined in the 2004 plan.

**Section 8. Monitoring, Evaluating and Reporting Progress**

This section of the HMP update provides procedures for ongoing monitoring and evaluation after the HMP update is adopted by each community's governing body, NCDEM, and FEMA, and establishes procedures to ensure that an annual evaluation report is prepared and appropriate revisions and updates of the plan are completed. The MAC understands that it has ongoing responsibility to monitor and evaluate the effectiveness of the HMP.

**Appendices**

These sections present supporting documentation as outlined within the plan.

## *D. Authority for HMP Adoption and Relevant Legislation*

This HMP update will be adopted by the Craven County Board of Commissioners and the governing bodies of each of the eight (8) participating municipalities under the authorities and police powers granted to county and municipal governments by the North Carolina General Statutes (see NCGS Chapter 153A).

The HMP update has been developed in accordance with the requirements of the following laws, regulations, and guidance:

- North Carolina General Statutes (NCGS), Chapter 166-A: North Carolina Emergency Management Act, as amended by Senate Bill 300: An Act to Amend the Laws Regarding Emergency Management as Recommended by the Legislative Disaster Response and Recovery Commissioner (a.k.a. Session Law 2001-214), adopted June 15, 2001.

- Public Law 106-390, The Robert T. Stafford Disaster Mitigation Act of 2000, as amended (adopted October 30, 2000).

- Interim Final Regulations regarding Hazard Mitigation Planning and the Hazard Mitigation Grant Program at 44 CFR Parts 201 and 206 as published in the Federal Register: October 1, 2002 (Volume 67, Number 190, Page 61512-61515).

- The July 1, 2008, version of the Local Multi-Hazard Mitigation Planning Guidance (also known as the "Blue Book"). This guidance represents FEMA's latest official interpretation of the federal regulations that implement the Disaster Mitigation Act of 2000.

The above laws, regulations, and guidance should be carefully monitored to ensure continued compliance.

# SECTION 2. COMMUNITY PROFILES

## I. CRAVEN COUNTY

### A. Location

Craven County is located in the central coastal plain of North Carolina. The County is located approximately eighty miles east of Raleigh, the state capital. Map 1 (Appendix A) provides the regional location. The County's major waterway is the Neuse River which joins the Pamlico Sound just east of New Bern. Major highways bisecting the County include US 17 (north-south route) and US 70 (east-west route). The southern boundary of the County is only 13 miles from the Atlantic Ocean. The County is home to the United States Marine Corps Air Station Cherry Point which gives the County regional, national, and international significance. The County has eight (8) municipalities including the towns of Bridgeton, Cove City, Dover, River Bend, Trent Woods, and Vanceboro, and the cities of Havelock and New Bern.

### B. Topography/Geology and Groundwater Resources

The Neuse and Trent Rivers drain into Craven County. The flow in both rivers and their tributaries is sluggish. Generally, the County slopes to the southeast. Elevations range from 63 feet above sea level at Dover to five feet above sea level in the marshes and floodplains located in the central and southeastern sections of the County. Approximately 88% of the County is almost level, 11% gently sloping, and 1% sloping to moderately steep.

The County's groundwater is plentiful. In most places, it is located near the surface, particularly in winter and early spring. Most inactive borrow pits contain water, and several large natural lakes exist in the southeastern area of the County.

Thousands of feet of sedimentary deposits underlie the County. The upper portions of these deposits contain aquifers which supply the County's well water. The surficial aquifer extends down from the water table to a maximum depth of about 60 feet. It is thicker in the southern areas of the County. In the early development of the County, this aquifer provided the main source of small domestic water supplies. However, the dependence on shallow wells has decreased because of low yield, high dissolved iron content and contamination.

The Castle Hayne formation supplies most of the County's wells. This aquifer is thin near the Lenoir and Pitt County lines but ranges up to 700 feet thick along the Carteret County line. In the upper part of the aquifer, the water is generally hard with high dissolved oxygen content. In the lower portions of the aquifer, the water is low in iron but salty in some places, especially the southern areas of the County.

The Black Creek formation and upper part of the Tuscaloosa formation near Cove City provide excellent water sources for both New Bern and the County. However, this aquifer is not utilized east of Cove City because of its depth and probable saltwater content.

### *C. History*

Craven County was named in honor of William, Earl of Craven, who lived from 1606-1697. His death preceded the establishment of Craven County, and he never had the pleasure of visiting the county which carries his name. The official Craven County seal was designed and adopted in 1981, using the coat-of-arms of the Earl, which is also the coat-of-arms of his nephew, William, Lord Craven, who succeeded him as Lord Proprietor of Carolina. The motto on the seal, "Virtus in Actione Consistit" translates to "Virtue in Consistent Action."

Craven County, originally included as a precinct of Bath County, was established in its present form in 1712. New Bern became its county seat in 1722, and was also the capital of the colony and first state capital until 1794. Because of its location, situated between the Albemarle and Cape Fear Rivers, Craven County grew in size and importance during the mid-18th century due to the significance of its county seat as a river port. As Craven County moved into the 19th century, it continued to flourish as the developing railroad system served to further New Bern's commercial dominance, wealth, and cultural sophistication. These influences were also felt in the communities surrounding the city.

During the Civil War, there was significant activity occurring in Craven County, and remains of some of the battlegrounds can still be found.

### *D. Climate*

Craven County is hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool with occasional brief cold spells. Rain falls throughout the year and is fairly heavy at times. Annual precipitation is adequate for all crops.

In winter, the average temperature is 47 degrees F., and the average daily minimum temperature is 38 degrees F. The lowest temperature on record, which occurred at New Bern in 1977, is 5 degrees. In summer, the average temperature is 78 degrees F., and the average daily maximum temperature is 85 degrees F. The highest recorded temperature, which occurred at New Bern in 1954, is 106 degrees.

Of the total annual precipitation, approximately 30 inches, or 57%, usually falls in April through September. The growing season for most crops falls within this period. In two years out of 10, the rainfall in April through September is fewer than 25 inches. Thunderstorms occur on about 45 days each year, and most occur in summer.

Snowfall is rare. The average seasonal snowfall is less than one inch. However, snow in excess of one inch that lasts more than a day does occasionally occur.

The average relative humidity in midafternoon is about 60%. Humidity is higher at night, and the average at dawn is about 85%. The sun shines 65% of the time possible in summer and 60% in winter. The prevailing wind is from the south-southwest. Average wind speed is highest, 12 miles per hour, late in winter and early in spring.

## *E. Demographic Summary*

### 1. Permanent Population

North Carolina is divided into 18 regions based on locale for the purpose of coordinating planning efforts between neighboring counties. These designated regions are considered the Councils of Government. Craven County is included in Region P along with Pamlico, Carteret, Jones, and Onslow counties. It is useful to compare the growth of Craven County to the other counties within Region P because of their geographic proximity and similar circumstances within the central coastal plain. Table 1 provides a summary of population change and population growth percentages by Region P and North Carolina. The US Census Bureau estimated Craven County's population at 92,668 in 2007.

**Table 1. Craven County, Region P, and North Carolina**
**Total Population and Percent Change, 1990-2007**

| | Total Population | | | Percent Change | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2007 Est. | '90-'00 | '00-'07 | '90-'07 |
| Craven County | 81,613 | 91,523 | 92,668 | 12.1% | 1.3% | 13.5% |
| Pamlico County | 11,372 | 12,934 | 13,068 | 13.7% | 1.0% | 14.9% |
| Carteret County | 52,556 | 59,383 | 62,766 | 13.0% | 5.7% | 19.4% |
| Jones County | 9,914 | 10,419 | 10,312 | 5.1% | -1.0% | 4.0% |
| Onslow County | 149,838 | 150,355 | 157,738 | 0.3% | 4.9% | 5.3% |
| Region P | 305,293 | 324,614 | 336,552 | 6.3% | 3.7% | 10.2% |
| North Carolina | 6,628,637 | 8,049,313 | 8,682,066 | 21.4% | 7.9% | 31.0% |

Source: US Census Bureau.

Table 2 provides a summary of Craven County's population growth by municipality.

**Table 2. Craven County Municipalities**
**Population Growth, 1990-2007**

| | Total Population | | | Percent Change | | |
|---|---|---|---|---|---|---|
| | 1990 | 2000 | 2007 Est. | '90-'00 | '00-'07 | '90-'07 |
| Bridgeton | 498 | 328 | 296 | -34.1% | -9.8% | -40.6% |
| Cove City | 497 | 433 | 428 | -12.9% | -1.2% | -13.9% |
| Dover | 451 | 443 | 428 | -1.8% | -3.4% | -5.1% |
| Havelock | 20,300 | 22,442 | 20,713 | 10.6% | -7.7% | 2.0% |
| New Bern | 17,363 | 23,111 | 23,388 | 33.1% | 1.2% | 34.7% |
| River Bend | 2,408 | 2,923 | 2,790* | 21.4% | -4.6% | 15.9% |
| Trent Woods | 2,366 | 4,224 | 4,192 | 78.5% | -0.8% | 77.2% |
| Vanceboro | 946 | 898 | 875 | -5.1% | -2.6% | -7.5% |

*The Town of River Bend estimated a 2007 population of 3,028.
Source: US Census Bureau and NC Office of State Planning.

## 2. Population Profile - Age

From 1990 - 2000, the total of individuals in Craven County who were 60 years of age and older increased substantially from 12,693 to 16,223 (see Table 3). This trend has directly resulted from increasing investment in waterfront and other suburban property in Craven County by retirees.

**Table 3. Craven County**
**Total Population by Age, 1990 - 2000**

| | Total Population | | Percent Change |
|---|---|---|---|
| Age | 1990 | 2000 | '90-'00 |
| 0-4 years | 7,066 | 6,682 | -5.4% |
| 5-18 years | 16,082 | 16,959 | 5.5% |
| 19-24 years | 9,772 | 10,808 | 10.6% |
| 25-44 years | 25,635 | 25,443 | -0.7% |
| 45-59 years | 10,365 | 15,369 | 48.3% |
| 60-74 years | 9,496 | 11,451 | 20.6% |
| 75 and up | 3,197 | 4,811 | 50.5% |
| Total | 81,613 | 91,523 | 12.1% |

Source: US Census Bureau.

Several important trends in the composition of Craven County's population can be identified through a review of Table 3. In the ten-year period between 1990 and 2000, the three most rapidly growing segments of the population were the ages of 45-59, 60-74, and 75 and up. During the 1990s, the 25-44 age group declined slightly. The preschool and school age (0-18) population and the young adult (19-24) population have decreased in terms of percentages of total population during 1990-2000.

## 3. Housing

From 1980 to 2000, Craven County's total dwelling units increased from 25,549 to 38,157, an increase of 49.3%. Table 4 provides a summary of dwelling unit growth in Craven County from 1990 to 2000.

**Table 4. Craven County**
**Summary of Year-Round and Seasonal Private Dwelling Units, 1990 and 2000**

| | Number of Units | | Percent Increase |
|---|---|---|---|
| | 1990 | 2000 | 1990-2000 |
| Year Round | 31,951 | 37,724 | 18.1% |
| Seasonal | 342 | 433 | 26.6% |
| Total Units | 32,293 | 38,157 | 18.2% |

Source: 1990 and 2000 US Census.

The number of occupied housing units for the County, as reported in the 2000 Census, was 23,078, or 60.5% of the total number of housing units. Vacant housing units (3,568) comprised 9.4% of the total number of units. Table 5 summarizes the County's dwelling units by tenure.

**Table 5. Craven County**
**Summary of Housing Units by Tenure, 1990 and 2000**

| | 1990 | % of Total | 2000 | % of Total |
|---|---|---|---|---|
| Owner-Occupied Units | 18,705 | 58.5% | 23,075 | 60.5% |
| Renter-Occupied Units | 10,837 | 33.9% | 11,514 | 30.2% |
| Vacant Units | 2,409 | 7.5% | 3,568 | 9.4% |
| Total Housing Units | 31,951 | 100.0% | 38,157 | 100.0% |

NOTE: 1990 data is based on year-round units; 2000 data includes 433 seasonal units.
Source: 1990 and 2000 US Census.

Table 6 provides a summary of residential building permits issued in Craven County from 2000 to 2008. During that seven-year period, a total of 3,365 residential building permits were issued.

**Table 6. Craven County**
**Summary of Residential Building Permits, 2000-2008**

| Year | Total Permits Issued |
|---|---|
| 2000 | 200 |
| 2001 | 237 |
| 2002 | 293 |
| 2003 | 357 |
| 2004 | 475 |
| 2005 | 576 |
| 2006 | 604 |
| 2007 | 360 |
| 2008 | 263 |
| Total | 3,365 |

Source: Craven County.

## 4. Economy

In 2000, there was a total of 35,725 employed persons in Craven County. Of that total, approximately 7,097, or 19.8% were employed by the military. The number employed increased by 14.1% from 1990 to 2000. The percentage employed by the military increased only slightly from 1990 to 2000. The strong military presence in Craven County through the years has served to support keeping unemployment rates at consistently low levels. Table 7 provides unemployment rates for the civilian labor force for selected years.

**Table 7. Craven County**
**Civilian Unemployment Rate, 16 years and over**

| | 1990 | 2000 |
|---|---|---|
| Civilian Labor Force | 33,448 | 37,733 |
| Number Employed | 31,305 | 35,725 |
| Number Unemployed | 2,143 | 2,008 |
| Craven County Unemployment Rate | 6.4% | 5.3% |
| North Carolina Unemployment Rate | 4.8% | 3.7% |

Source: 1990 and 2000 US Census.

Craven County's civilian employment is heavily concentrated in the retail trade and service sectors. All service categories combined provide employment for 38.5% of those employed who are 16 years of age and older. The largest single employment category is professional services, which constitutes 20.7% of all those employed who are 16 years of age and older. Manufacturing accounts for the second largest category with 13.6%. Table 8 provides a summary of Craven County's employment by industry. Of the County's total 2000 employed labor force, 10.2% were employed in public administration. The significant retail and service sector employment reflects support for those employed in government jobs.

**Table 8. Craven County**
**Employment by Industry, 2000**

| Categories | Total Employment | % of Total |
|---|---|---|
| Agriculture, forestry, fisheries, and mining | 802 | 2.2% |
| Construction | 2,665 | 7.5% |
| Manufacturing | 4,860 | 13.6% |
| Transportation | 1,426 | 4.0% |
| Wholesale trade | 826 | 2.3% |
| Information | 724 | 2.0% |
| Retail trade | 4,337 | 12.1% |
| Entertainment | 2,674 | 7.5% |
| Finance, insurance & real estate | 1,575 | 4.4% |
| Services, business & repair | 2,730 | 7.6% |
| Services, professional | 7,400 | 20.7% |
| Services, other | 2,060 | 5.8% |
| Public administration | 3,644 | 10.2% |
| Total | 35,723 | 100.0% |

Source: US Census Bureau.

Normally, per capita income is considered a good indicator of an area's income producing capability or strength. Table 9 provides a comparison of North Carolina and Craven County per capita income.

**Table 9. Craven County and North Carolina Per Capita Income, 1990 and 2000**

| | Craven County | North Carolina | Craven County's % of North Carolina |
|---|---|---|---|
| 1990 | $14,217 | $16,284 | 87% |
| 2000 | $18,243 | $20,307 | 91% |

Source: NC State Data Center.

From 1990 to 2000, the gap between Craven County per capita income level and that of the State narrowed slightly. In addition, the County's per capita income increased by $4,206, or 28.3%.

## *II. TOWN OF BRIDGETON*

### *A. Location*

The Town of Bridgeton is located in the central eastern portion of Craven County, east of the City of New Bern, just across the Neuse River. NC Highway 55 and US Highway 17 intersect within and around the town's environs. According to the US Census Bureau, the town has a total area of 0.36 square mile, all of it land.

### *B. Demographic Summary*

#### 1. Population

The population of Bridgeton as reported in the 1990 US Census was 498, with a 34.1% decrease occurring between 1990 and 2000, for a total 2000 population of 328. Bridgeton has the smallest population of Craven County's municipalities. The North Carolina Office of State Planning estimated the 2007 population of Bridgeton to be 296, demonstrating yet another decrease of 9.8% between the years 2000 and 2007. The population is also considered to be getting "younger", since the median age as reported in the 1990 US Census was 54.2 years, and the median age as reported in the 2000 US Census was 43.5 years. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects a further declining trend for Bridgeton's 2012 population, which it estimates at 281 persons.

#### 2. Housing

The occupancy rate of Bridgeton's housing units is relatively low – only 73.9% (156) of the town's housing units are occupied, with 26.1% (55 units) being vacant, as reported in the 2000 Census. The town's housing vacancy rate is the highest of the county's municipalities. Only five of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, 102 units, or 65.4%, are owner-occupied, and 54, or 34.6% of the units, are renter-occupied. The number of housing units (211) has increased greatly from the 1990 Census reported figure of 143.

#### 3. Economy

The 2000 Census reported that the majority of Bridgeton's workers were employed in the construction (18.5%); educational, health and social services (15.4%); and the manufacturing (12.3%) industries. Median income for Bridgeton's residents was $30,375, and 21.2% of Bridgeton's families were considered below poverty level, the highest percentage of the county's municipalities.

## *III. TOWN OF COVE CITY*

### *A. Location*

The Town of Cove City is located in the western portion of Craven County, about 10 miles west of New Bern. The North Carolina Railroad runs through town, and Cove City is bisected by NC State Road 1005 (Old US Highway 70) and NC Highway 41. The town is located approximately 2-1/2 miles north of US Highway 70. According to the US Census Bureau, the town has a total area of 0.6 square mile, all of it land.

### *B. Demographic Summary*

#### 1. Population

The population of Cove City as reported in the 1990 US Census was 497, with a 12.9% decrease occurring between 1990 and 2000, for a total 2000 population of 433. The North Carolina Office of State Planning estimated the 2007 population of Cove City to be 428, demonstrating a continuing decreasing trend in population. The population is also considered to be aging, since the median age as reported in the 1990 US Census was 36.1 years, and the median age as reported in the 2000 US Census was 45.4 years. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects only a slight increase for Cove City's 2012 population, which it estimates at 429 persons.

#### 2. Housing

The occupancy rate of Cove City's housing units is high – 93.3% (182) of the town's housing units are occupied, with only 6.7% (13 units) being vacant, as reported in the 2000 Census. None of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, 144 units, or 79.1%, are owner-occupied, and 38, or 20.9% of the units, are renter-occupied. The number of housing units (195) has increased from the 1990 Census reported figure of 171.

#### 3. Economy

The 2000 Census reported that the majority of Cove City's workers were employed in the manufacturing (28.9%), and the educational, health, and social services (23.7%) industries. Median income for the town's residents was $26,875, and 14% of Cove City's families were considered below poverty level.

## *IV. TOWN OF DOVER*

### *A. Location*

The Town of Dover is located in the extreme western portion of Craven County, approximately 15 miles northwest of New Bern. The North Carolina Railroad runs through town, and NC State Road 1005, NC State Road 1262, and US Highway 70 intersect within and around the town's environs. According to the US Census Bureau, the town has a total area of 0.9 square mile, all of it land.

### *B. Demographic Summary*

#### 1. Population

The population of Dover as reported in the 1990 US Census was 451, with a 1.8% decrease occurring between 1990 and 2000, for a total 2000 population of 443. The North Carolina Office of State Planning estimated the 2007 population of Dover to be 428, demonstrating a continuing declining trend in population. The population is also considered to be aging, since the median age as reported in the 1990 US Census was 36.2 years, and the median age as reported in the 2000 US Census was 42.5 years. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects a continuing declining trend for Dover's 2012 population, which it estimates at 424 persons.

#### 2. Housing

The occupancy rate of Dover's housing units is relatively high – 86.4% (185) of the town's housing units are occupied, with 13.6% (29 units) being vacant, as reported in the 2000 Census. Only one of the vacant units is used for seasonal, recreational, or occasional use. Of the occupied units, 147 units, or 79.5%, are owner-occupied, and 38, or 20.5% of the units, are renter-occupied. The number of housing units (214) has increased rather substantially (by over one-fourth) from the 1990 Census reported figure of 169.

#### 3. Economy

The 2000 Census reported that the majority of Dover's workers were employed in the educational, health and social services (20.2%); the manufacturing (18%); and the construction (17.4%) industries. Median income for Dover's residents was $25,156 (the lowest reported figure for the county's municipalities), and 15.6% of Dover's families were considered below poverty level.

## *V. CITY OF HAVELOCK*

### *A. Location*

The City of Havelock is located in southeastern Craven County, just south of the banks of the Neuse River. The North Carolina and Camp Lejeune railroads run through the city, and US Highway 70 and NC Highway 101 intersect within the city. Havelock is also home to the Marine Corps Air Station at Cherry Point, the largest Marine Corps Air Station on the East Coast of the United States. The air station and its associated support locations occupy more than 29,000 acres. According to the US Census Bureau, the city has a total area of 17.6 square miles, of which 16.7 square miles of it is land and 0.9 square mile of it is water.

### *B. Demographic Summary*

#### 1. Population

The population of Havelock as reported in the 1990 US Census was 20,300, with a 10.6% increase occurring between 1990 and 2000, for a total 2000 population of 22,442. The North Carolina Office of State Planning estimated the 2007 population of Havelock to be 20,713, demonstrating a decrease in population of 7.7% between the years 2000 and 2007. Havelock's population is young and is considered to be getting slightly "younger," since the median age as reported in the 1990 US Census was 23.2 years, and the median age as reported in the 2000 US Census was 23.0 years. The City's reported median age is the "youngest" of all of Craven County's municipalities. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects a continuing declining trend for Havelock's 2012 population, which it estimates at 20,024 persons.

#### 2. Housing

The occupancy rate of Havelock's housing units is high – 94.5% (6,411) of the city's housing units are occupied, with only 5.5% (372 units) being vacant, as reported in the 2000 Census. Only fourteen of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, only 2,428 units, or 37.9%, are owner-occupied, and 3,983, or 62.1% of the units, are renter-occupied. Havelock has the largest percentage of rental units of all the county's municipalities, which may be attributed to the presence of the Marine Corps Air Station at Cherry Point in Havelock. The total number of housing units (6,783) has decreased slightly from the 1990 Census reported figure of 6,832.

### 3. Economy

The 2000 Census reported that the majority of Havelock's workers were employed in the educational, health and social services (19.6%); public administration (17.3%); and the retail trade (13.1%) industries. Median income for the city's residents was $35,351, and only 6.8% of Havelock's families were considered below poverty level.

## *VI. CITY OF NEW BERN*

### *A. Location*

The City of New Bern, the county seat, is located at the confluence of the Trent and Neuse Rivers in the central portion of Craven County. NC Highways 55 and 43 as well as US Highways 17 and 70 intersect within and around the city's environs. The North Carolina Railroad and Norfolk Southern Railroad also intersect within the city. According to the US Census Bureau, the city has a total area of 27 square miles, of which 25.8 square miles of it is land area and 1.2 square miles of it is water area.

### *B. Demographic Summary*

#### 1. Population

The population of New Bern as reported in the 1990 US Census was 17,363, with a 33.1% increase occurring between 1990 and 2000, for a total 2000 population of 23,111. New Bern has the largest population of Craven County's municipalities. The North Carolina Office of State Planning estimated the 2007 population of New Bern to be 23,388, demonstrating a slight increase in population of 1.2% between the years 2000 and 2007. The population is also considered to be aging slightly, since the median age as reported in the 1990 US Census was 34.7 years, and the median age as reported in the 2000 US Census was 38.9 years. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects only a slight increase for New Bern's 2012 population, which it estimates at 23,798 persons.

#### 2. Housing

The occupancy rate of New Bern's housing units is relatively high – 90.2% (10,006) of the city's housing units are occupied, with 9.8% (1,088 units) being vacant, as reported in the 2000 Census. Fifty of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, 5,651 units, or only 56.5%, are owner-occupied, and 4,355, or 43.5% of the units, are renter-occupied. The number of housing units (11,094) has increased from the 1990 Census reported figure of 9,652.

#### 3. Economy

The 2000 Census reported that the majority of New Bern's workers were employed in the educational, health and social services (23.1%); manufacturing (14.9%); and the retail trade (12.5%) industries. Median income for New Bern's residents was $29,139, and 14.7% of New Bern's families were considered below poverty level.

## *VII. TOWN OF RIVER BEND*

### *A. Location*

The Town of River Bend is located approximately three miles southwest of New Bern and is bordered by the Trent River on the south , a navigable canal system on the east, and US Highway 70 to the north. According to the US Census Bureau, the town has a total area of 2.8 square miles, of which 2.5 square miles of it is land and 0.2 square mile of it is water.

### *B. Demographic Summary*

#### 1. Population

The population of River Bend as reported in the 1990 US Census was 2,408, with a sizable 21.4% increase occurring between 1990 and 2000, for a total 2000 population of 2,923. The North Carolina Office of State Planning estimated the 2007 population of the town to be 2,790, demonstrating a decrease in population of 4.6% between the years 2000 and 2007. The population is also considered to be aging, since the median age as reported in the 1990 US Census was 51.3 years, and the median age as reported in the 2000 US Census was 56.7 years. River Bend's reported median age is the "oldest" of all of Craven County's municipalities. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects only a slight decrease for River Bend's 2012 population, which it estimates at 2,746 persons.

#### 2. Housing

The occupancy rate of River Bend's housing units is relatively high – 90.9% (1,343) of the town's housing units are occupied, with 9.1% (134 units) being vacant, as reported in the 2000 Census. Only sixteen of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, 1,120 units, or 83.4%, are owner-occupied, and only 223, or 16.6% of the units, are renter-occupied. The number of housing units (1,477) has increased substantially (over one-fourth) from the 1990 Census reported figure of 1,172.

#### 3. Economy

The 2000 Census reported that the majority of River Bend's workers were employed in the educational, health and social services (22.9%), and the retail trade (12.1%) industries. Median income for River Bend's residents was $49,851, and only 0.4% of River Bend's families were considered below poverty level, the lowest percentage of the county's municipalities.

## *VIII. TOWN OF TRENT WOODS*

### *A. Location*

The Town of Trent Woods is located adjacent to and southwest of the City of New Bern along the northern banks of the Trent River. US 17 runs in an east-west direction north of Town. According to the US Census Bureau, the town has a total area of 3.4 square miles, of which 2.9 square miles of it is land and 0.5 square mile of it is water.

### *B. Demographic Summary*

#### 1. Population

The population of Trent Woods as reported in the 1990 US Census was 2,366, with an 78.5% increase occurring between 1990 and 2000, for a total 2000 population of 4,224. The North Carolina Office of State Planning estimated the 2007 population of Trent Woods to be 4,192, demonstrating a decrease in population of 0.8% between the years 2000 and 2007. The population is also considered to be aging somewhat, since the median age as reported in the 1990 US Census was 39.9 years, and the median age as reported in the 2000 US Census was 46.6 years. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects a continuing declining trend in population for Trent Woods' 2012 population, which it estimates at 3,690 persons.

#### 2. Housing

The occupancy rate of Trent Woods' housing units is high – 97% (1,692) of the town's housing units are occupied, with only 3% (52 units) being vacant, as reported in the 2000 Census. The town's housing vacancy rate is the lowest of the county's municipalities. Only three of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, 1,590 units, or a substantial 94%, are owner-occupied, and only 102, or 6% of the units, are renter-occupied. Trent Woods has the lowest percentage of rental units of the county's municipalities. The number of housing units (1,744) has increased significantly from the 1990 Census reported figure of 1,431.

#### 3. Economy

The 2000 Census reported that the majority of Trent Woods' workers were employed in the educational, health, and social services (33.8%); retail trade (12.0%); and the professional, scientific, management, administrative, and waste management services (10.8%) industries. Median income for Trent Woods' residents was $63,482 (the highest figure of Craven County's municipalities), and only 1.4% of Trent Woods' families were considered below poverty level.

## *IX. TOWN OF VANCEBORO*

### *A. Location*

The Town of Vanceboro is located in northern Craven County, about 14 miles northwest of New Bern. US Highway 17, NC Highways 43 and 118, and the Norfolk Southern Railroad intersect within and around the town's environs. According to the US Census Bureau, the town has a total area of 1.7 square miles, all of it land.

### *B. Demographic Summary*

#### 1. Population

The population of Vanceboro as reported in the 1990 US Census was 946, with a 5.1% decrease occurring between 1990 and 2000, for a total 2000 population of 898. The North Carolina Office of State Planning estimated the 2007 population of Vanceboro to be 875, demonstrating a slight decrease in population of 2.6% between the years 2000 and 2007. The population is also considered to be aging only slightly, since the median age as reported in the 1990 US Census was 32.6 years, and the median age as reported in the 2000 US Census was 33.8 years. See Table 2 in Section I.E for detailed population data. The NC Office of State Planning projects only a slight decrease for Vanceboro's 2012 population, which it estimates at 871 persons.

#### 2. Housing

The occupancy rate of Vanceboro's housing units is relatively high – 88.7% (385) of the town's housing units are occupied, with 11.3% (49 units) being vacant, as reported in the 2000 Census. Only four of the vacant units are used for seasonal, recreational, or occasional use. Of the occupied units, 241 units, or 62.6%, are owner-occupied, and 144, or 37.4% of the units, are renter-occupied. The number of housing units (434) has increased slightly from the 1990 Census reported figure of 418.

#### 3. Economy

The 2000 Census reported that the majority of Vanceboro's workers were employed in the manufacturing (20.3%); educational, health, and social services (18.1%); and the retail trade (11.7%) industries. Median income for Vanceboro's residents was $30,655, and 16.5% of Vanceboro's families were considered below poverty level.

# SECTION 3. IDENTIFICATION OF POTENTIAL NATURAL HAZARDS

## A. Introduction

As part of Craven County's hazard mitigation efforts and the preparation of this plan update, the county will need to decide on which specific hazards it should focus its attention and resources. This section of the HMP update identifies and analyzes the hazards facing Craven County and its constituent jurisdictions by answering the following questions:

1. What are the *types* of natural hazards that threaten the community?
2. What are the *characteristics* of each hazard?
3. What is the *likelihood* of occurrence (or probability) of each hazard?
4. What is the likely *magnitude* of the potential hazards?
5. What are the possible *impacts* of the hazards on the community?

The following section identifies each hazard that poses an elevated threat to Craven County. A rating system that evaluates the potential for occurrence for each identified threat is provided (see Table 16). The following natural hazards were determined to be of concern for Craven County and its municipalities:

1. Wildfire
2. Flooding
3. Severe Winter Storms
4. Severe Thunderstorms and Windstorms
5. Tornadoes
6. Hurricanes and Nor'easters
7. Dam/Levee Failure
8. Tsunami
9. Estuarine Erosion
10. Drought

A detailed explanation of these hazards and how they have impacted Craven County is provided on the following pages. The weather history summaries provided throughout this discussion have been compiled from the National Oceanic and Atmospheric Administration (NOAA) as provided through the National Climatic Data Center (NCDC). The NCDC compiles monthly reports that track weather events and any financial or life loss associated with a given occurrence. These reports are compiled and stored in an online database that is organized by state and county for the entire United States.

The tables presented within this section as well as Appendix E are the results of this research. Please note that the individual likelihood of occurrence tables included in the 2004 Hazard Mitigation Plan have been removed from each section and are provided in Section 3.O as one table summarizing all hazards affecting the County.

### *B. Explanation of Hazard Identification*

The following table provides an overview of all hazards identified in this HMP update along with a brief description of why and how the hazard was identified.

**Table 10. Explanation of Hazards Identified**

| Hazard | How Identified | Why Identified |
|---|---|---|
| Wildfires | Large undeveloped areas of Craven County contain remote heavily wooded areas that provide large amounts of materials which frequently cause fires. | Historical records indicate particular areas of Craven County are consistently subject to the effects of wildfires. |
| Flooding | Using historical events and information from FIRM flood maps, a number of areas within Craven County have been identified as flood-prone areas. | The presence of numerous creeks and rivers, exposure to the Pamlico Sound, as well as localized drainage concerns, give rise to the possibility of flooding events. |
| Severe Winter Storms | Historical meteorological data indicates that Craven County almost annually receives a significant amount of snow, sleet, and freezing rain. | The effects of winter storms on the limited availability of electricity for warmth, and of potable water for drinking and cooking during and after such events, could have devastating impacts on the citizens of Craven County. |
| Severe Thunderstorms | Throughout the summer and spring months, afternoon thunderstorms appear on a fairly regular basis. | Airflow patterns and the long-term predictability of severe thunderstorms make these events sudden and often devastating to Craven County. |
| Tornadoes | This type of meteorological phenomenon most often occurs with the presence of severe thunderstorms. With the frequency of such storms, tornadoes should always be considered a factor. | As with thunderstorms, the unpredictability and sudden onset of tornadic activity often leads to devastating effects on Craven County. |

| Hazard | How Identified | Why Identified |
|---|---|---|
| Hurricanes/ Nor'easters | Recent historical events (1996, 1999, and 2003) and existing meteorological data reflect the vulnerability of Craven County to hurricanes | Hurricanes, high winds, and inland flooding associated with these types of storms have had catastrophic impacts on the County historically, including events in 1996 (Hurricane Fran), 1999 (Hurricane Floyd), and 2003 (Hurricane Isabel) |
| Dam Failure | State Dam Safety Office records were consulted and reviewed. | Although the risks of occurrence and damages are minimal, some damages would occur in the County in the case of a dam failure. |
| Tsunamis | National Geophysical Data Center Research. | Although the risk of tsunami occurrence and damage in Craven County is very low, the impacts could be physically and economically catastrophic if they were to occur. |
| Drought | National Oceanic and Atmospheric Administration; North Carolina Drought Management Advisory Council | Although drought effects have not been significant in the past, population growth and continued water resource depletion suggest that this issue is worth monitoring. |

### *C. Wildfire*

A wildfire is an uncontrolled burning of grasslands, brush, or woodlands. The potential for wildfire depends upon surface fuel characteristics, recent climate conditions, current meteorological conditions, and fire behavior. Hot, dry summers and dry vegetation increase susceptibility to fire in the fall, a particularly dangerous time of year for wildfire.

The potential for a major fire hazard depends on the characteristics of the fuel, the climate, and fire behavior. While natural fires occur in any area in which there is vegetation, flammability varies by species, moisture content, and is influenced by the climate. Temperate, primarily deciduous forests, such as those in North Carolina, are most vulnerable to fire in autumn, when the foliage dries out. Grasses are least prone to ignition in the morning, when their moisture content is greatest.

According to *Forest Statistics for North Carolina, 2002*, published by the North Carolina Division of Forest Resources, 291,600 acres of the County's total acreage of 448,941 acres are in forestland. This represents approximately 65.5% of the County's land area.

Overall, 205,200 acres of the total 291,600 acres of forestlands in the County (approximately 70%) are in private ownership and as such are quite susceptible to development. The remaining forested acreage in the County is in ownership of the Federal, State or county/municipal governments, primarily that of the Federal government (48,600 acres of the Croatan National Forest and forested land on military installations in the County).

Almost annually, wildfires erupt throughout the region. On average, for the period between 1995 and 2000, Craven County experienced 23.6 wildfires per year. Debris fires, incendiary (i.e., intentionally lit) fires, and fires started by children accounted for over three quarters of annual fires during this period (19 per year). As population densities spread out into heavily forested areas, citizens and private property increasingly become more susceptible to the effects of wildfires. In 2008, there were a total of 52 wildfires with debris fires, incendiary fires, and fires started by children, accounting for approximately 90% (see Figure 1).

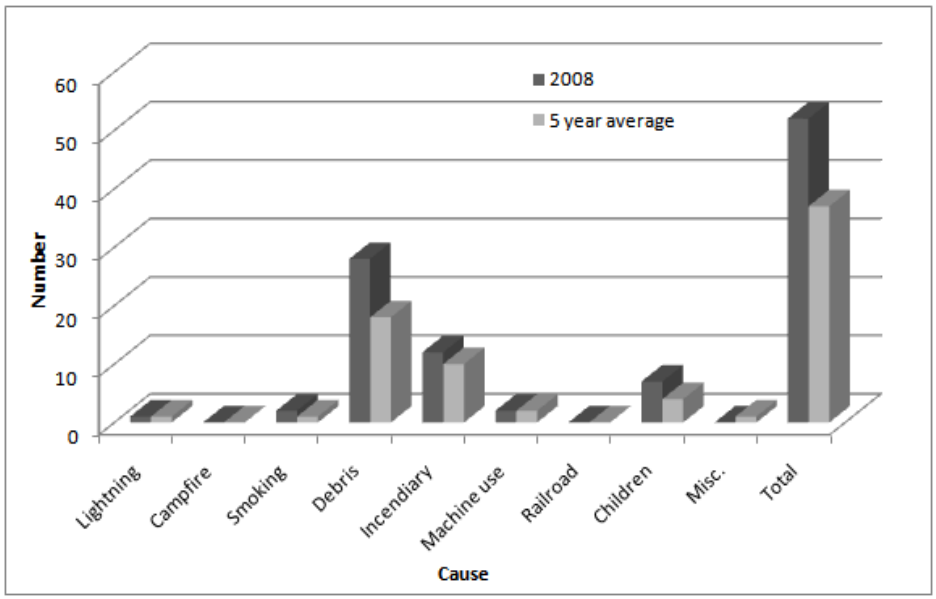



**Figure 1. Causes of Wildfires in Craven County - Year 2008 and Five Year Average**
*Source: NC Division of Forest Resources*

Although the incorporated government jurisdictions in Craven County have significantly less forestland within their corporate limits and extraterritorial jurisdictions (ETJs) than in the unincorporated County, the municipal governments' boundaries exist at the "urban/wildland interface" – the area where human development meets undeveloped, forested areas that provide fuel for fires. This "urban/wildland interface" presents the greatest risk to life and property from wildfires.

Overall, and with exceptions of large privately held tracts such as those owned by Weyerhauser and its subsidiaries and those held by the Federal government, the risk of wildfire damages in Craven County is mitigated by the fact that forested tracts are generally of manageable size,

accessible to fire fighting equipment and personnel, and circumscribed by roadways or waterways that limit the extent and severity of wildfires.

*D. Flooding*

Craven County is located at the confluence of the Neuse River with Pamlico Sound, and combined with the flat topography of the County, makes the County extremely susceptible to flooding. There are several different types of flooding which have various levels of potential for affecting Craven County. These types of flooding are as follows:

1. Riverine Flooding: This is the most common type of flooding. This occurs when a river or streams overflows its banks. In large rivers, it usually occurs after a serious, large-scale weather event. In streams, this can occur from more localized weather systems.

2. Flash Floods: Flash floods typically encompass a quick rise of high velocity water and large amounts of debris. Factors that contribute to flash flooding include the length and intensity of rain and the steepness of watershed and stream gradients. Other factors influencing flash floods include the amount of watershed vegetation, natural and artificial water storage, and the configuration of the streambed and floodplain. Flash floods not only occur from weather systems, but also from a dam failure, or breakup of ice. This type of flood poses the most risk to property and lives. Because of the rapid rise of the water levels, a large percentage of flood deaths occur from motorists who underestimate the depth and velocity of the floodwaters and attempt to cross flooded areas. This typically occurs when a weather event quickly drops an extensive amount of water. Walls of water from this type of event can reach 15 to 20 feet.

3. Dam Break Floods: Results from structural failures of dams.

4. Local Drainage or High Groundwater Levels: Heavy precipitation from local weather events may produce flooding outside of delineated flood plains. If the local soil cannot handle precipitation through infiltration and runoff, the water may accumulate. During winter, frozen ground and accumulated snow will contribute to this problem. This type of flooding generally occurs in flat and urban areas. High groundwater levels may cause leakage in susceptible basements.

5. Fluctuating Lake Levels: Lake levels can change over a short period of time, over a season, or on a long-term basis. Heavy rain or snow can influence levels. All lakes are susceptible to changes in water level, but the problem seems to occur most often in lakes that are landlocked or have inadequate outlets for maintaining a balance between in and outflow. These types of lakes can fluctuate from 5 to 15 feet over an extended period of time.

6. Coastal Flooding: Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall. These conditions are produced by hurricanes during the summer and fall, and nor'easters and other large coastal storms during the winter and spring. Storm surges may overrun barrier islands and push sea water up coastal rivers and inlets, blocking the downstream flow of inland runoff. Thousands of acres of crops and forestlands may be inundated by both saltwater and freshwater. Escape routes may be cut off quickly, stranding residents in flooded areas and hampering rescue efforts.

Craven County and a number of the municipal jurisdictions within the County administer local ordinances which regulate development within designated flood areas. The County also participates in the National Flood Insurance Program which rates areas in the County in regard to susceptibility of flooding.

The dominant sources of flooding in Craven County are storm surge and riverine flooding. Storm surge from the Atlantic Ocean propagates into Pamlico Sound, which further propagates into Neuse River and Trent River; riverine flooding from heavy rainfall occurs on Brice's Creek, Clubfoot Creek, Maple Cypress, Mauls Swamp, Mills Branch, Mills Branch Tributary, Mosley Creek, Mosley Creek Tributary, Samuels Creek/Rocky Run, Scotts Creek, Snake Swamp, Swift Creek, Tucker Creek, Village Creek, and Wilson Creek. Not all storms which pass close to Craven County produce extremely high surge. Similarly, storms which produce flooding conditions in one area may not necessarily produce flooding conditions in other parts of the county. However, the areas identified above are the most likely to experience flooding during storm events.

Approximately 23% of the county's land area is located in the 100-year floodplain, which is 9 feet above MSL in most impacted areas, according to the county's most recent approved (2004) FIRM maps (updated FIRM maps are currently under review by the County and municipal officials). Historically, the county's most significant residential flood damage has occurred in two flood damage impact areas. These areas were identified by the county following Hurricanes Bertha and Fran. One area is located along Brice's Creek (a tributary of the Trent River), adjacent to the southern city limit of New Bern. This area includes 130 residential structures. The other area is located along the eastern side of the Neuse River immediately south of the Town of Bridgeton (Woodrow area). This area includes 76 residential structures. The ground elevations in these two areas range from 3-8 feet above the NGVD.

From 1995 to 2000, the County suffered nine (9) documented flooding events reported to the National Climatic Data Center (NCDC), an average of over one (1) flooding event per year. This list is not exhaustive, but rather represents the best available historical data source on inland flooding and excludes events that were strictly storm surge related events (see Appendix E for a full listing of hazard events).

Major historical flooding was experienced in September, 1928; October, 1929; September, 1945; and after Hurricane Fran in September, 1996; and Hurricane Floyd in September, 1999. Since the adoption of the County's 2004 Multi-Jurisdictional Hazard Mitigation Plan, the County has experienced several flooding events. Table 11 provides a summary of these events.

**Table 11. Craven County Flooding Events, 2004-2009**

| Location | Date | Type | Death | Property Damage |
|---|---|---|---|---|
| County | 2/27/2004 | Storm Surge | 0 | 0K |
| Havelock | 7/11/2004 | Flash Flood | 0 | 0K |
| County | 8/3/2004 | Flash Flood | 0 | 0K |
| County | 4/15/2005 | Storm Surge | 0 | 90K |
| County | 5/6/2005 | Storm Surge | 0 | 0K |
| County | 10/7/2005 | Flood | 0 | 50K |
| County | 11/21/2006 | Coastal Flood | 0 | 0K |
| James City | 4/15/2007 | Flood | 0 | 0K |
| County | 5/7/2007 | Coastal Flood | 0 | 0K |
| Cherry Point Usnr | 7/10/2007 | Flood | 0 | 0K |
| County | 9/24/2008 | Coastal Flood | 0 | 5K |
| Havelock | 6/12/2009 | Flood | 1 | 1K |
| Havelock | 8/12/2009 | Flood | 0 | 50K |

*Source: National Oceanic and Atmospheric Administration.*

## *E. Severe Winter Storms*

Severe winter storms display themselves in a wide variety of ways including heavy snow, blizzards, freezing rain, ice pellets, and extreme cold. Severe winter storms are extra-tropical cyclones fueled by strong temperature gradients and an active upper-level jet stream. The storms that hit North Carolina usually form in the Gulf of Mexico or off the southeast Atlantic Coast. In North Carolina, very few of these result in a blizzard.

Craven County lies within a region that is very unlikely to be hit with severe blizzard conditions (i.e., high winds with blowing snow), but is subject to freezing rain, icing, and heavy snowfall conditions. Essentially stated, problems occur when a winter storm event exceeds the average annual snowfall total of 0.5 inches of snow in a single event or when icing occurs. When such events occur, they can and often time do produce numerous negative impacts upon the transportation network, power transmission facilities, communications facilities, agricultural commodities, and the health of citizens.

Snow and ice storms are common, with nine (9) reported incidents recorded from 1996 to 2003, an average of over one (1) significant snow and/or ice event per year. Since the adoption of the County's 2004 Multi-Jurisdictional Hazard Mitigation Plan, there have been eight (8) reported incidents of severe winter weather. There were no reported deaths, injuries, or damages as a result of these events (see Appendix E for a full listing of hazard events).

### *F. Severe Thunderstorms and Windstorms*

Thunderstorms are underrated in terms of the damage, injury, and death they can bring. Lightning precedes thunder, because lightning causes thunder. As lightning moves through the atmosphere, it can generate temperatures of up to 54,000 degrees Fahrenheit. This intense heating generates shockwaves which turn into sound waves, thus generating thunder.

Warm, humid conditions encourage thunderstorms as the warm, wet air updrafts into the storm. As warm, moisture rich air rises, it forms cumulus nimbus clouds, or thunderstorm clouds, usually with a flattened top or an anvil shape, reaching to altitudes of over 40,000 feet. If this air is unstable, the conditions are favorable to cause hail, damaging winds, and tornadoes.

Damage to property from direct or indirect lightning can take the form of an explosion or a burn. Damage to property has increased over the last 35 years. This is probably due to increased population. The National Weather Service recorded 19,814 incidents of property damage between 1959 and 1994. Yearly losses are estimated at $35 million by the National Weather Service. This amount is compiled from newspaper reports, but many strikes are not reported. Lightning causes an average of between 55 to 60 fatalities and 300 injuries each year. Between 1995 and 2008, there were 648 fatalities in the United States attributed to lightning strikes. The National Lightning Safety Institute estimates United States lightning costs and losses between $5 and $6 billion per year . This information is compiled from insurance reports and other sources that keep track of weather damages.

Thunderstorm winds also cause widespread damage and death. Thunderstorm 'straight line' wind occurs when rain-cooled air descends with accompanying precipitation. According to the National Weather Service, a severe thunderstorm is a thunderstorm which produces tornadoes,

hail 0.75 inches or more in diameter, or winds greater than 58 mph. At the very extreme, winds of 160 mph have been recorded. These winds can smash buildings and uproot and snap trees, and are often mistaken for tornadoes.

'Downbursts' are often spawned during thunderstorms. Downbursts are excessive bursts of wind that are sometimes mistaken for tornadic activity. These are defined as a surface wind in excess of 125 mph, which are caused by small scale downdrafts from the base of a convective cloud. A downburst occurs when rain-cooled air within a convective cloud becomes heavier than its surroundings. Since cool air is heavier than warm air, it rushes toward the ground with a destructive force. Exactly what triggers the sudden downward rush is still unknown.

Downbursts appear to strike at a central point and blow outward (picture a bucket of water dashed against grass). If it hits directly straight, the grass will be flattened in a circular pattern. If it hits at an angle, the grass will be flattened in a teardrop pattern. Downbursts resulted in 268 deaths and 8 related accidents between 1974 and 1982.

Downbursts can be further classified into two categories:

1. Microburst: Less than 2 ½ miles wide at the surface, duration less than 5 minutes and winds up to 146 miles per hour.

2. Macroburst: Greater than 2 ½ miles wide at the surface, duration of 5-30 minutes with winds up to 117 miles per hour.

Craven County is highly susceptible to thunderstorms and windstorms, suffering 87 significant events from 1959 to 2003, an average of over two (2) significant events per year. Very conservatively estimated, these storms have caused $1 million in reported crop damages and $167,000 in property damages countywide. Since the adoption of the County's 2004 Multi-Jurisdictional Hazard Mitigation Plan, there have been 26 thunderstorms/ wind events, two (2) lightning strikes, and 62 hail storms resulting in $201,000 in property damages countywide (see Appendix E for a full listing of hazard events).

*G. Tornadoes*

Tornadoes are produced during severe thunderstorms, which are created near the convergence zone between warm, moist air and cold, dry air. Tornadoes derive their energy from the heat contained in warm, moist air masses. Tornadoes do not form during every thunderstorm. They occur when the warm, moist air is trapped beneath a stable layer of cold, dry air by an intervening layer of warm dry air. This effect is called an inversion. If this inversion is disturbed, the moist air will push through the stable air that is holding it down. This warm air

will then condense as the latent heat it holds is released. The air will then spiral upwards. With the help of different types of winds, this spiral gains speed, producing a tornado.

The path of a tornado is generally less then 0.6 mile wide. The length of the path can range from a few hundred yards to dozens of miles. A tornado will rarely lasts longer then 30 minutes. The combinations of conditions that cause tornadoes are common across the southern U.S. in early spring, especially in April and May. Tornadoes have been reported lifting and moving objects weighing more than 300 tons up to 30 feet in the air. They can also lift homes off their foundations and move them 300 feet. They collect an incredible amount of debris, which then can be projected outward at high velocities. Typically, tornadoes are accompanied by heavy rain.

The National Weather Service issues a tornado watch for a specific geographic area when conditions favor tornadic activity. A tornado warning is issued when a tornado has actually been sighted or indicated by weather radar. The intensity, path length, and width of tornadoes are rated according to a scale originally developed by T. Theodore Fujita and Allen D. Pearson in 1971. At the time Fujita derived the scale, little information was available on damage caused by wind, so the original scale presented little more than educated guesses at wind speed ranges for specific tiers of damage. Further research suggested that wind speeds for strong tornadoes on the Fujita scale were greatly overestimated, and on February 1, 2007, the Fujita scale was decommissioned (in the US only) in favor of what scientists believe is a more accurate Enhanced Fujita Scale. The EF Scale is thought to improve on the F-scale on many counts – it accounts for different degrees of damage that occur with different types of structures, both man-made and natural. The expanded and refined damage indicators and degrees of damage standardize what was somewhat ambiguous. It also is thought to provide a much better estimate for wind speeds, and sets no upper limit on the wind speeds for the strongest level, EF5. The Enhanced Fujita Scale is provided in Table 12.

**Table 12. Enhanced Fujita Tornado Scale**

| Category | Wind Speed | Equivalent Saffir-Simpson Scale | Potential Damage |
|---|---|---|---|
| EF0 | 65-85 mph | N/A | Light Damage: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. |
| EF1 | 86-110 mph | Cat 1/2/3 | Moderate Damage: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken. |
| EF2 | 111-135 mph | Cat 3/4/5 | Considerable Damage: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground. |

| Category | Wind Speed | Equivalent Saffir-Simpson Scale | Potential Damage |
|---|---|---|---|
| EF3 | 136-165 mph | Cat 5 | Severe Damage: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance. |
| EF4 | 166-200 mph | Cat 5 | Devastating Damage: Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated. |
| EF5 | >200 mph | N/A | Explosive Damage: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 feet; steel reinforced concrete structures badly damaged; high-rise buildings have significant structural deformation. |

*Source: National Oceanic and Atmospheric Administration.*

A total of 23 tornado events have been documented by the National Climatic Data Center in Craven County from 1965 to 2003 (an average of one event every 1.5 years) resulting in 41 injuries and approximately $4 million in property damage. Since the adoption of the County's 2004 Multi-Jurisdictional Hazard Mitigation Plan, there have been seven (7) tornadoes resulting in $10,000 in property damages (see Appendix E for a full listing of hazard events). In conclusion, tornadoes represent a significant threat to Craven County primarily due to their relative frequency and large impact.

### *H. Hurricanes and Nor'easters*

Hurricanes are cyclonic storms that originate in tropical ocean waters poleward of about 50 degrees North latitude. Basically, hurricanes are heat engines, fueled by the release of latent heat from the condensation of warm water. Their formation requires a low pressure disturbance, sufficiently warm sea surface temperature, rotational force from the spinning of the Earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere.

Hurricanes that impact North Carolina form in the so-called Atlantic Basin, from the west coast of Africa westward into the Caribbean Sea and Gulf of Mexico. Hurricanes in this basin generally form between June 1 and November 30, with a peak around mid-September. As a hurricane develops, barometric pressure at its center falls and winds increase. Winds at or exceeding 39 mph result in the formation of a tropical storm, which is given a name and closely monitored by the NOAA National Hurricane Center in Miami, Florida. When winds are at or exceed 74 mph, the tropical storm is deemed a hurricane.

Because hurricanes derive their strength from warm ocean waters, they are generally subject to deterioration once they make landfall. The forward momentum of a hurricane can vary from just a few miles per hour to up to 40 mph. This forward motion, combined with a counterclockwise surface flow make the right front quadrant of the hurricane the location of the most potentially damaging winds.

Hurricane intensity is measured using the Saffir-Simpson Scale, ranging from 1 (minimal) to 5 (catastrophic). The following scale categorizes hurricane intensity linearly based upon maximum sustained winds, minimum barometric pressure, and storm surge potential.

- ***Category 1***. Winds of 74 to 95 miles per hour. Damage primarily to shrubbery, trees, foliage, and unanchored mobile homes. No appreciable wind damage to other structures. Some damage to poorly constructed signs. Storm surge possibly 3 to 5 feet above normal. Low-lying roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.

- ***Category 2***. Winds of 96 to 110 miles per hour. Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roof materials of buildings; some window and door damage. No major wind damage to buildings. Storm surge possibly 6 to 8 feet above normal. Coastal roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.

- ***Category 3***. Winds of 111 to 130 miles per hour. Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. Storm surge possibly 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.

- ***Category 4***. Winds of 131 to 155 miles per hour. Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows, and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. Storm surge possibly 13 to 18 feet above normal. Major damage to lower floors of structures near shore due to flooding and battering by waves

and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major erosion of beaches.

- ***Category 5***. Winds greater than 155 miles per hour. Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Storm surge possibly greater than 18 feet above normal. Major damage to lower floors of all structures less than 15 feet above sea level. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.

North Carolina has had an extensive hurricane history dating back to colonial times. During the nineteenth century, storms occurred in 1837, 1846, 1856, 1879, 1883, and 1899. Between 1960 - 1990, there was a decrease in landfalling hurricanes, with the exception of Hurricane Donna in 1960. However, during the 1950s, North Carolina was ravaged by several hurricanes, including Hazel, Connie, Diane, and Ione. Recent history has included several hurricanes as well, with Hugo (1989), Emily (1993), Opal (1995), Bertha (1996), Fran (1996), Bonnie (1998), Dennis (1999), Floyd (1999), and Isabel (2003) all leaving their mark on North Carolina. However, these storms had varying impacts on Craven County (see Table 13).

**Table 13. Recorded Hurricanes in Craven County, 1913 - 2003**

| Date | Event Name | Damages/indirect costs |
|---|---|---|
| September 3, 1913 | | 10 ft. flood elevation; major property damage |
| September 16, 1933 | | 7.5 ft. flood elevation; major property damage |
| October 15, 1954 | Hazel | 7.0 ft. flood elevation; moderate property damage |
| August 12, 1955 | Connie | 6.4 ft. flood elevation; minor property damage |
| August 17, 1955 | Diane | 7.7 ft. flood elevation; major property damage |
| September 19, 1955 | Ione | 7.8 ft. flood elevation; major property damage |
| September 11-12, 1960 | Donna | 6.5 ft. flood elevation; minor property damage |
| September, 1984 | Diana | 6.5 ft. flood elevation; minor property damage |
| July 12-13, 1996 | Bertha | 7.5 ft. flood elevation; moderate property damage |
| September 6, 1996 | Fran | 9.0 ft. flood elevation, major property damage |
| October 7, 1996 | Josephine | flash flooding; minor property damage |
| August 30, 1999 | Dennis | 3.0 ft. flood elevation; minor property damage |
| September 14, 1999 | Floyd | flash flooding; major property damage |
| September 23, 2003 | Isabel | flash flooding; major property damage |

*Source: National Oceanic and Atmospheric Administration.*

Nor'easters share many of the same characteristics of hurricanes, but unlike hurricanes, these storms are extratropical, deriving their strength from horizontal gradients in temperature. The presence of the warm Gulf Stream waters off the eastern seaboard during the winter acts to dramatically increase surface horizontal temperature gradients within the coastal zone. During winter offshore cold periods, these horizontal temperature gradients can result in rapid and intense destabilization of the atmosphere directly above and shoreward of the Gulf Stream. This period of instability often precedes wintertime coastal extratropical cyclone development.

It is the temperature structure of the continental air mass and the position of the temperature gradient along the Gulf Stream that drives this cyclone development. As a low pressure deepens, winds and waves can uninhibitedly increase and cause serious damage to coastal areas as the storm generally moves to the northeast. The proximity of North Carolina's coast to the Gulf Stream makes it particularly prone to nor'easters.

One of the most significant effects of hurricanes/nor'easters in low-lying areas of Craven County is storm surge. Storm surge represents the greatest potential for loss of life related to a hurricane or nor'easter. Storm surge is simply water that is pushed toward the shore by the force of the winds swirling around the storm. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level 15 feet or more.

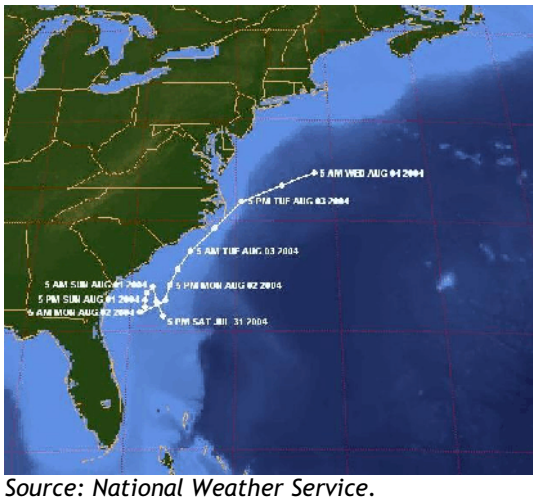
In addition, wind waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides. The potential damages from storm surge in Craven County are discussed in more detail in Section 6 of this plan.

North Carolina's geographic location on the Atlantic Ocean, and its proximity to the Gulf Stream, makes it prone to hurricanes/nor'easters. In fact, North Carolina has experienced the fourth greatest number of hurricane landfalls of any state in the twentieth century (trailing Florida, Texas, and Louisiana). Craven County is located in the coastal plain of North Carolina. The geographic location of the county to the coast greatly increases the likelihood of occurrence for hurricanes. The following provides a brief description of several hurricanes which have had a significant impact on the County since adoption of the 2004 Craven County Multi-Jurisdictional Hazard Mitigation Plan.

1. Hurricane Alex (July 31 to August 6, 2004)

Hurricane Alex, a Category 2 storm with 100 mph sustained winds, brushed the Outer Banks of North Carolina during the late morning to early afternoon hours on August 3rd. The most significant impacts occurred along the Outer Banks from Ocracoke to Buxton where winds gusted to near 100 mph and soundside flooding was estimated between 4 to

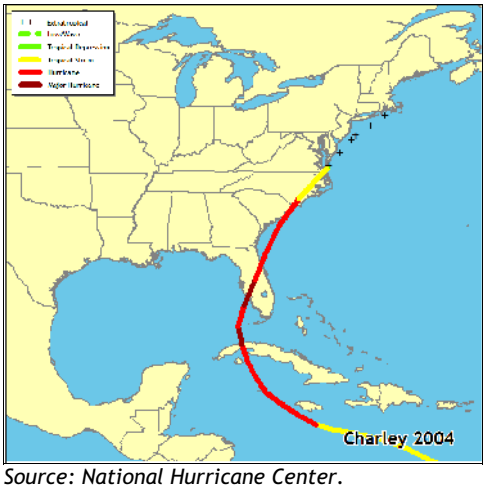
6 feet. Storm surge along the coast, along the lower reaches of the Neuse and Pamlico Rivers, and across other counties adjacent to the Pamlico and Albemarle Sounds were estimated at 1 to 3 feet where no significant damage occurred. Four to eight inches of rainfall was estimated across eastern Craven and Carteret counties extending northeast and including Dare and Hyde counties. Freshwater flooding was reported across Craven and Carteret counties.



*Source: National Weather Service.*

2. Hurricane/Tropical Storm Charley (August 13 to 15, 2004)

Hurricane Charley initially made landfall on the west coast of Florida between Fort Myers and Tampa as a Category 4 hurricane. The storm crossed Florida, and exited the coast as a Category 1 storm. It continued northeast and made landfall again near Cape Romain as a weak Category 1 hurricane with sustained winds at 75 mph. It moved up the coast and then inland around Myrtle Beach. In Horry and Georgetown counties, insurance claims totaled $5 million, mostly along the Grand Strand. There were downed trees, roof damage, and flooding along the coast in this area.

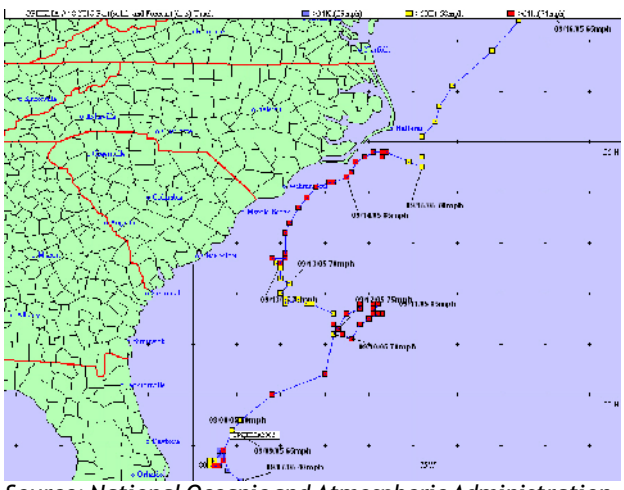



*Source: National Hurricane Center.*

As a weakened tropical storm, Charley moved northeast across the coastal plains of eastern North Carolina during the afternoon hours on August 14th. Onslow County received the most damage, with estimates over $5 million, as winds gusted to near hurricane force, toppling trees and power lines with structural damage to homes and businesses. Water levels rose up to two feet across the lower reaches of the Neuse and Pamlico Rivers, and across the Outer Banks. Storm total rainfall, estimated between 4 to 6 inches, occurred across a large part of the area resulting in freshwater flooding in seven counties across the coastal plains.

3. Hurricane Ophelia (September 6 to 23, 2005)

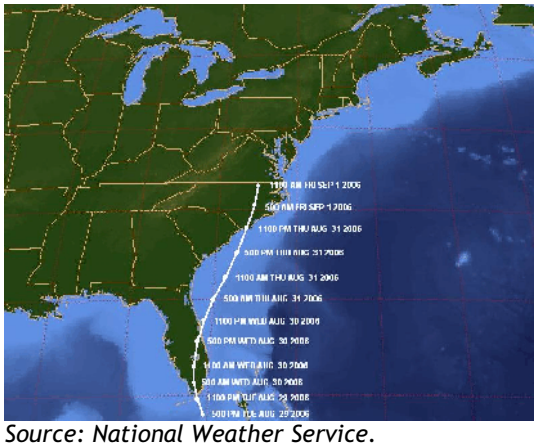
Category 1 Hurricane Ophelia, with maximum sustained winds of 85 mph, approached the North Carolina coast on September 13th. The hurricane remained offshore brushing the southern coastal counties of Onslow and Carteret on the 14th and 15th. Highest winds and damages occurred across this area where winds gusted to near 100 mph, and storm surges of up to six feet resulted in structural damages totaling near $35 million. The highest surge was reported along the lower reaches of the Neuse River in southern Craven County where water levels rose to eight feet, during the night of the 14th. Ophelia brushed by Outer Banks Hyde and Dare counties on the 16th with hurricane force wind gusts, primarily across coastal Hyde County where minor flooding and structural damage occurred. Minor wind damage occurred across the inland counties of Duplin, Jones, Lenoir, and Craven where tropical storm force wind gusts blew shingles off roofs, and downed trees and power lines. The combination of surge from Pamlico Sound and heavy storm total rainfall, from 4 to 9 inches, resulted in the flooding of streams, roads, and lower elevations in Beaufort, Carteret, Craven, Jones, Onslow, and Pamlico counties.



*Source: National Oceanic and Atmospheric Administration.*

4. Tropical Storm Ernesto (August 24 to September 1, 2006)

Tropical Storm Ernesto, with maximum sustained winds of 70 mph, made landfall on August 31st during the late evening hours. The strong tropical storm moved across the coastal plains region during the early morning hours of September 1st. In general, wind gusts ranged from 40 to 60 mph with the highest gusts near 70 mph along the coastal sections of Onslow County. Minor storm surge flooding and beach erosion occurred along the Onslow and Carteret County coastlines and the Neuse River. Storm total rainfall ranged from 4 inches to near 10 inches. This heavy rainfall resulted in extensive freshwater flooding and eventual river flooding across the area with some primary and many secondary roads flooded.



*Source: National Weather Service.*

5. Retired Names

Some hurricanes are so significant and have such a great impact on an area that the names are retired. The name of a hurricane may be retired if the country affected by the storm makes the request to the World Meteorological Organization (WMO). When the name is retired it may not be used again for at least ten years to avoid public confusion with other storms. Several of the hurricanes that affected Craven County were so destructive that their names were retired. The following is a list of those hurricanes: Hazel, Connie, Diane, Ione, Donna, Fran, Floyd, Isabel, and Charley.

*I. Dam/Levee Failure*

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. This term is roughly synonymous with the term "levee" and these terms will be used interchangeably in this document.

Dams provide tremendous benefits, including water supply for drinking, irrigation and industrial use, flood control, hydroelectric power, recreation, and navigation. At the same time, however, dams also represent a great risk to public safety, the environment and local and regional economies when they fail. Dam failure is the collapse, breach, or other failure of a dam resulting in downstream flooding. Historically, some of the largest disasters in the United States have resulted from dam failures. In 1889, 2,209 lives were lost when the South Fork Dam failed above Johnstown, Pennsylvania. The 1928 St. Francis Dam failure killed 450. During the 1970's, the failures of the Buffalo Creek Dam in West Virginia, Teton Dam in Idaho, and the Toccoa Falls Dam in Georgia collectively cost 175 lives and more than $1 billion in losses. Such dam failures as Silver Lake Dam in Michigan in 2003 ($100 million in damages and economic losses of $1 million per day) and the Big Bay Lake Dam in Mississippi in March 2004 (100 homes destroyed) are current reminders of the potential consequences of unsafe dams.

In 1994, the Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers (USACE) sponsored a National Inventory of Dams (NID) and, through working with State dam safety officials, assigned each dam a downstream hazard classification based on the potential for loss of life and damage to property should the dam fail. This NID is updated yearly by FEMA with USACE funds and the assistance of state regulators.

The three classifications of dams identified by the NID are "high hazard", "intermediate hazard" and "low hazard". High hazard dams are those dams whose failure would cause loss of human life and significant property damage. As of 2006, North Carolina has 1,148 "high hazard" dams – the largest number of "high hazard" dams in the United States. Another 764 dams in the state

are classified as "intermediate hazard", meaning that significant property damage would occur in the event of a dam failure.

Dams in North Carolina are regulated under the Dam Safety Law of 1967 (NCGS 143-215.24), which authorizes the implementation of a dam inspection and certification program in the interest of public health, safety and welfare. The dam inspection and certification program is administered by the Dam Safety Program (DSP) of the Division of Land Resources, NC Department of Environmental and Natural Resources (DENR). Each year the DSP performs about 2,000 inspections and identifies an average of 100 dams exhibiting conditions that could lead to failures. These dams are called "unsafe" dams, which mean that they have deficiencies which leave the dam susceptible to failure. Most "unsafe" dams are also "high hazard" dams.

Dams are dynamic structures that experience both internal and external changes in their conditions as they age. Old pipes deteriorate, and development in a watershed causes more runoff that can result in the overtopping of dams. Large storm events, such as hurricanes or severe thunderstorms, can overwhelm a dam's ability to function properly. For example, 40 dams failed in North Carolina following Hurricane Floyd in September of 1999 and over 100 dams overtopped, causing property damage and requiring evacuation of downstream areas to avoid injury and loss of life.

It does not take a hurricane, however, for a dam to fail. About six dams per year (on average) fail in North Carolina, for a variety of reasons. While engineering explanations, such as hydraulic, geotechnical, or structural conditions can answer the question of why dams fail, most dam failures occur because the owners of the dams do not have the financial means to address dam maintenance and repair. Repairs to dams are very costly, averaging $500,000 for required repairs to each dam classified as "unsafe." If financial resources were available to dam owners to perform repairs on dams, the risk of failure posed by these dams would be reduced. This need for financial resources is becoming more important, as the population of North Carolina has increased by approximately 20 percent in the past decade, resulting in more people living in areas that can be impacted by dam failures.

In conclusion, the growing number of dams, the aging of the dams, and the significant increase in population exposed to consequences of dam failure mean that the risk to citizens of North Carolina from dam failure is increasing.

Craven County's risk from dam failure remains fairly small, however, due to the relatively small number of major dams and the flat topography and wide floodplain areas in the County that would allow the impacts of a dam failure to be dispersed over a relatively wide area. As of August 2009, the North Carolina Dam Inventory lists only three dams in Craven County (see Table 14).

**Table 14. Dams In or Affecting Craven County**

| State ID Code | Dam Name | River or Stream | Dam Status | Hazard Potential |
|---|---|---|---|---|
| CRAVE-001 | Carolina Pines Pond Dam | Anderson Creek | Impounding | Low |
| CRAVE-002 | Mclawhorn Pond Dam | Trent River | Impounding | Low |
| CRAVE-003 | River Bluffs Dam | Neuse River | Exempt | Low |

Source: North Carolina Dam Inventory August 10, 2009, North Carolina Dam Safety Program.

### *J. Tsunami*

The phenomenon called a "tsunami" (soo-NAH-mee) is a series of waves of extremely long wave length and long period, generated in a body of water by an impulsive disturbance that displaces the water such as an earthquake, landslide, or sub-marine volcanic eruption. The term tsunami was adopted for general use in 1963 by an international scientific conference. Tsunami is a Japanese word represented by two characters: "tsu" and "nami". The character "tsu" means harbor, while the character "nami" means wave. In the past, tsunamis were often referred to as "tidal waves" by many English speaking people. The term "tidal wave" is a misnomer. Tides are the result of gravitational influences of the moon, sun, and planets. Tsunamis are not caused by the tides, nor are they related to the tides, though a tsunami striking a coastal area is influenced by the tide level at the time of impact. The scientific community once referred to tsunamis as "seismic sea waves". "Seismic" implies an earthquake-related mechanism of generation, which is often, but not always, the case.

Researchers at the Woods Hole Oceanographic Institute in Massachusetts made national headlines in the year 2000 when they discovered that cracks in the ocean floor could warn of an unpredictable disaster threatening the US East Coast. The cracks, a 25-mile-long series of roof shingle-shaped ridges located 300 to 600 feet below the ocean surface and just north of Cape Hatteras in North Carolina, may mean that a tsunami, a giant wave, could roar onshore without warning.

The cracks, located in the Mid-Atlantic Ocean, may cause the seabed to crumble, creating a submarine landslide, or "slump," to push huge masses of seawater toward the shore. The cracks were found near the edge of the continental shelf, where the land drops sharply, forming the continental slope. If land breaks off at the cracks, the slump would cascade down the slope, sucking down the sea surface behind it and creating a tsunami or even a series of tsunamis that would crash onto the Virginia and North Carolina Coasts 20 minutes later. The uncertainty of this risk, however, combined with the uncertainty of how far inland effects would be felt and the uncertainty of the science behind tsunami formation minimize this risk.

## *K. Estuarine Erosion*

Eroding shorelines in Craven County are common. In 1975, the Shoreline Erosion Inventory, North Carolina was published by the USDA Soil Conservation Service. This report continues to provide the most recent shoreline erosion data. Estuarine erosion rates were determined for eight "reaches" along the Neuse River shoreline using aerial photographs covering 32 years. The Neuse River average annual erosion rate for Craven County was determined to be 3.8 feet per year, which was next to the highest rate among all 15 counties in the study (Bertie County's rate was 0.92 feet per year, compared to 4.5 feet for Washington County, which had the highest rate). The Craven County study covered 47.41 miles and showed 46.56 miles were eroding, for a total loss of nearly 650 acres over the 32-year period. The average width of the eroded area was 121 feet. Table 15 provides data on each of the eight reaches. While some measures may have been taken to mitigate or eliminate some of the erosion, estuarine shoreline erosion continues to be a significant concern.

**Table 15. Estuarine Erosion Areas in Craven County**

| | |
|---|---|
| REACH NO. 1 | |
| Av. width lost to erosion | 87.6 feet |
| Av. height of bank | 3.0 feet |
| Length of shoreline eroding | 7.7 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 7.7 miles |
| REACH NO. 2 | |
| Av. width lost to erosion | 69.4 feet |
| Av. height of bank | 23.2 feet |
| Length of shoreline eroding | 3.8 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 3.8 miles |
| REACH NO. 3 | |
| Av. width lost to erosion | 147.1 feet |
| Av. height of bank | 20.3 feet |
| Length of shoreline eroding | 7.6 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 7.6 miles |
| REACH NO. 4 | |
| Av. width lost to erosion | 175.0 feet |
| Av. height of bank | 11.1 feet |
| Length of shoreline eroding | 10.5 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 10.5 miles |
| REACH NO. 5 | |
| Av. width lost to erosion | 115.3 feet |
| Av. height of bank | 8.5 feet |
| Length of shoreline eroding | 5.5 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 6.3 miles |

| | |
|---|---|
| REACH NO. 6 | |
| Av. width lost to erosion | 119.2 feet |
| Av. height of bank | 9.0 feet |
| Length of shoreline eroding | 5.1 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 5.1 miles |
| REACH NO. 7 | |
| Av. width lost to erosion | 37.7 feet |
| Av. height of bank | 7.5 feet |
| Length of shoreline eroding | 1.6 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 1.6 miles |
| REACH NO. 8 | |
| Av. width lost to erosion | 95.0 feet |
| Av. height of bank | 5.1 feet |
| Length of shoreline eroding | 4.8 miles |
| Length of shoreline accreting | 0 miles |
| Total length of shoreline | 4.8 miles |

*Source: Shoreline Erosion Inventory, NC, USDA Soil Conservation Service, Raleigh, NC, October, 1975.*
(NOTE: This data has not been updated.)

### *L. Drought*

Although the National Climatic Data Center has not listed drought events in Craven County, since 1999, Craven County, like the majority of North Carolina cities, towns and counties has faced a moderate to severe drought.

Drought has several meanings, but generally, drought reduces the amount of water available for agriculture, municipalities, industry, commerce, tourism, fire suppression, and wildlife. Reduction of electrical power generation and water quality deterioration is likely. Water shortages in some communities have had dramatic effects on local budgets, revenues, and citizens. Near panic situations among some members of the public have caused elected officials to spend considerable revenue to assist the public.

By January of 2001, Craven County was classified on the US Drought Monitor of North Carolina as "Abnormally Dry." As drought continued in North Carolina into the summer of 2002, it led to a declaration of disaster for agriculture drought. This situation led to funding becoming available for many farmers in the form of Small Business Administration low-interest loans.

Drought effects are often severe. Drought can last for extended periods and it affects all citizens, businesses and government. Craven County and its municipalities have the authority to restrict use of certain water resources. These restrictions and how they are imposed are found in local ordinances.

The Drought Monitoring Council was an interagency coordination and information exchange body created in 1992. In 2002, the council did a creditable job monitoring and coordinating drought responses, while increasing public awareness of the council's function and effectiveness. In 2003, the General Assembly recognized the Drought Monitoring Council's leadership and performance by giving them official statutory status and assigning them the responsibility for issuing drought advisories. The council's name was changed to the Drought Management Advisory Council (DMAC) to reflect the broader role of the council, which extends beyond monitoring drought conditions. The drought advisories provide accurate and consistent information to assist local governments and other water users in taking appropriate drought response actions in specific areas of the state that are exhibiting impending or existing drought conditions.

According to the North Carolina Drought Management Advisory Council, there are four categories of drought. From least detrimental to worst, the drought categories are moderate, severe, extreme, and exceptional. State and federal officials use the different drought categories as a barometer to assist local governments and other water users in taking appropriate drought response actions. For instance, drought officials recommend to water users and local governments experiencing moderate drought to minimize non-essential water uses. Non-essential uses include those that do not have health or safety impacts such as car washing and cleaning streets or sidewalks. However, officials recommend that water users eliminate non-essential water use when areas are experiencing severe drought, a category that is one step worse than moderate drought. Since adoption of the County's 2004 Multi-Jurisdictional Hazard Mitigation Plan, the entire state of North Carolina has been under varying degrees of drought condition. As late as September 2008, Craven County was being impacted by moderate drought conditions according to the NC Drought Management Advisory Council.

### *M. Ranking of Natural Hazard Potential*

The hazards outlined within the preceding sections, as well as hazards that have occurred in years prior to 2004 (when the last Hazard Mitigation Plan was prepared), have been ranked below based on a score derived from several factors. Each hazard was ranked based on frequency, number of injuries caused, number of resulting deaths, and dollar amount of property damage losses since 1959 (NOTE: The 2004 plan ranking was based on opinion not fact). These factors have been ranked on a scale of 1 (High) to 10 (Low). The table is organized to display the ranking of each hazard with respect to a given factor. As evidenced by the table, the hazards have been listed in order by total hazard potential. Refer to Appendix E for a listing of natural hazard events by year.

**Table 16. Craven County Ranking of Hazard Potential**

| Hazard | Ranking by Frequency | Ranking by Injuries | Ranking by Deaths | Ranking by Property Damage Loss | Total All Factors |
|---|---|---|---|---|---|
| Severe Winter Storms | 4 | 1 | 2 | 2 | 9 |
| Hurricanes and Nor'easters | 5 | 3 | 1 | 1 | 10 |
| Severe Thunderstorms/ Windstorms | 1 | 4 | 3 | 4 | 12 |
| Tornadoes | 2 | 2 | 5* | 3 | 12 |
| Flooding | 3 | 5* | 4 | 5 | 17 |
| Wildfire | 6* | 5* | 5* | 6* | 22 |
| Dam/Levee Failure | 6* | 5* | 5* | 6* | 22 |
| Tsunami | 6* | 5* | 5* | 6* | 22 |
| Estuarine Erosion | 6* | 5* | 5* | 6* | 22 |
| Drought | 6* | 5* | 5* | 6* | 22 |

*Indicates a tie score.
*Source: National Oceanic and Atmospheric Administration.*

## *N. Explanation of Hazards not Identified*

The following table provides an explanation of the hazards which were not identified within the scope of this HMP update.

**Table 17. Explanation of Hazards Not Identified**

| Hazard | Why Not Identified |
|---|---|
| Earthquakes | Although minor earthquakes have been known to occur, the County is not in an area subject to significant seismic activity in recorded history. |
| Landslides | The slopes/grades of land in Craven County are not sufficient to result in any significant land subsidence. |
| Volcanoes | There has been no record of any recent volcanic activities within Craven County in recent geologic time. |

## O. Hazard Damage and Likelihood of Occurrence Summary

The following table provides an estimate of damage potential and likelihood of occurrence based on the preceding sections. All factors were taken into account when filling out this table including input from county/municipal staff members, data documenting historical occurrences, and instances of storms impacting the region since the last Hazard Mitigation Plan Update in 2004.

**Table 18. Craven County Hazard Impact**

| Type of Hazard & Associated Elements[1] | Likelihood of Occurrence[2] (Highly Likely, Likely, Possible, Unlikely) | Intensity Rating[3] (Intensity Scales or Relative Terms) | Potential Impact[4] (Catastrophic, Critical, Limited, Negligible) |
|---|---|---|---|
| Severe Winter Storms | Likely | Severe | Limited |
| Hurricanes and Nor'easters | Possible | Severe | Catastrophic |
| Severe Thunderstorms/ Windstorms | Highly likely | Severe | Limited |
| Tornadoes | Possible | Severe | Critical |
| Flooding | Likely | Moderate | Critical |
| Wildfire | Highly likely | Moderate | Limited to Critical |
| Dam/Levee Failure | Unlikely | Moderate | Limited |
| Drought | Possible | Moderate | Negligible |

NOTES:

[1] Estuarine erosion and tsunamis were not factored into this analysis due to their low likelihood of occurrence.

[2] Likelihood of occurrence was estimated using historic data and the following chart (based on th 2004 plan):

| Likelihood | Frequency of Occurrence |
|---|---|
| Highly Likely | Near 100% probability in the next year. |
| Likely | Between 10 and 100% probability in the next year, or at least one chance in the next 10 years. |
| Possible | Between 1 and 10% probability in the next year, or at least one chance in the next 100 years. |
| Unlikely | Less than 1% probability in the next year, or less than one chance in the next 100 years. |

[3] The hazard's intensity was estimated using historic data and various standardized scales as outlined in Table 16 Ranking of Hazard Potential. This table provides a composite score of hazard impact and potential based on four factors including: frequency, number of injuries, number of deaths, ranking based on total property damage losses. The classification listed in the table above is based on the following classifications:

Severe: Hazard potential ranking of 0 to 13
Moderate: Hazard potential ranking of 14 or greater

[4] The potential impact was estimated by considering the magnitude of the event, how large an area within the community is affected, and the amount of human activity in that area, then using the following chart as a tool (based on the 2004 plan):

| Level | Area Affected | Impact |
|---|---|---|
| Catastrophic | More than 50% | • Multiple deaths<br>• Complete shutdown of facilities for 30 days or more<br>• More than 50 percent of property is severely damaged |
| Critical | 25 to 50% | • Multiple severe injuries<br>• Shutdown of critical facilities for 1-2 weeks<br>• More than 25 percent of property is severely damaged |
| Limited | 10 to 25% | • Some injuries<br>• Shutdown of some critical facilities 24 hours to one week<br>• More than 10 percent of property is severely damaged |
| Negligible | Less than 10% | • Minor injuries<br>• Minimal quality-of-life impact<br>• Shutdown of some critical facilities and services for 24 hours or less<br>• Less than 10 percent of property is severely damaged |
| N/A | Hazard has no discernable impact on the built environment | |

# *SECTION 4. COMMUNITY CAPABILITY ASSESSMENT*

This section of the HMP update is intended to analyze Craven County and its constituent jurisdictions' capacity to address the threats that natural hazards pose to them. This section will identify those areas in which the participating jurisdictions are already undertaking positive hazard mitigation efforts that should be supported or enhanced and may also identify areas where their current policies may be worsening hazard risks. In order to achieve these goals, this section contains the following subsections:

A) Agency/Organizational Review
B) Existing Policies and Program Review
C) Legal Capability Review
D) Fiscal Capability Review
E) Political Acceptability Review

Where necessary, each of the above subsections will be further "broken-down" for each participating jurisdiction, as follows:

1) Craven County (unincorporated areas)
2) Town of Bridgeton
3) Town of Cove City
4) Town of Dover
5) City of Havelock
6) City of New Bern
7) Town of River Bend
8) Town of Trent Woods
9) Town of Vanceboro

## *A. Agency/Organizational Review*

The purpose of this subsection of the HMP is to list and describe all local government departments, agencies and organizations that have a direct (or indirect) impact on hazard mitigation and/or hazard control through specific responsibilities in these areas or through seemingly unrelated responsibilities (e.g., site selection for school facilities), and to describe these responsibilities.

## 1. Craven County General Administration

The Craven County Administration office is located at 406 Craven Street, New Bern. The County operates under a Board of Commissioners-Manager form of government and has 595 full-time employees. The County Manager is Harold Blizzard. The following table provides a summary of the governmental departments and the number of employees in each.

**Table 19. Craven County General Administration**

| Department | # of Employees | Department | # of Employees |
|---|---|---|---|
| Social Services | 183 | CARTS (Transportation) | 7 |
| Health | 136 | Information Technology | 7 |
| Sheriff | 69 | Inspections | 7 |
| Jail | 42 | Recreation | 7 |
| Tax | 24 | Airport | 6 |
| Convention Center | 12 | Human Resources | 5 |
| Maintenance | 12 | Administration | 4 |
| Water | 12 | Elections | 3 |
| Communications | 11 | Emergency Services | 3 |
| Finance | 10 | Garage | 3 |
| Solid Waste | 10 | Economic Development | 2 |
| Planning | 8 | Soil Conservation | 2 |
| Register of Deeds | 8 | Veteran's Services | 2 |

*Source: Craven County Planning Department.*

Table 20 below provides an overview of offices, organizations, and agencies responsible for hazard control and hazard mitigation activities in the County.

**Table 20. Agency/Organizational Review for Craven County**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | Craven County has adopted a certified CAMA Land Use Plan, subdivision ordinance, mobile home park ordinance, Marine Corps Air Station zoning ordinance, regional airport height control zoning ordinance, and a flood damage prevention ordinance which it administers through its seven-person Planning Department.<br><br>The County also has an appointed, eight-member Planning Board.<br><br>Inspections and permitting (building, plumbing, HVAC) are administered to State standards through the four-person Craven County Inspections Department. | Donald R. Baumgardner<br>Director of Planning and Community Development<br>Craven County<br>(252) 636-6618<br><br>Shelton Toler<br>Chief Building Inspector<br>Craven County<br>(252) 636-4987 |
| Engineering (includes capital improvement plan) | The County does not have a licensed professional engineer on County staff, and contracts for engineering services on an "as-needed" basis.<br><br>The County annually adopts a Capital Improvements Program, which is administered by the Planning and Inspections Department. | Rusty Hayes<br>Water and Sewer Superintendent<br>(252) 636-6615<br><br>Donald R. Baumgardner<br>Director of Planning and Community Development<br>Craven County<br>(252) 636-6618 |
| Sewer | The county does not operate sewage collection or treatment facilities. | Rusty Hayes<br>Water and Sewer Superintendent<br>(252) 636-6615 |
| Water | The Craven County water system serves Townships 1, 3, 5, 6, 7, 9, and a portion of Township 8. Township 2 is served by a private system, First Craven Sanitary District, and by the Town of Bridgeton. The cities of New Bern and Havelock; the towns of Vanceboro, Cove City and Dover; and the Marine Corps Air Station Cherry Point all operate their own municipal water systems. The Town of River Bend operates its own municipal water system.<br><br>According to the 2007 Water Supply Plan, Craven County provides potable water service to 2,387 residential, commercial, and industrial metered connections. A total population of 5,968 was served. In emergencies, the County also provides treated water to Carteret County, Cove City, First Craven Sanitary District, Havelock, and New Bern. The County's distribution system has 87 miles of system lines. The system's finished water storage capacity is 0.60 million gallons. The system's current treatment plant capacity is 0.72 million gallons per day. Craven County receives its water supply from six (6) deep wells that draw water from the Black Creek Aquifer. | Rusty Hayes<br>Water and Sewer Superintendent<br>(252) 636-6615 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Fire | Craven County has a total of fifteen (15) fire districts/departments, all but two (2) of which operate on a volunteer basis (New Bern and Havelock have professional fire services). Cherry Point has a federally-supported fire department. Each district has its own separate taxing district and rate. Currently, fire protection is adequate to meet demand and there are no plans in the immediate future to add new districts. Equipment acquisition is handled on an as-needed basis. | Stanley Kite<br>Emergency Services Director<br>Craven County<br>(252) 636-6608 |
| Law Enforcement | Law enforcement is provided to the County by the Craven County Sheriff's Department. The department is located at the Craven County Judicial Center, 1100 Clarks Road in New Bern. The department has three (3) divisions: Administration, Jail, and School Resource Officers. The Administration Division consists of the Sheriff, Chief Deputy, Criminal Division Commander, Investigative Division Commander, Civil Division Commander, Administrative Division Commander, six (6) administrative staff positions, and one (1) Chaplain/Administrative Assistant. The Jail Division has forty-seven (47) people on staff. The Jail is located at the Craven County Judicial Center on Clarks Road and is certified for 292 beds. The Department also has a 40-bed work release facility on Alligator Road. The School Resource Officer Division has four (4) resource officers assigned to schools outside of municipal limits. | Jerry Monette, Sheriff<br>Craven County<br>(252) 636-6620 |
| Electricity | Six entities provide electricity generation and distribution services to the County – Progress Energy (private), the City of New Bern (municipal) and three cooperatives (Jones-Onslow EMC, Tideland EMC, and Carteret-Craven EMC). | *Jones-Onslow EMC*<br>1-800-682-1515<br>*Tideland EMC*<br>1-800-637-1079<br>*Carteret-Craven EMC*<br>1-800-682-2217<br>*Progress Energy*<br>1-800-452-2777<br>*City of New Bern Electric Utility*<br>(252) 636-4070 |
| Roads/Streets | The County does not own or maintain streets – this function is served by NCDOT and select municipalities. | N/A |
| Stormwater Management/ Drainage Maintenance | Craven County supports state regulations relating to stormwater runoff resulting from development (Stormwater Disposal Policy 15A NCAC 2H.001-.1003) and the Neuse River buffer rules, but currently there is no county-wide stormwater management program. | Donald R. Baumgardner<br>Director of Planning and Community Development<br>Craven County<br>(252) 636-6618 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Parks, Greenways, Open Space | The Craven County Recreation and Parks Department is staffed with a full-time director, an athletic director, two recreation program directors, a secretary, and two maintenance persons. The County owns and operates nine (9) recreation facilities/parks to provide a full-service recreation program for children and adults. | Jan Parker<br>Director of Recreation and Parks, Craven County<br>(252) 636-6606 |
| Health Care | CarolinaEast Medical Center, the cornerstone of CarolinaEast Health System, is located in New Bern and has been providing medical care to residents for more than forty (40) years. The Medical Center is accredited by the Joint Commission on Accreditation of Healthcare Organizations and is a participating hospital for the Eastern Regional Advisory Committee (ERAC). In the event of a major or man-made disaster, the County Emergency Management Director may request activation of the ERAC Medical Response Plan through NC Emergency Management (NCEM). The hospital is staffed with over 200 physicians who are assisted by over 1,500 medical and support personnel. The hospital offers a variety of medical and surgical services such as neurosurgical, intensive and intermediate care, women's care, pediatric care, and cancer care. In addition to the Medical Center, other components of CarolinaEast Health System include:<br>• CarolinaEast Emergency Care<br>• CarolinaEast Oupatient Care<br>• CarolinaEast Heart Care<br>• CarolinaEast Cancer Care<br>• CarolinaEast Rehabilitation Hospital<br>• CarolinaEast Primary Care<br>• CarolinaEast Adult Mental Health<br>• CarolinaEast Home Care<br>• CarolinaEast Women's Care<br>Citizens of Craven County also have regional access to University Health Systems of Eastern North Carolina located in Pitt County. University Health Systems includes Pitt County Memorial Hospital in Greenville, NC, community hospitals, physician practices, home health, and other independently operated health services. University Health Systems is affiliated with the Brody School of Medicine and East Carolina University.<br><br>The EMS providers include: Vanceboro Rescue, Bridgeton EMS, Number 7 Township EMS, Havelock EMS, New Bern/ Craven County EMS, Cove City EMS, and Fort Barnwell EMS. | Stanley Kite<br>Emergency Services Director, Craven County<br>(252) 636-6608 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Shelters | Primary Shelters (Capacity):<br><br>- Arthur Edwards Elementary School, Havelock (500)<br>- Vanceboro Farm Life Elementary School, Vanceboro (500)<br>- Havelock High School, Havelock (800)<br>- Brinson Memorial Elementary School, New Bern (500)<br>- Trent Park Elementary School, New Bern (250)<br><br>In addition, there are six (6) secondary shelters and twelve (12) remaining shelters which could be utilized as needed, depending upon capacity. | Stanley Kite<br>Emergency Services Director, Craven County<br>(252) 636-6608<br><br>American Red Cross<br>(252) 637-3405 |

## 2. Town of Bridgeton General Administration

The Town has a Board of Aldermen and a Mayor. The Staff includes a Town Clerk, Zoning Administrator, Building Inspector, and Chief of Police with one full-time and two part-time officers.

Table 21 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the Town.

**Table 21. Agency/Organization Review for the Town of Bridgeton**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The Town of Bridgeton has an adopted certified CAMA Land Use Plan (and updates), a zoning ordinance, a subdivision ordinance, and a flood damage prevention ordinance. These ordinances are administered through the Town Clerk with the assistance of NCDCA-Washington, as necessary.<br><br>The Town also has an appointed, five-member Planning Board.<br><br>Inspections and permitting (building, plumbing, HVAC) are administered to State standards through the Town's Planning and Inspections office. | Elaine Bryan<br>Town Clerk<br>(252) 637-3697<br><br>Terria Baynor<br>NCDCA-Washington<br>(252) 974-1308<br><br>Alton Williams<br>Building Inspector<br>Chris S. Santos<br>Zoning Administrator<br>(252) 637-3697 |
| Engineering (includes capital improvement plan) | As needed, under contract – no Town staff. | Rodman L. Williams<br>Mayor<br>(252) 637-3697 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Sewer | The Town of Bridgeton operates a 75,000 gallon per day wastewater treatment plant with discharge into the Neuse River. The system was put in operation in 1993 and the town has approximately 250 sewer customers in and immediately adjacent to Town. System currently operates at approximately 48% of capacity<br><br>JUSA Utilities Bridgeton (not a Town entity) is in the permitting process of developing a new wastewater treatment plant that will eliminate discharge into the Neuse River. | Rodman L. Williams<br>Mayor<br>(252) 637-3697 |
| Water | Water in the Town is provided by the First Craven Sanitary District | Ed Riggs, Manager<br>First Craven Sanitary District<br>(252) 633-6500 |
| Fire | Fire service provided by the Tri-Community Fire Department, a volunteer fire department | Chief, Tri-Community Fire Department<br>(252) 633-3200 |
| Law Enforcement | The town's Police Department is staffed with one full-time officer, two part-time officers, and two-three non-paid reserve officers. | Stephen Brown, Chief<br>(252) 637-2033 |
| Electricity | Electricity is provided to the Town by Progress Energy | Progress Energy<br>1-800-452-2777 |
| Roads/Streets | The Town owns and maintains 4.53 miles of roads, and received $12,276.75 in NC Powell Bill monies for street maintenance in 2009. | Rodman L. Williams<br>Mayor<br>(252) 637-3697 |
| Stormwater Management/ Drainage Maintenance | As needed, under contract from Town Board of Commissioners. | Progress Energy<br>1-800-452-2777 |
| Parks, Greenways, Open Space | The Town owns and maintains a CAMA-funded park which contains grills, cement tables and benches, playground equipment, and a gazebo. The Town also owns land which is leased to the Bridgeton Improvement Committee. They have built and are maintaining a nature trail and bird watch/ sanctuary on the land. | N/A |

### 3. Town of Cove City General Administration

The Town of Cove City consists of a four-member Town Board of Aldermen plus an elected Mayor. The Town Staff consists of a Town Clerk, who is responsible for day-to-day town management.

Table 22 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the Town.

**Table 22. Agency/Organizational Review for the Town of Cove City**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The Town of Cove City is included in the Craven County certified CAMA Land Use Plan, and has a flood damage prevention ordinance. These ordinances are administered through the Town Clerk with the assistance of NCDCA-Washington, as necessary.<br><br>Inspections and permitting (building, plumbing, HVAC) are administered to State standards through the County's Planning and Inspections office. | Sonja Gaskins<br>Town Clerk<br>(252) 633-1595<br><br>Lee Patrick<br>NCDCA-Washington<br>(252) 974-1308<br><br>Shelton Toler, Chief Building Inspector<br>Craven County<br>(252) 636-4987 |
| Engineering (includes capital improvement plan) | As needed, under contract. | N/A |
| Sewer | The Town has a wastewater collection system under construction which will be connected to the City of Kinston collection/treatment system in 2010. | Dred C. Mitchell<br>Mayor<br>(252) 633-1595 |
| Water | The Town of Cove City owns and operates its own water distribution lines. The Town serves approximately 244 households. The City of New Bern owns the wells and is responsible for treatment. | Dred C. Mitchell<br>Mayor<br>(252) 633-1595 |
| Fire | Fire protection provided by the Cove City Volunteer Fire Department. | Chief, Cove City Volunteer Fire Department<br>(252) 638-4712 or 911 in case of emergency |
| Law Enforcement | Cove City relies on the Craven County Sheriff's Department for police protection. | Jerry Monette, Sheriff<br>Craven County<br>(252) 636-6620 |
| Electricity | Electricity is provided to the Town by Progress Energy | Progress Energy<br>1-800-452-2777 |
| Roads/Streets | Town maintains approximately 2.83 miles of Town roads and used $12,519.64 in NC Powell Bill monies in 2009 for road maintenance at direction of the Town Board, under contract. | Dred C. Mitchell<br>Mayor<br>(252) 633-1595 |
| Stormwater Management/ Drainage Maintenance | As needed, under contract from Town Board of Commissioners. | Dred C. Mitchell<br>Mayor<br>(252) 633-1595 |
| Parks,Greeways, Open Space | No Town owned or managed facilities at this time | Dred C. Mitchell<br>Mayor<br>(252) 633-1595 |

## 4. Town of Dover General Administration

The Town of Dover has a Town Board of Aldermen and an elected Mayor. The Town Staff consists of a Town Clerk who is responsible for day-to-day management of the Town.

Table 23 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the Town.

**Table 23. Agency/Organization Review for the Town of Dover**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The Town of Dover is included in the Craven County certified CAMA Land Use Plan, and has adopted a zoning ordinance. This ordinance is administered through the Board of Aldermen.<br><br>Inspections and permitting (building, plumbing, HVAC) are administered to State standards through the County's Planning and Inspections office. | John Wetherington<br>Town Alderman<br>(252) 523-9610<br><br>Shelton Toler, Chief Building Inspector<br>Craven County<br>(252) 636-4987 |
| Engineering (includes capital improvement plan) | As needed, under contract. | N/A |
| Sewer | The Town of Dover has a wastewater collection system under construction, which will be connected to the City of Kinston collection/treatment system in 2010. This project will extend sewer collection lines to 279 residential customers in the Town of Dover. Wastewater treatment will be provided by the City of Kinston. The Kinston wastewater treatment facility reuses a portion of treated effluent to replace potable water usage. | John Wetherington<br>Town Alderman<br>(252) 523-9610 |
| Water | The Town of Dover owns and operates its own water production system – wells, distribution lines and treatment. The Town has a 100,000-gallon above-ground storage tank. Average daily pumping capacity is 32,100 gallons. The Town serves approximately 175 households in Town and in nearby communities. | John Wetherington<br>Town Alderman<br>(252) 523-9610 |
| Fire | Fire protection provided by the Dover Volunteer Fire Department. | Chief, Dover Volunteer Fire Department<br>(252) 527-2583 or 911 in case of emergency |
| Law Enforcement | Dover relies on the Craven County Sheriff's Department for police protection. | Jerry Monette, Sheriff<br>Craven County<br>(252) 636-6620 |
| Electricity | Electricity is provided to the Town by Progress Energy | Progress Energy<br>1-800-452-2777 |
| Roads/Streets | Town maintains approximately 2.88 miles of town roads and used $13,298.13 in NC Powell Bill monies in 2009 for road maintenance at direction of the Town Board, under contract. | John Wetherington<br>Town Alderman<br>(252) 523-9610 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Stormwater Management/ Drainage Maintenance | As needed, under contract from Town Board of Aldermen. | John Wetherington<br>Town Alderman<br>(252) 523-9610 |
| Parks,Greenways, Open Space | No Town owned or managed facilities at this time | John Wetherington<br>Town Alderman<br>(252) 523-9610 |

## 5. City of Havelock General Administration

The City of Havelock has a Council-Manager form of government with a mayor. There are nine (9) city departments which include the following:

- Administration
- Public Works
- Utilities
- Fire and Rescue
- Police
- Parks and Recreation
- Information Technology
- Finance
- Planning and Inspections

Table 24 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the City.

**Table 24. Agency/Organization Review for the City of Havelock**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The City of Havelock has adopted a certified CAMA Land Use Plan (and updates), zoning ordinance, subdivision ordinance, flood damage prevention ordinance, stormwater management ordinance, erosion and sedimentation control ordinance, minimum housing code ordinance, all of which are administered through a four-person Planning and Inspections office.<br><br>The City also has an appointed, six-member Planning Board.<br><br>Inspections and permitting (building, plumbing, HVAC) are administered to State standards through the City's Planning and Inspections office. | J. Scott Chase, AICP<br>Planning Director<br>City of Havelock<br>(252) 444-6411<br><br>Michael Cerjan,<br>Building Codes<br>Enforcement Officer<br>(252) 444-6413 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Engineering (includes capital improvement plan) | Engineering services are not managed in-house, but rather are procured as needed, under contract. | Dan Harbaugh<br>Public Works Director<br>City of Havelock<br>(252) 444-6410 |
| Sewer | The City of Havelock's Public Services Department oversees sanitary sewer service for the community. The system is a traditional gravity system with pump stations. The treatment plant discharges effluent into the East Prong of Slocum Creek. Existing demand at the City's wastewater treatment plant (WWTP) is between 1.33-1.50 million gallons per day (MGD). Sludge produced at the WWTP is transported to Jones County near the Town of Pollocksville.<br><br>The condition of Havelock's sanitary sewer system is reason for concern. Between July 2004 and December 2006, the City operated their sewer system under a State-Imposed Special Order of Consent (SOC). The SOC is an agreement with the State of North Carolina that requires improvements to the sanitary sewer system because the plant was operating at nearly 90% capacity. The SOC was lifted in December 2006 because the City supplied information to the Division of Water Quality (DWQ) that they were taking corrective action to increase available capacity. Specifically, the City is increasing immediate capacity by eliminating storm water inflow and infiltration issues for the sewage collection system. | Dan Harbaugh<br>Public Works Director<br>City of Havelock<br>(252) 444-6410 |
| Water | The City of Havelock's Public Services Department oversees potable water service for the community from the most plentiful aquifer in the State of North Carolina–the Castle Hayne Aquifer. Wells that pull water from this aquifer often yield 200-500 gallons of water per minute, but the yield can exceed 2,000 gallons per minute at its highest observed condition. The average thickness of the aquifer, which is composed of limestone, sandy limestone, and sand, is 175 feet. Havelock's four wells are located in the "transition" portion of the aquifer, where water is a mixture of salt and fresh, and all wells extend greater than 200 feet deep. The City has a permit to withdraw up to 2.8 million gallons of water per day from the Castle Hayne Aquifer. The City supplies approximately 5,000 metered customers within the urban services area. The average daily water demand for the city is 1.2-1.3 million gallons. The water supply also supports Havelock's 550-600 fire hydrants in the event of a fire. | Dan Harbaugh<br>Public Works Director<br>City of Havelock<br>(252) 444-6410 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Fire | The Havelock Fire and Rescue Department shares its headquarters with the police department in the Government Plaza along US 70. As development has increased in northwest Havelock, the ability of this location to serve all residents has been stretched. Under the interlocal agreement, the Township Six Fire Station and fire personnel from MCAS-Cherry Point serve the western portion of Havelock. The Township Six Station is officially a Craven County station; it was included in Havelock City Limits via annexation. This station continues to respond to Craven County emergencies and is funded by the County. An additional City of Havelock Station in the western section of Havelock was completed and operational in April 2010; again leaving Township Six to respond primarily to Craven County emergencies.<br><br>The Havelock Fire Department has nine (9) career employees and fifty-five (55) volunteers. The department provides fire protection and paramedic services within city limits. The department has two engines, four ambulances, and one rescue truck. These resources are used to respond to approximately 240 fire incidents and 1,300 EMS calls annually. The fire department responds to incidents within City limits, and the EMS and rescue services contract with Craven County to cover approximately 220 square miles in unincorporated Craven County. | Rick Zaccardelli,<br>Fire Chief<br>City of Havelock Fire Department<br>(252) 444-6441 or 911 in case of emergency |
| Law Enforcement | The Police Department has approximately thirty (30) full-time members who work in Criminal Investigations, Telecommunications, Administrative Support Functions, Community Outreach, Animal Services, School Resources, and Patrol Operations. There are four (4) patrol teams who cover the City 24 hours a day. In addition, there are a number of part-time and volunteer officers who are sworn officers with the same training and certification as paid police officers. The volunteer members function in the community as if they were paid members of the department. | G. Wayne Cyrus<br>Chief of Police<br>City of Havelock Police Department<br>(252) 447-3212 |
| Electricity | Electric service is provided to the City by Carteret-Craven EMC, Progress Energy, and the City of New Bern. | *Carteret-Craven EMC*<br>1-800-682-2217<br>*Progress Energy*<br>1-800-452-2777<br>*City of New Bern Electric Utility Dept.*<br>(252) 636-4050 |
| Roads/Streets | The City of Havelock Public Works Department (PWD) operates and maintains 47.20 miles of city roads and received approximately $518,170 in NC Powell Bill monies in 2009 to assist it with road maintenance. PWD is also responsible for snow removal and drainage system maintenance. | Mike Taylor<br>Streets Maintenance Supervisor<br>City of Havelock<br>(252) 444-6414 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Stormwater Management/ Drainage Maintenance | The City has developed a regular schedule for drainage maintenance which includes ongoing clean-out of roadside ditches; periodic contracting to clean ditches and canals; and continuous year-round trapping of beavers in the Slocum Creek wetlands as well as destroying the beaver dams. Under direction of the Public Works Director, this program has proven to be very effective in reducing flooding problems.<br><br>The City also requires Stormwater Best Management Practices (BMP) for most new land development pursuant to NCAC 2B.0235 (Neuse River Basin--Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements) and supports the North Carolina Coastal Stormwater regulations. | Dan Harbaugh<br>Public Works Director<br>City of Havelock<br>(252) 444-6400<br><br>J. Scott Chase, AICP<br>Planning Director<br>City of Havelock<br>(252) 444-6411 |
| Parks, Greenways, Open Space | Havelock has five (5) parks with a variety of ball fields and facility types, including tee ball, softball/baseball, soccer/football, tennis courts, and basketball courts. Seven of the softball/baseball fields have lights, two of the outside basketball courts have lights, and the soccer field and tennis courts also have lights. Six of Havelock's parks have an open field to allow residents to enjoy non-structured play. In addition, the Recreation Complex also has a Recreation Center that includes an indoor basketball court and a weight and exercise room. Extra amenities include a covered stage, a boat ramp, and two fishing piers. | David Smith<br>Director of Parks and Recreation<br>City of Havelock<br>(252) 444-6439 |

### 6. City of New Bern General Administration

The City of New Bern is governed by a Mayor and Board of Aldermen, which consists of six elected officials elected from voters by ward. The City Manager is responsible for implementing city policy and administering the day-to-day operation of the city. There are nine (9) departments which report to the City Manager, and include: Electric Utilities, Engineering, Finance, Fire/Rescue, Human Resources, Parks and Recreation, Planning and Inspections, Police, and Public Works.

Table 25 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the City.

**Table 25. Agency/Organization Review for the City of New Bern**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The City of New Bern has adopted a Regional CAMA Land Use plan (and updates), a land use ordinance (zoning, subdivision and historic district requirements), a flood damage prevention ordinance, a stormwater management ordinance, an erosion and sedimentation control ordinance, and a minimum housing and nuisance abatement ordinance, which are administered through a nineteen (19) person Planning and Inspections office.<br><br>Inspections and permitting (building, plumbing, electrical, and HVAC) are administered to State standards through the City's Inspections office.<br><br>The City also has an appointed Planning and Zoning Board, Board of Adjustment, and Historic Preservation Commission staffed by the City's Planning office. | Michael W. Avery, AICP<br>Director of Planning & Inspections<br>City of New Bern<br>(252) 639-7580<br><br>Johnny Clark<br>Chief Building Inspector<br>Inspections Division<br>City of New Bern<br>(252) 639-2940 |
| Engineering (includes capital improvement plan) | The Engineering Department is responsible for organizing and directing the planning, design, construction, and maintenance of water and wastewater treatment, sewer collection and water distribution systems and related work as required. The Department is composed of four divisions: Administration, Water & Sewer, Wastewater Plants, and Water Treatment Plant. | Jordan Hughes, P.E.<br>Acting City Engineer<br>City of New Bern<br>(252) 639-7525 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Sewer | The City of New Bern laid the first sewer lines in the 1930's. Currently there are approximately 380 miles of sewer collection lines within the City and its boundaries. The City currently provides service to approximately 16,000 customers. The sewer system is comprised of gravity lines, force mains, and four vacuum sewer systems. Vacuum sewer is utilized in low-lying areas where ground water tables are high and gravity sewer installations are cost prohibitive. Assumed ownership and maintenance of Craven County's low pressure system in Township 7.<br><br>The division is responsible for the operation and maintenance of two wastewater treatment plants. There are currently twenty (20) employees in the division.<br><br>The City of New Bern's Wastewater Treatment Plant was originally constructed in 1964. It was a single train trickling filter plant, capable of treating a flow of 4.0 MGD. In 1993 a second treatment train was added. The expanded plant is permitted to treat 6.5 MGD to tertiary levels. Assumed ownership and maintenance of Craven County's .5 MGD secondary level land application system in Township 7.<br><br>A state-certified wastewater laboratory is located on site. Testing is done on both the influent and effluent for plant efficiency and monitoring process. Sludge from the plant is treated by an anaerobic digester system. The sludge is land-applied under a sludge application permit by plant personnel.<br><br>The City adopted a sewer use ordinance complying with Federal and State Regulations governing publicly owned treatment works. The sewer use ordinance outlines acceptable connections, policies, and procedures for connection to the system.<br><br>The City adopted a Pretreatment Program to monitor large or unusual discharges into the system. The program provides an application process, sets discharge limits, determines monitoring requirements, and provides for violation penalties. | James Ipock<br>Utility Operations Superintendent<br>City of New Bern<br>(252) 639-7540<br><br>Judy Majstoravich<br>Wastewater Treatment Plants Manager<br>City of New Bern<br>(252) 639-7555 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Water | The City of New Bern laid the first water lines sometime around 1896. Currently there are approximately 310 miles of distribution line within the City and its boundaries. The current population according to the 2008 census estimate is approximately 28,600. The City currently provides service to approximately 17,200 customers. New Bern's water supply is groundwater taken from the Black Creek/ Pee Dee and Castle Hayne Aquifers. Water is pumped from five (5) wells located in Cove City and fifteen (15) wells along the City's western boundary. Water from the Castle Hayne Aquifer is treated at the City's new 6.5 MGD water plant and then blended with water from the other aquifer at the 4 MG clearwell noted below. The City has six (6) elevated water storage tanks, a one million gallon (1 MG) clearwell, and one four-million gallon (4 MG) clearwell with a total storage capacity of 7.25 million gallons. The current average consumption for the City is 4.2 million gallons per day. | James Ipock<br>Utility Operations Superintendent<br>City of New Bern<br>(252)639-7540 |
| Fire | The City of New Bern Fire-Rescue Department has a Class 3 response rating and provides suppression, prevention and technical rescue services. It operates from three stations strategically located throughout the City. The department holds a Task Force 10 for USAR and Swift Water Rescue serving a ten (10) county area. | City of New Bern Main Fire Station<br>(252) 639-2931 |
| Law Enforcement | The Town's police department consists of 93 sworn officers, of which 86 are "on-hand," handling operations, services (logistical and planning), and investigations; 41 civilian employees, of which 37 are "on-hand," handling telecommunications, information services, animal control, property and evidence, and parking enforcement activities; and 70 volunteers including a Certified Emergency Response Team (CERT). The deparment is National Incident Management System (NIMS) compliant. | Frank Palombo,<br>Chief of Police<br>City of New Bern<br>(252) 672-4100 |
| Electricity | The City of New Bern's electric system today is supplied by NC Eastern Municipal Power Agency (NCEMPA) at four delivery points from Progress Energy and has two substations with nearly 500 miles of distribution lines. Annual peak demand served is 110 megawatts. Altogether, New Bern has over 27,750 residential, commercial and industrial electric customers in and around the City. In addition, the utility employs close to 70 employees. | Jon Rynne<br>City of New Bern<br>Electric Utility Department<br>(252) 639-2820 |
| Roads/Streets | The City of New Bern Public Works Department (PWD) operates and maintains 149.01 miles of City roads and received approximately $738,500 in NC Powell Bill monies in 2009 to assist it with road maintenance. PWD is also responsible for snow removal and drainage system maintenance. The City complies with NCAC 2B.0235 (Neuse River Basin--Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements). | Danny Meadows<br>Public Works<br>(252) 639-7500 |
| Stormwater Management/ Drainage Maintenance | The City of New Bern's Public Works Department disseminates information on stormwater best management practices (BMPs) and enforces State law regarding stormwater management through verification of submission and review of stormwater management and sedimentation erosion control plans, when required. | Danny Meadows<br>Public Works<br>(252) 639-7500 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Parks, Greenways, Open Space | The City of New Bern Recreation and Parks Department provides recreational services to the City and many of the County (and other municipal) residents in the vicinity of New Bern. The department maintains park facilities, which includes 65 active and 205 passive recreational acres, and operates extensive organized recreational and special events programs, including two 15,000 square foot recreation centers with amenities, a 300 capacity aquatics center, and a community resources center. | Thurman C. Hardison, Recreation Director City of New Bern (252) 639-2900 |

## 7. Town of River Bend General Administration

The Town of River Bend has a Mayor and five Council members. The Town has a full-time manager. In addition to general support staff, the town's staff includes a Town Clerk, Deputy Clerk, Finance Administrator, Public Works Superintendent, and Chief of Police.

Table 26 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the town.

**Table 26. Agency/Organization Review for the Town of River Bend**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The Town has adopted a CAMA land use plan, zoning ordinance, subdivision ordinance, floodplain management ordinance, administered through the Town Manager's office, who serves in the capacity of zoning administrator. The Town also has a seven-member appointed Planning Board and a seven-member appointed Community Appearance Commission. Building Inspections and Building Permits are issued through Craven County's Inspections Office. | Drew Havens Town Manager (252) 638-3870 |
| Engineering (includes capital improvement plan) | The Town does not have a licensed professional engineer on Town staff, and contracts for engineering services on an "as-needed" basis.<br><br>The Town has an excellent Capital Improvements Plan which is updated annually. | Drew Havens Town Manager (252) 638-3870 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Sewer | The Town of River Bend purchased the wastewater systems from Carolina Water Service in 1996. The Town operates a wastewater plant (.33 MGD) that discharges into the Trent River. The facility consists of two extended air-activated sludge treatment units. One has a capacity to treat 220,000 gallons per day, and the other has a capacity of 110,000 gallons per day. The system is permitted as a Class II wastewater treatment system. The Town of River Bend maintains extensive and detailed records of the operation of its collection and treatment systems. During the period from January 1, 2006 through December 31, 2006, River Bend reported no spills associated with either system.<br><br>The Town was issued a NPDES permit (NC0030406) on October 22, 2003. The Town is required to monitor specified parameters either daily, weekly, or twice per month. During the period of July 2004 through July 2007, there were two minor violations. A one-day violation of low dissolved oxygen was corrected within one day and a one-day exceedance of fecal coliform limit due to sampling problems was corrected by improvement to sampling techniques. The Town also holds a second NPDES permit for the discharge of backwash water from the filters for potable water system. This permit allows a discharge of 7,000 gallons of backwash water per day from two (2) points, or a total of 14,000 gallons per day. | Christina Massengill<br>Public Works Superintendent<br>Town of River Bend<br>(252) 638-3870 |
| Water | The Water Treatment System consists of three wells, filters, piping and two elevated storage tanks. The production capacity is 800,000 gallons per day and currently produces an average of 250,000 gallons per day. The storage capacity is 400,000 gallons.<br><br>The Town of River Bend's water systems is operated by the Town's Water Resources/Public Works Department, which consists of a Superintendent, one Lead Operator, two Water Resources Operators, two Public Works Specialists, and a Customer Service Clerk. | Christina Massengill<br>Public Works Superintendent<br>Town of River Bend<br>(252) 638-3870 |
| Fire | The Town of River Bend relies on volunteer fire protection services provided by the Rhems Volunteer Fire Department (RVFD). The town constitutes over 90 percent of the service area for this district. A new fire station was recently completed in Town, greatly improving fire protection coverage in the area. | Rhem Volunteer Fire Department<br>252-637-3365 or 911 in case of emergency |
| Law Enforcement | The Town's police department consists of one part-time and five full-time officers who handle all community outreach and patrol operations as well as administrative support functions. | Earl "Duke" Pratt<br>Chief of Police<br>Town of River Bend<br>(252) 638-1108 |
| Electricity | Electric service is provided to the Town by Progress Energy. | Progress Energy<br>1-800-452-2777 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Roads/Streets | The Town owns and maintains 16.48 miles of town streets. Town maintenance of local streets is conducted with a 3-person public works crew (one superintendent and two public works employees) and contractors hired with $86,525 in NC Powell Bill funds (approximate 2009 allocation), and with Town general revenue monies. | Christina Massengill<br>Public Works Superintendent<br>Town of River Bend<br>(252) 638-3870 |
| Stormwater Management/ Drainage Maintenance | The Town is subject to and complies with Neuse Basin buffer rules, but not currently under NPDES Phase II requirements. Town conducts drainage/ditch maintenance on an "as-needed" basis.<br><br>The Town also complies with the NC Coastal Stormwater Management rules. The Town of River Bend developed a town-wide Drainage Master Plan which prioritizes drainage system problems in a ranked order. This plan has prioritized and addressed drainage problems. The basis of the priority for drainage systems is the size of the drainage area, number of lots affected, and soil permeability. Problem locations identified include: Teakwood and Channel Run Park, Oak Leaf Court, #109 Gatewood Run Park, and the End of Plantation Drive at the new water tower. The latest drainage area was a $90,000 project in the Lakemere area in FY2009. | Christina Massengill<br>Public Works Superintendent<br>Town of River Bend<br>(252) 638-3870<br><br>Drew Havens<br>Town Manager<br>(252) 638-3870 |
| Parks, Greenways, Open Space | The Town owns several small areas of developed recreational facilities and open space. The town also has several wildlife preserves located along the Plantation Canal and the Trent River. Developed park space totals approximately 14 acres and public open space totals approximately 40 acres. The Town also enjoys the privately operated, 150-acres River Bend Golf and Country Club. | Christina Massengill<br>Public Works Superintendent<br>Town of River Bend<br>(252) 638-3870 |

## 8. Town of Trent Woods General Administration

The Town of Trent Woods has a Mayor-Council form of government. In addition to general support staff, the Town's staff includes a Town Clerk, Director of Finance, Director of Public Works, and Chief of Police.

Table 27 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the town.

**Table 27. Agency/Organization Review for the Town of Trent Woods**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The Town has adopted the 2008 Regional Land Use Plan for New Bern, River Bend, and Trent Woods, a zoning ordinance, subdivision ordinance, and floodplain management ordinance, which are administered through the Town Clerk's office.<br><br>The Town also has an appointed Planning Board.<br><br>Building Inspections and Building Permits are issued through Craven County's Code Enforcement Officer to State standards. | Michael J. Haber<br>Zoning and Subdivision Admininstrator<br>(252) 637-9810 |
| Engineering (includes capital improvement plan) | The Town does not have a licensed professional engineer on Town staff, and contracts for engineering services on an "as-needed" basis. | Michael J. Haber<br>Maintenance Director<br>Town of Trent Woods<br>(252) 637-9810 |
| Sewer | The Town of Trent Woods is served by the City of New Bern sewer system. There are approximately 1,100 Town residences on the system. | City Engineer<br>City of New Bern<br>(252) 636-4004 |
| Water | Residents in the Town of Trent Woods have access to the City of New Bern's potable water system and many residents have hooked on to the City's system for their water needs. At this time, the Town of Trent Woods's residents are provided water through the New Bern water system. Trent Woods contains approximately 1,850 single-family lots with approximately 1,100 currently being served by New Bern public water system. Water service is available to all lots in Trent Woods; however, many utilize individual private wells for water supply or to supplement irrigation. | City Engineer<br>City of New Bern<br>(252) 636-4004 |
| Fire | Fire protection for Trent Woods residents is provided by the West New Bern Volunteer Fire Department, located on Chelsea Road. While supported to some degree by County Fire Tax funding, this is a volunteer organization. | Fire Chief<br>West New Bern Volunteer Fire Dept.<br>(252) 633-3043 or 911 for emergencies |
| Law Enforcement | The Town has five full-time and two part-time officers who handle all community outreach and patrol operations as well as administrative support functions. The Town also employs a part-time school crossing guard. | Michael Register<br>Chief of Police<br>(252) 637-3030 |
| Electricity | Electric service is provided in the Town of Trent Woods by Progress Energy and the City of New Bern. | *Progress Energy*<br>1-800-452-2777<br>*City of New Bern Electric Utility*<br>(252) 636-4070 |
| Roads/Streets | The Town owns and maintains 13.48 miles of town streets, with major thoroughfares maintained by NCDOT. Town maintenance of local streets is conducted through the 2-person maintenance department and contractors, and with $107,267.83 in NC Powell Bill monies (approximate 2009 allocation) and Town general revenue monies. | Michael J. Haber<br>Maintenance Director<br>(252) 637-9810 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Stormwater Management/ Drainage Maintenance | No town-wide stormwater management program. Town conducts drainage/ditch maintenance on an "as-needed" basis. The Town of Trent Woods enacted a Flood Damage Prevention Ordinance to reduce risks to life and property and public health and safety from flood hazards. Provisions of the ordinance address alteration of floodplains, and require mitigation for uses and facilities vulnerable to flooding. | Michael J. Haber Maintenance Director (252) 637-9810 |
| Parks, Greenways, Open Space | The Town of Trent Woods contains two public recreational and open space areas – the Meadows Family Park located on Country Club Drive and a small park at Chelsea Road and Country Club Drive. The New Bern Golf and Country Club, although privately owned and operated, serves as a major source of recreation and open space for Town residents. | Michael J. Haber Maintenance Director (252) 637-9810 |

## 9. Town of Vanceboro General Administration

The Town of Vanceboro has a Town Board of Aldermen and a Mayor. In addition to general support staff, the Town has staff that includes a Town Clerk, Public Works Director, and Chief of Police.

Table 28 below provides an overview of offices, organizations and agencies responsible for hazard control and hazard mitigation activities in the Town.

**Table 28. Agency/Organization Review for the Town of Vanceboro**

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Planning and Zoning (includes building inspections) | The Town of Vanceboro has adopted a zoning ordinance, subdivision ordinance, and floodplain management ordinance, administered through the Town Clerk's office. The Town also has an appointed Planning Board. Building Inspections and Building Permits are issued through Craven County's Code Enforcement Officer to State standards. | Renee Ipock Town Clerk (252) 244-0919 |
| Engineering (includes capital improvement plan) | As needed, under contract – no Town staff. | Renee Ipock Town Clerk (252) 244-0919 |
| Sewer | The Town of Vanceboro operates its own wastewater treatment plant and transmission lines, serving approximately 476 customers and treating approximately 250,000 gpd of sewage. Town is under moratorium as of 5/8/01, restricting new sewage connections. | Vernon Edwards Public Works Director (252) 244-0919 |

| Area of Responsibility | Description | Contact Person and Telephone |
|---|---|---|
| Water | The Town of Vanceboro owns and operates its own water production system – wells, distribution lines and treatment, serving approximately 465 customers with 550,000 gpd of potable water. | Vernon Edwards<br>Public Works Director<br>(252) 244-0919 |
| Fire | Fire protection provided by the Vanceboro Volunteer Fire Department. | Chief, Vanceboro Volunteer Fire Department<br>(252) 244-1123 or 911 in case of emergency |
| Law Enforcement | The Town's police department is staffed with one full-time and one part-time officer. Currently, there is one full-time officer position which is vacant. | William J. Turner<br>Chief of Police<br>Town of Vanceboro<br>(252) 244-0919 |
| Electricity | Electric service is provided by Progress Energy. | Progress Energy<br>1-800-452-2777 |
| Roads/Streets | The Town maintains approximately 7.84 miles of town roads and used approximately $33,602.12 in NC Powell Bill monies in 2009 for road maintenance at the direction of the Town Board, under contract. | Vernon Edwards<br>Public Works Director<br>(252) 244-0919 |
| Stormwater Management/ Drainage Maintenance | As needed, under contract from Town Board of Commissioners and with town maintenance staff (5 total employees). The Town complies with the North Carolina Coastal Stormwater Management Rules. | Vernon Edwards<br>Public Works Director<br>(252) 244-0919 |
| Parks, Greenways, Open Space | One (1) small, town-owned and maintained park. | Vernon Edwards<br>Public Works Director<br>(252) 244-0919 |

## *B. Existing Policies and Program Review*

The purpose of this subsection of the HMP update is to describe the policies, programs, ordinances, and practices that each participating community has in place affecting hazard control and/or hazard mitigation. Whereas many participating communities have similar policies and ordinances, several of the most common of these policies and ordinances will be described generally or generically in the following overview section. Deviations from the "generic" descriptions provided below will be noted in each community's individual subsection below. Individual jurisdictional mitigation plans and policies are identified in Subsection C.

1. Flood Damage and Prevention Ordinance

Each community that participates in the National Flood Insurance Program (NFIP) must adopt a flood damage prevention ordinance. In general, this ordinance requires the following provisions in all areas of special flood hazard (100-year floodplain) identified by the Federal Emergency Management Agency in its Flood Insurance Rate Map (FIRM):

- All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure;
- All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damages;
- All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages;
- Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;
- All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
- New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters;
- On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding; and,
- Any alteration, repair, reconstruction, or improvements to a structure which is in compliance with the provisions of this ordinance, shall meet the requirements of "new construction" as contained in this ordinance.

In areas designated as floodways, no encroachments, including fill, new construction, substantial improvements, and other developments shall be permitted unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood. Implementation responsibility is typically through the Town/City/County Planning Department as a condition of a zoning permit.

New FIRMs produced by the State of North Carolina Floodplain Mapping Program and the Federal Emergency Management Agency are currently under review by Craven County and its constituent municipalities.

2. North Carolina State Building Code

The NC State Building Codes regulate for fire resistance, in addition to seismic, flooding, and high wind resilience. These codes are reviewed annually and amended as new requirements and materials are introduced. Building codes apply primarily to new construction or buildings undergoing substantial alteration.

Enforcement at the local level is provided by the Craven County Inspections Department and similar departments in the Cities of Bridgeton, New Bern, and Havelock (Cities and ETJ) and extends beyond construction inspections to the advance review of plans. An applicant for a building permit must submit plans to the appropriate inspections department for approval. The inspections department reviews the plans and elects to approve or reject them or to require revisions. Construction cannot begin until local officials confirm that the plans are in accordance with the code.

A building inspector must then visually monitor the construction of the building. The inspector's duty is to make sure that the project follows the plans as approved. Inspectors are empowered to stop work on projects that fail to conform to the plans. Any observed errors must be fixed before work can continue. The inspector must perform a final review before an occupancy permit is issued.

3. Zoning Ordinance

Zoning is the traditional and nearly ubiquitous tool available to local governments to control the use of land. Broad enabling authority for municipalities in North Carolina to engage in zoning is granted in N.C.G.S. 160A-381. The statutory purpose for the grant of power is to promote health, safety, morals, or the general welfare of the community. Land "uses" controlled by zoning include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and set backs, density of population, and the like. The local government is authorized to divide its territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

4. Subdivision Ordinance

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that subdividers install adequate drainage facilities, and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding, unless flood hazards are overcome through filling or other measures and prohibit filling of floodway areas. They require that subdivision plans be approved prior to the sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures.

Broad subdivision control enabling authority for municipalities is granted in N.C.G.S. 160-371. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street (N.C.G.S. 160A-376). The definition of subdivision does not include the division of land into parcels greater than 10 acres where no street right-of-way dedication is involved.

The community thus possesses great power (in theory, anyway) to prevent unsuitable development in hazard-prone areas.

5. Capital Improvements Plan

A capital improvements program is a planned schedule of capital expenditures for physical improvements within a local government's jurisdiction, usually over a five-year period, listed according to priority.

6. Coastal Area Management Act (CAMA) Plans

In 1972, Congress enacted the Coastal Zone Management Act (CZMA) to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses (e.g., State and Federal offshore oil and gas development). Through the CZMA, states are encouraged to develop coastal zone management programs (CZMPs) to allow economic growth that is compatible with the protection of natural resources, the reduction of coastal hazards, the improvement of water quality, and sensible coastal development. The CZMA provides financial and technical incentives for coastal states to manage their coastal zones in a manner consistent with CZMA standards and goals.

The nation's coastal and ocean resources are under increasing pressure from population growth and development. Coastal areas host over 50% of the total U.S. population within only 17% of the nation's land area. Between 1994 and 2015, coastal population is projected to increase by 28 million people. This movement to the coast has presented difficult challenges for coastal resource managers.

The Coastal Zone Management Program (CZMP) is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the Coastal Programs Division (CPD) within the National Oceanic and Atmospheric Administration's (NOAA's) Office of Ocean and Coastal Resource Management (OCRM). The CZMP's leaves day-to-day management decisions at the state level in the 34 states and territories with federally approved coastal management programs. Currently, 95,376 national shoreline miles (99.9%) are managed by the Program.

In 1974, the state of North Carolina adopted the Coastal Area Management Act (CAMA) in compliance with the CZMA. CAMA established a cooperative program of coastal area management between local and State governments.

7. Community Rating System

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the Community Rating System in the NFIP. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

There are now nearly 900 communities receiving flood insurance premium discounts based on their implementation of local mitigation, outreach, and educational activities that go well beyond minimum NFIP requirements. These include Craven County and the municipalities of Bridgeton, Havelock, New Bern, River Bend and Trent Woods. While premium discounts are one of the benefits of participation in CRS, it is more important that these communities are carrying out activities that save lives and reduce property damage. These nearly 900 communities represent a significant portion of the nation's flood risk as evidenced by the fact that over 66% of the NFIP's policy base is located in these communities. Communities receiving premium discounts through the CRS cover a full range of sizes from small to large, and a broad mixture of flood risks including coastal and riverine.

8. Neuse Rules

*a. Buffer Protection Rules*

On December 11, 1997, the North Carolina Environmental Management Commission (EMC) adopted a set of permanent rules to support implementation of the Neuse River Nutrient Sensitive Waters Management Strategy. The rules were subsequently reviewed by the NC Rules Review Commission and the General Assembly in its 1998 'short' session. All of the rules, with the exception of the riparian area, or buffer, protection rule (15A NCAC 2B .0233), became effective as permanent rules on August 1, 1998. In addition, a portion of the wastewater discharge rule (.0234) became effective as a temporary rule on January 22, 1998. Those rules are as follows:

- Rule .0202 – Definitions (amended existing rule),
- Rule .0232 to establish the nutrient reduction goal,
- Rule .0234 for wastewater discharges,
- Rule .0235 for urban stormwater management,
- Rules .0236 and .0238 for agricultural nitrogen reduction,
- Rule .0239 for nutrient management,
- Rule .0240 for nutrient offset payments.

One of the permanent rules that the Commission adopted in December 1997 was a riparian buffer protection rule. The 1998 General Assembly disapproved that buffer protection rule and directed the Commission to make certain changes. The Commission had already adopted the buffer protection rule as a temporary rule effective July 22, 1997. That temporary rule remained in effect until June 22, 1999, when a revised temporary rule and a temporary buffer mitigation rule that addressed the General Assembly's concerns went into effect. The Commission adopted these two rules and a buffer delegation rule as permanent rules in December 1999. All three rules became effective as permanent rules, after review by the Rules Review Commission, minor changes, and review by the 2000 General Assembly, on August 1, 2000:

- Rule .0233 for protection and maintenance of riparian areas,
- Rule .0241 for delegation of authority for Rule .0233, and
- Rule .0242 for mitigation required under Rule .0233.

*b. Neuse Stormwater Rules*

The Neuse Stormwater Rule applies to the largest and fastest-growing local governments in the Neuse River basin. The rule establishes a broad set of objectives for reducing nitrogen runoff from urban areas. The rule also sets up a process for DWQ to work with the affected local governments to develop a model stormwater plan for meeting the objectives. The affected local governments include the Craven County municipalities of New Bern and Havelock.

The model plan includes four elements for reducing nitrogen (explained below):

- Reviewing and approving stormwater management plans for new development.
- Educating the public.
- Identifying and removing illegal discharges.
- Identifying sites where water quality management projects can be inserted into existing development ("retrofits").

After the rule becomes effective, the local governments and the Division of Water Quality (DWQ) will have one year to develop the model plan. Local governments will then have an additional 18 months to get their stormwater plan approved by the EMC and begin implementing the plan. If a local government doesn't implement a stormwater plan, then it may be subject to federal NPDES stormwater permitting.

Local governments will make annual progress reports to the EMC which will include nitrogen loading reduction estimates.

Local governments and DWQ will work together to incorporate existing stormwater programs and these new nitrogen control requirements into an efficient and flexible plan for local government and economic development activities.

Local plans must include the following elements:

- Development Review/Approval: New development would have to meet the 30% reduction goal by implementing planning considerations and best management practices, such as constructed wetlands. The nitrogen load from new developments may be partially offset by payment to the Wetlands Restoration Fund.

- Public Education: Citizens can easily reduce the nitrogen pollution coming from their lawns and septic systems if they understand the impacts of their actions and respond with appropriate management measures. The local governments and DWQ will develop public education materials for the Neuse basin.

- Illegal Discharges: Illegal discharges are substances deposited in storm sewers (which lead directly to streams) that really should be handled as wastewater discharges. Depending on the source, illegal discharges may contain nitrogen. Local governments must identify and remove illegal discharges.

- Retrofit Locations: There are a number of funding sources available for water quality projects, such as the Clean Water Management Trust Fund and the Wetland Restoration Program that the NC General Assembly has recently established. However, it is often difficult to locate appropriate project sites in urban areas. To assist technical experts, local governments will identify sites where water quality projects can fit into existing development.

## *C. Community Capability Assessment*

### 1. Capability Assessment Tables

The following tables provide a capability assessment and assessment of existing programs and policies for each participating jurisdiction in Craven County.

**Table 29. Community Capability Assessment for Craven County**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | Adopted August 2009, certified October 2009 | See Section C.2 - Special Note on Craven County CAMA Plan. | High, sets prudent planning objectives for reduction of hazards | None |
| Zoning Ordinance | Adopted Mobile Home Park Ordinance (1978), Craven County Regional Airport Height Control Ordinance (2006) and Marine Corp Air Station Zoning (1989) | Craven County does not have a county-wide zoning ordinance to regulate the location of land uses. There is a zoning ordinance affecting an area east of the Cherry Point Marine Corps Air Station. An additional area of zoning exists around the Craven County Airport. However, its principal purpose is sound attenuation and avoidance of hazards to airplanes and not land use control. | Low, allows for conflicting uses in or near hazard areas | Consideration of zoning for additional areas of the county. |
| Subdivision Ordinance | Adopted in 1982, Updated in 1989 | Specifies procedures for review and approval of subdivision plats and specifies required design standards for land development and approval of subdivisions. | Medium, requires adequate ditching/ drainage structures and requires detailed information on natural features, storm drains, grade of lots and proposed roads, flood hazard areas and flood elevations as prerequisite for subdivision, but does not discourage high density development in high hazard areas | Assess regulations for methods in which the effect of high density and intensity development in high hazard areas can be mitigated |
| Watershed Protection Ordinance | N/A | Craven County is not in a State-mandated watershed protection area. | Low, no ordinance in effect | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Recreation and Park Plan for Craven County, North Carolina | Adopted 2005 | Waterfront Access Plan for Craven County (1987), Craven County Parks and Recreation Master Plan (1982, updated in 1987), and Craven County Estuarine Shoreline and Beach Access Plan (1987). All plans specify strategies to improve recreation opportunities in facilities owned and operated by Craven County and for improved waterfront access for the public. | Medium, since master plan and waterfront access plan are in place, but they do not prioritize the acquisition of hazard-prone lands for facilities (as appropriate) | Focus acquisition of land for system in hazard-prone areas for passive parks/walking trails, when possible. This will also achieve goal of providing public waterfront access. The Comprehensive Recreation Plan provides strategies for expanding recreational opportunities. |
| Inspections / Permitting | Conducted through Craven County Building Inspections Department | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |
| Stormwater Management | No Countywide stormwater management program | Craven County supports and complies with North Carolina Stormwater Management Rules. | Low, since lack of stormwater management program allows for sedimentation of drainage system, swamps and streams – possibly exacerbating flooding | Consider adoption of Stormwater Management Program |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Flood Damage Prevention Ordinance | Participates in the NFIP.<br><br>Adopted in 1987.<br><br>Joined Community Rating System program on October 1, 1991. | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the County.<br><br>The CRS program of the National Flood Insurance Program (NFIP) is intended to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance. It provides incentives for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. The incentives are in the form of premium discounts. Craven County is a "Class 8" CRS member, which means that property owners in SFHA receive a 10% reduction on their flood insurance premiums and property owners outside of the SFHA receive a 5% reduction. | High, requires freeboard above Base Flood Elevation (BFE) for all developments in SFHA | None |
| Water and Sewer Policies | Policy adopted annually and reflected in the 2009 CAMA Land Use Plan. | Sewer system construction is encouraged for individual developments. The County's policy is to provide central water service to all areas of the county. | Policy objective is to make water and sewer service available | None |
| Capital Improvements Plan | None | N/A | Low, since no CIP exists | Consider adoption of a fiscally responsible/ conservative CIP |

**Table 30. Community Capability Assessment for the Town of Bridgeton**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | Adopted and in effect | Coastal Area Management Act (CAMA) Plan: Adopts goals intended to guide future land use; encourages avoidance of undesirable development in floodplain; supports stormwater runoff management and avoidance of development in unsafe or unfeasible areas. See Section C.3 - Special Note on Bridgeton Land Use Plan. | High, sets prudent planning objectives for reduction of hazards and post-disaster reconstruction | None, other than update of CAMA plan as necessary |
| Zoning Ordinance and Watershed Protection Ordinance | Adopted and in effect | Adopts development use, design standards, density and intensity requirements within the Town and enables a zoning board of adjustment to oversee ordinance provisions; allows "planned unit developments" (PUD) that cluster development (see Article IX). | High, coordinates zoning districts with land suitability and infrastructure availability and encourages PUD/cluster development | None |
| Subdivision Ordinance | Adopted and in effect | Specifies procedures for review and approval of subdivision plats and specifies required design standards for land development and approval of subdivisions (see Sections 11 and 13, in particular) | High, requires adequate ditching / drainage structures and requires detailed information on natural features, storm drains, grade of lots and proposed roads, flood hazard areas and flood elevations as prerequisite for subdivision | None |
| Parks/Greenway System | N/A - No program at this time | N/A - No parks at this time | Low, since no Town owned parks or greenways exist | Consider development of a parks and recreation master plan to purchase floodprone land for development as parks/ recreational facilities. |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Inspections/ Permitting | Conducted through the Town of Bridgeton Building and Inspections Office | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |
| Stormwater Management | None currently in place | The Town supports the NC Coastal Stormwater Management rules. | Medium, NCDOT and Town conduct ditch/drainageway maintenance as necessary, but limited resources/powers to control overall stormwater quality and quantity | Due to significant drainage-related flooding in town, consider adoption of a stormwater management plan and best management practices |
| Flood Damage Prevention Ordinance | Participates in the NFIP.<br><br>Adopted May 4, 1987. | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the Town. Bridgeton is not a participant in the CRS program. | High, elevation above Base Flood Elevation (BFE) for all developments in SFHA in Town and ETJ | None |
| Capital Improvements Plan | None | N/A | Low, since no CIP exists | Consider adoption of a CIP |

**Table 31. Community Capability Assessment for the Town of Cove City**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | Adopted and in effect | Cove City is included in the 2009 Craven County CAMA Land Use Plan and the policies in that plan apply to the Town of Cove City (see Section C.2 - Special Note on Craven County CAMA Land Use Plan) | Low, since overall policy guidance for land use does not exist | Adopt a CLUP to CAMA standards |
| Zoning Ordinance | Adopted and in effect | Adopts development use, design standards, density and intensity requirements within the Town and enables a zoning board of adjustment to oversee ordinance provisions; allows "planned unit developments" (PUD) that cluster development (see Article IV). | High, coordinates zoning districts with land suitability and infrastructure availability and encourages PUD/cluster development | None |
| Subdivision Ordinance | None at this time | The Town complies with the Craven County Subdivision Ordinance. | Low, since overall policy guidance for land use does not exist | Adopt a CLUP to CAMA standards |
| Parks/Greenway System | None at this time | N/A - No parks at this time | Low, since no Town owned parks or greenways exist | None - due to rural location and large lot size, ample recreational opportunities are available to citizenry |
| Inspections/ Permitting | Conducted through Craven County Permitting/Building Inspections | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |
| Stormwater Management | NCDOT (for State roads), Town council conducts ditch/ drainage maintenance under contract as necessary | The Town relies on Craven County, through the County's subdivision ordinance, for stormwater management. | Medium, NCDOT and Town do conduct ditch/drainageway maintenance as necessary, but limited resources/powers to control overall stormwater quality and quantity | Due to significant drainage-related flooding in town, consider adoption of a stormwater management plan and best management practices |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Flood Damage Prevention Ordinance | Participates in the NFIP.<br><br>Adopted August 12, 2002. | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the Town. Cove City is not a participant in the CRS program. | High, elevation above Base Flood Elevation (BFE) for all developments in SFHA in Town and ETJ | None |
| Capital Improvements Plan (CIP) | None | N/A | Low, since no CIP exists | Consider adoption of a CIP |

**Table 32. Community Capability Assessment for the Town of Dover**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | Adopted and in effect | Dover is included in the 2009 Craven County CAMA Land Use Plan and the policies in the plan apply to the Town of Dover (see Section C.2 - Special Note on Craven County CAMA Land Use Plan). | Low, since overall policy guidance for land use does not exist | Adopt a CLUP to CAMA standards |
| Zoning Ordinance | Adopted and in effect | Adopts development use, design standards, density and intensity requirements within the Town and enables a zoning board of adjustment to oversee ordinance provisions; allows "planned unit developments" (PUD) that cluster development. | High, coordinates zoning districts with land suitability and infrastructure availability and encourages PUD/cluster development | None |
| Subdivision Ordinance | None at this time | The Town of Dover complies with the Craven County Subdivision Ordinance | Low, since overall policy guidance for land use does not exist | Adopt a CLUP to CAMA standards |
| Parks/Greenway System | None at this time | N/A - No parks at this time | Low, since no Town owned parks or greenways exist | None - due to rural location and large lot size, ample recreational opportunities are available to citizenry |
| Inspections/ Permitting | Conducted through Craven County Permitting/Building Inspections | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |
| Stormwater Management | NCDOT (for State roads), Town council conducts ditch/ drainage maintenance under contract as necessary | The Town of Dover relies on Craven County, through the County's subdivision ordinance, for stormwater management. | Medium, NCDOT and Town do conduct ditch/drainageway maintenance as necessary, but limited resources/powers to control overall stormwater quality and quantity | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Flood Damage Prevention Ordinance | No Floodplain Management Ordinance in effect. | The Town does not participate in the NFIP. | Low, since there are no land use controls on development in high hazard areas and Town residents cannot obtain flood insurance through the National Flood Insurance Program (NFIP) | None, since no area in the Town is in the 100 or 500 year floodplain as defined by FEMA |
| Capital Improvements Plan (CIP) | None | N/A | Low, since no CIP exists | Consider adoption of a CIP |

**Table 33. Community Capability Assessment for the City of Havelock**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CAMA) | Current plan adopted in 2009 | Coastal Area Management Act (CAMA) Plan: Adopts goals intended to guide future land use; encourages avoidance of undesirable development in floodplain, supports stormwater runoff management and avoidance of development in unsafe or unfeasible areas. Adopts policies very similar to those described above (see Section C.4 - Special Note on Havelock 2009 Comprehensive Land Use Plan). | High, sets prudent planning objectives for reduction of hazards and post-disaster reconstruction | None |
| Zoning Ordinance | Draft Unified Development Ordinance (UDO), July 16, 2010 | Adopts development use, design standards, density and intensity requirements within the City and enables the City Planning Department and a zoning board of adjustment to oversee ordinance provisions; encourages "planned unit developments" (PUD) that cluster development. | High, coordinates zoning districts with land suitability and infrastructure availability and encourages PUD/cluster development | None |
| Subdivision Ordinance | Draft Unified Development Ordinance (UDO), July 16, 2010 | Specifies procedures for review and approval of subdivision plats and specifies required design standards for land development and approval of subdivisions. | High, requires adequate ditching/drainage structures and requires detailed information on natural features, storm drains, grade of lots and proposed roads, flood hazard areas and flood elevations as prerequisite for subdivision | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Parks/Greenway System | The City of Havelock hired a consultant to create the Comprehensive Parks and Recreation Master Plan. The plan was adopted by the City in September 2007. The information provided below was obtained from the master plan.<br><br>The City of Havelock has no existing level of service standards for evaluating parks and recreation facilities. Although 39% of the residential acres with Havelock's city limits exist in the western portion (above NC 101/Fontana Boulevard), only 16% of the park and recreational facilities are located there. The four west-side parks include the Waterfront, Stonebridge, Wolf Creek, and MacDonald Downs Parks. Additionally, one of these parks–Wolf Creek–has no public access, dropping the percentage of usable facilities in western Havelock to 14%. The population of Havelock continues to grow westward, and these residents are clearly underserved. The Comprehensive Parks and Recreation Master Plan | The 2007 Parks and Recreation Master Plan is in effect - calls for systematic development of parks and recreation facilities. | High, considers acquisition of parks and greenways, that will protect hazard-prone areas | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Inspections/ Permitting | Conducted through City of Havelock Planning and Inspections Deparment to State code | The City of Havelock Code of Ordinances ensures compliance with State building code | High, effective, City-wide system for enforcement of State building code | None |
| Stormwater Management | Stormwater Management Ordinance adopted April 23, 2001<br><br>Erosion and Sedimentation Control Ordinance Adopted on July 28, 1975<br><br>Draft Unified Development Ordinance (UDO), July 16, 2010, Chapter 156 | Chapter 17 of City of Havelock Code of Ordinances - Establishes standards and procedures to satisfy 15A NCAC 2B.0235 Neuse River Basin--Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements and the North Carolina Stormwater Management rules.<br><br>Chapter 4A of City of Havelock Code of Ordinances – Regulates certain land-disturbing activities to control accelerated erosion and sedimentation in order that water pollution from sedimentation may be controlled, and that the accelerated erosion and sedimentation of lakes and natural watercourses and damage to public and private property by sedimentation be inhibited. | High, reduces sedimentation accrual in ditches and canals and ensures proper functioning of City drainage system | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Flood Damage Prevention Ordinance | Participates in the NFIP<br><br>Adopted on May 4, 1987<br><br>Joined Community Rating System Program (CRS) on October 1, 1995 | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the City.<br><br>The CRS program of the National Flood Insurance Program (NFIP) is intended to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance. It provides incentives for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. The incentives are in the form of premium discounts. The City of Havelock is a "Class 8" CRS member, which means that property owners in SFHA receive a 10% reduction on their flood insurance premiums and property owners outside of the SFHA receive a 5% reduction. | High, requires freeboard above Base Flood Elevation (BFE) for all developments in SFHA and reduces flood insurance rates for property owners in the City | None |
| Capital Improvements Plan (CIP) | Maintains a current CIP | The planning horizon for the City's current CIP is FY2011/12. High priority projects in the document include: new patrol cars for the police department, a new fire station on US 70 near Catawba Road, new compaction truck for solid waste pick-up, specific improvements to the water and sewer treatment and collection systems, and upgrades to the Tourist Center. | High | Maintain an updated CIP |

**Table 34. Community Capability Assessment for the City of New Bern**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | New Bern, River Bend and Trent Woods Regional Land Use Plan, Adopted 2008 | Plan meets requirement of Coastal Area Management Act (CAMA) Plan: Adopts goals intended to guide future land use; encourages avoidance of undesirable development in floodplain, supports stormwater runoff management and avoidance of development in unsafe or unfeasible areas. A full list of these policies is at the New Bern Regional Land Use Plan (see Section C.5 - Special Note on 2008 Regional Land Use Plan for New Bern, River Bend, and Trent Woods) | High, sets prudent planning objectives for reduction of hazards and post-disaster reconstruction | None |
| Zoning Ordinance | Coordinated Land Use Ordinance including zoning adopted in 1992<br><br>Waterfront Conservation and Development Plan (WCDP) adopted in 1988<br><br>New Bern Urban Design Plan (NBUDP) was adopted in 2000<br><br>Historic District guidelines (HD) adopted in 1995 | Article IX of Section 15 of Appendix A of the City of New Bern Code of Ordinances - Adopts development use, design standards, density and intensity requirements within the City and enables the City Planning Department and a zoning board of adjustment to oversee ordinance provisions; encourages "planned unit developments" (PUD) that cluster development and allows broad design and performance standards rather than prescriptive, Euclidian zoning in all areas of the City.<br><br>WCDP, NBUDP, and HD plan all incorporate consideration for hazard reduction in design of new or substantially renovated buildings, particularly in flood hazard areas | High, coordinates zoning districts and structure design with land suitability and infrastructure availability and encourages PUD/cluster development | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Subdivision Ordinance | Coordinated Land Use Ordinance including subdivision design standards and requirements adopted in 1992, and amended as necessary | Specifies procedures for review and approval of subdivision plats and specifies required design standards for land development and approval of subdivisions | High, requires adequate ditching/drainage structures and requires detailed information on natural features, storm drains, grade of lots and proposed roads, flood hazard areas and flood elevations as prerequisite for subdivision | None |
| Parks/Greenway System | The City of New Bern operates a full-service parks and recreation department with numerous passive and active recreational facilities | City adopted a Parks and Recreation Master Plan in 1996 that defined the present and future role of the City of New Bern Parks and Recreation Department and recommended policy guidelines and standards of service. | Medium, because City maintains an excellent parks and recreation program, but no strategic plan is in place to prioritize (or consider) acquisition of appropriate hazard-prone areas for future facilities | Focus acquisition of land for system in hazard prone areas for passive parks/walking trails, when possible |
| Inspections/ Permitting | Conducted through City of New Bern Planning and Inspections Department to State code | Section 10 of City of New Bern Code of Ordinances - Ensures compliance with State building code. | High, effective, City-wide system for enforcement of State building code | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Stormwater Management | Stormwater Management Ordinance adopted March 13, 2001<br><br>Erosion and Sedimentation Control Ordinance Adopted in March, 1968 (with zoning ordinance)<br><br>Both items are incorporated into the 2008 Regional Land Use Plan for New Bern, River Bend, and Trent Woods. | Section 15-501 through 565 of Appendix A of the City of New Bern Code of Ordinances - Establishes standards and procedures to satisfy 15A NCAC 2B.0235 Neuse River Basin--Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements and support North Carolina Coastal Stormwater Management Rules.<br><br>Section 15-306 through 309 of Appendix A of the City of New Bern Code of Ordinances – Regulates certain land-disturbing activities to control accelerated erosion and sedimentation in order that water pollution from sedimentation may be controlled, and that the accelerated erosion and sedimentation of lakes and natural watercourses and damage to public and private property by sedimentation be inhibited. | High, reduces sedimentation accrual in ditches and canals and ensures proper functioning of City drainage system | None |
| Flood Damage Prevention Ordinance | Participates in the NFIP<br><br>Adopted on April 28, 1987<br><br>Joined Community Rating System Program (CRS) on October 1, 1992 | Section 15-296 through 300 of Appendix A of the City of New Bern Code of Ordinances ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the City. The City has a CRS Rating of 8. | High, requires one foot of freeboard above Base Flood Elevation (BFE) for all developments in SFHA and reduces flood insurance rates for property owners in the City | None |
| Capital Improvements Plan (CIP) | None | N/A | Low, since no CIP exists | Consider adoption of a fiscally conservative CIP |

**Table 35. Community Capability Assessment for the Town of River Bend**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | New Bern Regional Land Use Plan (NBRLP), Adopted 2008 (includes Town of River Bend) | NBRLP Plan meets requirement of Coastal Area Management Act (CAMA) Plan: Adopts goals intended to guide future land use; encourages avoidance of undesirable development in floodplain, supports stormwater runoff management and avoidance of development in unsafe or unfeasible areas. A full list of these policies is in the New Bern Regional Land Use Plan, Section 3.821 (see Section C.5 - Special Note on 2008 Regional Land Use Plan for New Bern, River Bend, and Trent Woods) | High, sets prudent planning objectives for reduction of hazards and post-disaster reconstruction | None |
| Zoning Ordinance | Adopted in 1981, Amended in 1989 | Adopts development use, design standards, density, and intensity requirements within the Town and enables the Town Planning Department and a zoning board of adjustment to oversee ordinance provisions; encourages "planned unit developments" (PUD) that cluster development. | High, coordinates zoning districts with land suitability and infrastructure availability and encourages PUD/cluster development | None |
| Subdivision Ordinance | Adopted in 1981 and amended 2005 | Specifies procedures for review and approval of subdivision plats and specifies required design standards for land development and approval of subdivisions. | High, requires adequate ditching/drainage structures and requires detailed information on natural features, storm drains, grade of lots and proposed roads, flood hazard areas and flood elevations as prerequisite for subdivision | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Parks/Greenway System | The Town of River Bend owns several areas of developed recreational facilities and open space. The town also has several wildlife preserves located along the Plantation Canal and the Trent River. Developed park space totals approximately 14 acres and public open space totals approximately 40 acres. | None – a parks and recreation master plan has not been adopted. The Town does have a Master Plan for the Town Commons. | Medium, because the Town maintains an excellent parks and recreation program, but no strategic plan is in place to prioritize (or consider) acquisition of appropriate hazard-prone areas for future facilities | Focus acquisition of land for system in hazard-prone areas for passive parks/walking trails, when possible |
| Inspections/ Permitting | Conducted through Craven County Permitting/Building Inspections | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |
| Stormwater Management | In June 2009, the town adopted a series of local ordinance changes to encourage low intensity development (LID) practices. These changes assist with stormwater management | Subdivision ordinance calls for impact statements on the part of a developer prior to any major construction work being completed, and the Town ensures enforcement of State sedimentation and erosion control laws. In addition, in June 2009, the subdivision ordinance was revised to incorporate LID design requirements. The Town supports the North Carolina Coastal Stormwater Management rules. | Medium, NCDOT and Town do conduct ditch/drainageway maintenance as necessary, but limited resources/powers to control overall stormwater quality and quantity | The Town will continue to support the North Carolina Coastal Stormwater Management rules |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Flood Damage Prevention Ordinance | Participates in the NFIP<br><br>Originally adopted on August 21, 1985, amended December 19, 2001 | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the Town. The Town has been approved by the ISO insurance office for participation in the CRS program. The Town has not yet been rated, but a rating of 8 is expected. | High, requires freeboard above Base Flood Elevation (BFE) for all developments in SFHA | None |
| Capital Improvements Plan | Adopted annually | The Town of River Bend maintains a Five Year Capital Improvement Plan, a multi-year forecast (through 2008) of major infrastructure, capital improvement, and equipment needs and a projection of expenditures needed to meet these needs. | High, CIP does not encourage development in hazard-prone areas and helps improve existing drainage problems | None |

**Table 36. Community Capability Assessment for the Town of Trent Woods**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | New Bern Regional Land Use Plan (NBRLP), Adopted March 9, 2000 (includes Town of Trent Woods) | NBRLP Plan meets requirement of Coastal Area Management Act (CAMA) Plan: Adopts goals intended to guide future land use; encourages avoidance of undesirable development in floodplain, supports stormwater runoff management and avoidance of development in unsafe or unfeasible areas. A full list of these policies is in the New Bern Regional Land Use Plan, Section 3.831 (see Section C.5 - Special Note on 2008 Regional Land Use Plan for New Bern, River Bend, and Trent Woods) | High, sets prudent planning objectives for reduction of hazards and post-disaster reconstruction | None |
| Zoning Ordinance | Adopted April 14, 1987, updated in 1998, and last amended on September 6, 2007. | Town zoning ordinance limits development in wetlands overlay district, ensuring compliance with Federal and State laws regarding wetlands. | Medium, protects wetland areas and does not currently allow high intensity use in hazard areas (or anywhere in the Town), but with sewer extended to Town, pressure for more intense uses in hazard areas may result | Consider review and revision of zoning ordinance to reflect sewer system and the higher intensity uses it will demand. |
| Subdivision Ordinance | Adopted November 9, 1989 and most recently amended on May 8, 2007. | Specifies procedures for review and approval of subdivision plats and specifies required design standards for land development and approval of subdivisions (see Article III, Section 305 and 306, particularly) | Medium, requires detailed information on natural features, storm drains, grade of lots and proposed roads, flood hazard areas and flood elevations as prerequisite for site development - but could be updated to incorporate additional erosion control measures | Consider adoption of an erosion control plan. |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/ Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Parks/Greenway System | The Town of Trent Woods owns and operates several small areas of developed recreational facilities and open space. | A parks and recreation master plan has not been prepared | Medium, because the Town maintains an excellent parks and recreation program, but no strategic plan is in place to prioritize (or consider) acquisition of appropriate hazard-prone areas for future facilities | Focus acquisition of land for system in hazard prone areas for passive parks/walking trails, when possible |
| Inspections/ Permitting | Conducted through Craven County Permitting / Building Inspections | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |
| Stormwater Management | No comprehensive, Town-wide stormwater management program, but stormwater impacts are considered in subdivision ordinance | Subdivision ordinance requires that developers specify drainage features and measures as part of subdivision approval, and the Town ensures enforcement of State sedimentation and erosion control laws.<br><br>The Town complies with the North Carolina Coastal Stormwater Management rules. | Medium, NCDOT and Town do conduct ditch/drainageway maintenance as necessary, but limited resources/powers to control overall stormwater quality and quantity | Due to significant drainage related flooding in town, consider adoption of a stormwater management plan and best management practices |
| Flood Damage Prevention Ordinance | Participates in the NFIP<br><br>Adopted February 10, 1987, and last amended on June 3, 2004. | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the Town. The Town does not participate in the CRS program. | High, elevation above Base Flood Elevation (BFE) for all developments in SFHA in Town and ETJ | None |
| Capital Improvements Plan | None | CIP currently in progress. | High, preparation of a CIP is in progress | Consider adoption of a fiscally conservative CIP |

**Table 37. Community Capability Assessment for the Town of Vanceboro**

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Comprehensive Land Use Plan (CLUP) | Adopted and in effect | Vanceboro is included in the 2009 Craven County CAMA Land Use Plan and the policies in the plan apply to the Town of Vanceboro (see Section C.2 - Special Note on Craven County CAMA Land Use Plan). | Low, since overall policy guidance for land use does not exist | Adopt a CLUP to CAMA standards |
| Zoning Ordinance | Adopted in 1977 and in effect | Adopts development use, design standards, density and intensity requirements within the Town and enables a zoning board of adjustment to oversee ordinance provisions; allows "planned unit developments" (PUD) that cluster development. | High, coordinates zoning districts with land suitability and infrastructure availability and encourages PUD/cluster development | None |
| Subdivision Ordinance | None at this time | The Town complies with the Craven County Subdivision Ordinance. | Low, since overall policy guidance for land use does not exist | Adopt a CLUP to CAMA standards |
| Parks/Greenway System | One small town owned park | The Town has not prepared a Parks and Recreation Master Plan | Low, since no comprehensive parks/greenways system exists | None - due to rural location and large lot size, ample recreational opportunities are available to citizenry and Town does not have resources to operate and maintain a full parks/recreation department |
| Inspections/ Permitting | Conducted through Craven County Permitting/Building Inspections | Ensures compliance with State building code | High, centralized and efficient County-wide system for enforcement of State building code | None |

| Policies and Programs | Policy/ Program Status | Document Reference | Effectiveness/Rationale for Mitigation | Recommendations for Future Action |
|---|---|---|---|---|
| Stormwater Management | NCDOT (for State roads), Town Aldermen conduct ditch/ drainage maintenance under contract as necessary | Stormwater management is regulated through the Craven County Subdivision Ordinance. The Town supports the North Carolina Stormwater Management rules. | Medium, NCDOT and Town do conduct ditch/drainageway maintenance as necessary, but limited resources/powers to control overall stormwater quality and quantity | None |
| Flood Damage Prevention Ordinance | Participates in the NFIP<br><br>Adopted August 4, 1988 | Ensures that properties developed in Special Flood Hazard Areas (SFHA) meet elevation and design requirements as required by the Federal Emergency Management Agency (FEMA) for provision of Federally backed flood insurance in the Town. The Town does not participate in the CRS program. | High, elevation above Base Flood Elevation (BFE) for all developments in SFHA in Town and ETJ | None |
| Capital Improvements Plan (CIP) | None | N/A | Low, since no CIP exists | Consider adoption of a fiscally conservative CIP |

2. Special Note on Craven County CAMA Land Use Plan

The Craven County CAMA Land Use Plan was adopted by Craven County in August, 2009. The land use plan includes policy statements which address the following issues:

1. Public Access
2. Land Use Compatibility
3. Infrastructure Carrying Capacity
4. Natural Hazard Areas
5. Water Quality
6. Local Areas of Concern

The policy statements have an impact on three areas:

- CAMA minor and major permitting as required by N.C.G.S. 113A-118 prior to undertaking any development in any area of environmental concern.
- Establishment of local planning policy.
- Review of proposed projects requiring state or federal assistance or approval to determine consistency with local policies.

The following provides a list of policies included in the 2009 Craven County CAMA Land Use Plan which are relevant to mitigation planning, redevelopment, and implementation of the Hazard Mitigation Plan:

*Natural Hazard Policies*

- Craven County recognizes the uncertainties associated with sea level rise. The rate of rise is difficult to predict. Thus, it is difficult to establish policies to deal with the effects of sea level rise. Craven County supports cooperation with local, state, and federal efforts to inform the public of the anticipated effects of sea level rise.
- Craven County supports hazard mitigation planning. The Land Use Plan and the Hazard Mitigation Plan should be consistent with one another. When either are revised, the other should be reviewed for consistency. Should there ever be conflicting policies, the Land Use Plan shall take precedence.
- Craven County supports relocation of structures endangered by erosion, if the relocated structure will be in compliance with all applicable policies and regulations.
- Craven County supports the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of fresh water swamps, marshes, and 404 wetlands.

- Craven County will, at a minimum, support 15A NCAC 7H and other local, state, and federal policies to minimize threats to life, property, and natural resources resulting from erosion, high winds, storm surge, flooding , or sea level rise.
- Craven County will make efforts to educate citizens and industries regarding the importance of properly storing and disposing of hazardous chemicals on a regular basis.

*Natural Hazards Implementing Actions*

- Craven County will rely on the North Carolina Department of Environment and Natural Resources, Division of Coastal Management to monitor and regulate development in areas susceptible to sea level rise and wetlands loss.
- Craven County will consider updates or amendments to its land use plan policies as necessary to protect the county's public and private properties from rising water levels.
- Craven County will support bulkheading to protect its shoreline areas from intruding water resulting from rising sea level.
- Craven County will press state and federal agencies with regulatory authority, and will use local development regulations to monitor and regulate outer continental shelf exploration.
- Craven County will utilize future land use map to control development. This map is coordinated with the land suitability map and proposed infrastructure map.
- As part of the hazard mitigation planning process, Craven County will support educating its citizens and businesses on the importance of properly storing hazardous materials.

3. Special Note on Bridgeton Land Use Plan

The Bridgeton Land Use Plan was adopted by the Town of Bridgeton in May, 1996, with amendments adopted in April, 1998. The following provides a list of policies included in the 1995 Land Use Plan or 1998 Land Use Plan Addendum, which are relevant to mitigation planning, redevelopment, and implementation of the Hazard Mitigation Plan:

*Floodprone Areas*

- It shall be the policy of the Town of Bridgeton to support regulations limiting the potential property losses which might be incurred by flooding. This shall be accomplished by continued enforcement of the local flood damage prevention ordinance and through appropriate coordination with the public, Craven County Inspections Department, NC Division of Coastal Management, FEMA, and the Army Corps of Engineers.

*Hurricane and Flood Evacuation Needs and Plans*

- It shall be the policy of the Town of Bridgeton to support and endorse the County's evacuation plan relative to hurricanes and floods. The town will be represented on the planning committee for the overall hazard mitigation plan and will sign endorsement of the document whenever updated.

*Stormwater Runoff*

- It shall be the policy of the Town of Bridgeton to rely on State enforcement of stormwater runoff regulations to minimize contamination of the Neuse River from urban uses or development.

*Restriction of Development in Areas up to 5 Feet Above Mean High Water*

- It shall be the policy of the Town of Bridgeton to allow appropriate development in low-lying areas subject to sea level rise in accordance with local, state, and federal regulations. This shall be accomplished by consistent enforcement of local zoning, flood damage prevention ordinance, state building codes, and federal flood insurance requirements.

*Redevelopment of Developed Areas, Including Relocation of Structures Endangered by Erosion*

- It shall be the town's policy to encourage development and rehabilitation of deteriorating properties. This shall be accomplished by periodic investigation into Community Development Block Grant Applications for housing rehab or other improvements to relieve blight conditions.

4. Special Note on Havelock 2009 Comprehensive Land Use Plan

The following goals, policies, and objectives support the Hazard Mitigation Plan and are included in the City of Havelock 2009 Comprehensive Plan:

***Goal 8***: Minimize damage and distribution to daily lives caused by an inadequate storm water management system that is prone to flooding.

*Objective 8.1*: Manage the quantity and quality of storm water run-off generated by individual parcels in the city.

*Policy 8.1.1* Implement and enforce state regulations related to storm water quantity and quality, especially in relation to special provisions adopted for the Neuse River Basin.

*Policy 8.1.2* Continue to participate in the National Flood Insurance Program and enforce the minimum rules and requirements set forth in the Flood Damage Prevention Ordinance.

*Policy 8.1.3* Continue to coordinate with the North Carolina Division of Water Quality regarding state storm water regulations and permits required during the development review process.

*Policy 8.1.4* Evaluate new cost-effective programs for minimizing flood damage, including modification of construction setback requirements and other site design techniques.

*Objective 8.2* Identify, prioritize, and provide financial resources to plan, construct, operate and maintain a city-wide storm water management program.

*Policy 8.2.1* Prepare a storm water master plan (SWMP) that identifies and prioritizes storm water problem areas and targets capital improvements to mitigate them. The content and format of the SWMP shall exceed the minimum rules and requirements set forth under the National Pollution Discharge Elimination System (NPDES) for a Phase 1 Permit and the Neuse River Nutrient Sensitive Waters Management Strategy.

*Policy 8.2.3* Where deemed fiscally prudent, allocate funds in the City's Capital Improvements Plan on an annual basis to implement recommendations for the local Storm Water Management Plan.

***Goal 13***: Protect the City's natural resources, infrastructure, and human life from harm by natural disasters.

*Objective 13.1*: Continue to improve pre-disaster planning and post-disaster response and redevelopment for the City.

*Policy 13.1.1* Review adequacy of zoning, subdivision, and flood damage prevention ordinances for control of flooding hazards.

*Policy 13.1.2* Actively support full participation in the County's Special Needs Registry.

*Policy 13.1.3* Update the Parks and Recreation Master Plan to incorporate purchase and development of flood-prone lands for recreational activities as a priority.

*Policy 13.1.4* Work with NCDOT Division Four Highway Operations Unit and convene a working group to develop solutions for localized drainage issues caused (in part or in whole) by NCDOT maintained drainage facilities.

*Policy 13.1.5* Review "Firewise" zoning and subdivision standards and report on their appropriateness for incorporation into zoning and subdivision ordinances.

*Policy 13.1.6* Continue to undertake public education efforts designed to help inform the public of their exposure to natural hazards and to inform them of actions they can take to mitigate the damages to their health and property from natural hazards.

*Policy 13.1.7* Work with Craven County to convene a working group with electric service providers to produce a report that addresses the issues of disaster preparedness techniques and communication with County officials during and immediately after a natural hazard event that results in loss of electrical power.

*Policy 13.1.8* Apply for funding from HMGP or other Federal/State funding for at least two of the tope priority ANHRE identified IF they are eligible and in a project category identified by the State of North Carolina as being of high priority.

*Policy 13.1.9* Ensure that elevation certification data, data related to mitigation measures implemented, and floodplain data are available through the Internet on the County's GIS website.

*Policy 13.1.10* Encourage surveyors, local government officials, engineers, and land planners to become familiar with the NFIP land use and building standards by attending annual workshops presented by the NC Division of Emergency Management (NC DEM).

*Policy 13.1.11* Continue to participate in the Community Rating System (CRS) program of the National Flood Insurance Program (NFIP).

*Policy 13.1.12* Designate a representative (member and alternate) to a County-wide Mitigation Advisory Committee and ensure those representatives complete the tasks detailed in the Hazard Mitigation Plan.

5. Special Note on Regional Land Use Plan for New Bern, River Bend, and Trent Woods

The following policies and action items support this Hazard Mitigation Plan, including redevelopment, and are included in the Regional Land Use Plan for New Bern, River Bend, and Trent Woods:

*Natural Hazards Policies*

*Policy NH 1*: Special Flood Hazard Areas (SFHA) (those areas having a one percent chance of flooding in any year) may be flooded during major storm events and pose risks. The regional municipalities will take measures to mitigate these risks and will avoid taking any action in these areas that materially increases risks to life and property.

*Policy NH 2*: Development and redevelopment within special flood hazard areas shall meet the standards of the National Flood Insurance Program.

*Action Item NH2a*:The lowest floor elevation should be at least two feet higher than the A and AE zones (for new development).

*Policy NH 3*: In addition to improved protection from flood hazards for life and property, any proposed redevelopment or expansion of a site within the special flood hazard areas should demonstrate that post-development conditions will improve the capacity of the area to provide storage or conveyance of flood waters (for redevelopment).

*Policy NH 4*: New public facilities and structures, and improvements to existing public facilities and structures, shall be located and designed to mitigate natural hazards.

*Policy NH 5*: Emergency evacuation shall be a priority in the development and approval of transportation plans and improvements included in the NC DOT Transportation Improvement Program (TIP).

*Action Item NH5a*: The regional municipalities shall make emergency evacuation training available for emergency responders, including procedures and process.

*Policy NH 6*: The regional municipalities will continue public education efforts with respect to protecting property from hazards, particularly flood and wind damage, as well as construction requirements related to the National Flood Insurance Program. Also, public education will provide information and mapping of emergency shelters, water supplies, and evacuation routes.

*Policy NH 7*: The municipalities support the Craven County Hazard Mitigation Plan and the Emergency Management Plans, especially as they relate to hazard mitigation, disaster preparation, evacuation, and post-disaster recovery. They also support the continuation of hurricane awareness programs.

*Action Item NH7a*: The municipalities will continue to actively enforce the NC State Building Code, particularly requirements for construction standards to meet wind-restrictive factors such as a design wind velocity. The municipalities will continue to participate in the National Flood Insurance Program and will continue to enforce flood-related provisions in respective Land Use/Zoning Ordinances. Additionally, the municipalities will also continue to participate, or seek participation in the Community Rating System (CRS).

*Action Item NH7b*: The municipalities will avoid zoning areas susceptible to storm surge for higher density residential uses and intensive nonresidential uses, and will continue to support and cooperate with the state and federal governments and other local units of government in emergency management planning and training.

*Action Item NH7c*: The municipalities will continue to support enforcement of state and federal programs which aid in mitigation of hurricane hazards, including CAMA and the US Army Corps of Engineers “404" permit process and FEMA/National Flood Insurance Programs.

*Policy NH 8*: Minimize the location of land uses and structures in identified flood hazard areas.

*Action Item NH8a*: The municipalities will continue to participate in the National Flood Insurance Program and promote enforcement through the building inspections program. Proposed developments complying with the requirements of the Land Use/Zoning Ordinances, applicable state building codes, and National Flood Insurance Program, not otherwise damaging to areas of environmental concern, may be permitted. The municipalities support continued enforcement of the CAMA and “404" wetlands permits for development processes in areas susceptible to flooding.

*Water Quality Policies*

*Policy WQ 1*: The municipalities endorse policies, plans, and actions that help protect the water quality of the planning area's rivers, streams, beaches and estuarine systems by preventing soil erosion and sedimentation, and by controlling stormwater runoff entering receiving waters.

*Action Item WQ1a*: The municipalities will promote the use of best available management practices to minimize the degradation of water quality resulting from stormwater runoff; examples of these practices include using pervious or semi-pervious materials for driveways and walks, retaining natural vegetation along marsh and waterfront areas, and allowing stormwater to percolate into the ground rather than discharging it directly to estuarine/coastal waters. Swales should be encouraged for use throughout the planning area.

*Policy WQ 2*: Protect, maintain, and conserve coastal and 404/401 wetlands and open space as established by State standards.

*Policy WQ 3*: Ground water resources shall be protected from pollution, salt-water intrusion, and excessive drawdown. Efforts shall be made to monitor the quantity and quality of groundwater resources.

*Action Item WQ3a*: The municipalities should seek to work with state agencies and other institutions to initiate research for injection of properly treated effluent from wastewater treatment plants into coastal aquifers. Studies should be initiated to investigate the appropriate use and recycling/reuse of treated water, an important freshwater resource. River Bend has reviewed how other states are using this resource to block the intrusion of salt water as the aquifers in the coastal plain are drawn down. Clearly the use of coastal aquifers as a source of potable water carries the risk of salt water intrusion into the fresh water aquifer, replacing what was once potable water. An example would be the public water supply on Hilton Head Island which has recently purchased a desalination plant.

*Policy WQ 4*: Stormwater runoff from development should be of the quality and quantity of the pre-development volumes. Low impact development and other non-structural methods of controlling stormwater runoff will be encouraged.

*Action Item WQ4a*: The municipalities will seek to improve stormwater drainage by requesting either the US Army Corps of Engineers or other source to undertake a drainage study. The study recommendations will be incorporated into public infrastructure improvements and new standards for private development. The municipalities will coordinate with each other and adjoining local government jurisdictions to address comprehensive stormwater management practices and policies to enhance water quality.

*Policy WQ 5*: Development that preserves the natural features of the site including existing topography and significant existing vegetation shall be encouraged. Coastal and non-coastal wetlands shall not be considered part of a lot's acreage for the purpose of determining minimum lot size or development density. Open space developments shall be encouraged to reduce impervious surface areas associated with new development and redevelopment.

*Policy WQ 6*: Development will adhere to the Neuse Buffer Rules as an effective, low cost means of protecting water quality.

*Policy WQ 7*: The environmental benefits of properly designed, vegetated roadside drainage swales shall be recognized. Curb and gutter designs shall be reserved to developments that are urban in character (i.e. less than 10,000 square foot lot sizes) and that are served by adequate stormwater collection, retention, and slow release facilities.

*Policy WQ 8*: Untreated wastewater discharges shall not be permitted into the receiving waters of the region. Discharges of treated wastewater will be allowed with all applicable Division of Water Quality permits. Nitrogen and phosphorus limits will be in accordance with the State-mandated Neuse River Nutrient Sensitive Waters Management Strategy.

## *D. Legal Capability Review*

As a general rule, local governments have only that legal authority which is granted to them by their home state. This principle, that all power is vested in the State and can only be exercised to the extent it is delegated, is known as "Dillon's Rule," and applies to all North Carolina's political subdivisions. Enabling legislation in North Carolina grants a wide array of powers to its cities, towns, and counties.

Local regulations which are enacted within the bounds of the state's enabling authority do not automatically meet with judicial acceptance. Any restrictions which local governments impose on land use or building practices must follow the procedural requirements of the Fourteenth Amendment, or risk invalidation.

These and other constitutional mandates apply to federal and state governments, and all their political subdivisions. Any mitigation measures that are undertaken by the local government in its regulatory capacity must be worded and enforced carefully within the parameters established by the state and federal Constitutions, even when such measures are authorized by the General Statutes of North Carolina, and even when such measures are enacted in order to protect public health and safety by protecting the community from the impacts of natural hazards.

Within the limits of Dillon's Rule and the federal and state constitutions, local governments in North Carolina have a wide latitude within which to institute mitigation programs, policies, and actions. All local government powers fall into one of four basic groups (although some governmental activities may be classified as more than one type of power): regulation, acquisition, taxation, and spending. Hazard mitigation measures can be carried our under each of the four types of powers. Following are a list of these powers and how they may be useful tools for hazard mitigation:

### 1. Regulations

#### *a. General Police Power*

Local governments in North Carolina have been granted broad regulatory powers in their jurisdictions. North Carolina General Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate, or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety, and welfare), towns, cities, and counties may include requirements for hazard

mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

*b. Building Codes and Building Inspections*

Many structural mitigation measures involve constructing and retrofitting homes, businesses, and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the building code. North Carolina has a state compulsory building code which applies throughout the state (N.C.G.S. 143-138). However, municipalities and counties may adopt codes for the respective areas if approved by the state as providing "adequate minimum standards." However, local regulations cannot be less restrictive than the state code.

Local governments in North Carolina are also empowered to carry out building inspection. N.C.G.S. Ch. 160A, Art. 19, Part 5; and Ch. 153A, Art. 18, Part 4 empower cities and counties to create an inspection department, and enumerates its duties and responsibilities, which include enforcing state and local laws relating to the construction of buildings; installation of plumbing, electrical, heating systems, etc.; building maintenance; and other matters.

*c. Land Use*

Regulatory powers granted by the state to local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development; all these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enact and enforce zoning ordinances, floodplain ordinances, and subdivision controls.

Zoning: For the purpose of promoting health, safety, morals, or the general welfare, a county or a municipality may adopt zoning and development regulation ordinances. These ordinances may be adopted as part of a unified development ordinance or as a separate ordinance. A zoning ordinance may regulate and restrict the height, number of stories and size of buildings and other structures, the percentage of lots that may be occupied, the size of yards, courts and other open spaces, the density of population, and the location and use of buildings,

structures, and land for trade, industry, residence, or other purposes. The ordinance may provide density credits or severable development rights for dedicated rights-of-way pursuant to NC GS 153A-340 for counties or 160A-381 for municipalities.

Floodway Regulation: The North Carolina General Statutes declare that the channel and a portion of the floodplain of all the state's streams will be designated as a floodway, either by the local government or by the state. The legislatively declared purpose of designating these areas as a floodway is to help control and minimize the extent of floods by preventing obstructions which inhibit water flow and increase flood height and damage and other losses (both public and private) in flood hazard areas, and to promote the public health, safety, and welfare of citizens of North Carolina in flood hazard areas.

To carry out this purpose, local governments are empowered to grant permits for the use of the floodways, including the placement of any artificial obstruction in the floodway. No permit is required for certain uses, including agricultural, wildlife and related uses; ground level uses such as parking areas, rotary aircraft ports; lawns, gardens, golf courses, tennis courts, parks, open space, and similar private and public recreational uses. Existing artificial obstructions in the floodway may not be enlarged or replaced without a permit; local governments are empowered to acquire existing obstructions by purchase, exchange, or condemnation if necessary to avoid flood damages.

The procedures that are laid out for issuing permits for floodway use require the local government to consider the dangerous effects a proposed artificial obstruction may create by causing water to be backed up or diverted; or the danger that the obstruction will be swept downstream to the injury of others; and by the injury or damage that may occur at the site of the obstruction itself. Local governments are to take into account anticipated development in the foreseeable future which may be adversely affected by the obstruction, as well as existing development.

Planning: In order to exercise the regulatory powers conferred by the General Statutes, local governments in North Carolina are required to create or designate a planning agency. The planning agency may perform a number of duties, including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties. The importance of the planning powers of local governments is

emphasized in N.C.G.S. 153A-340, which requires that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted "in accordance with a plan," the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community.

Subdivision Regulation: A county or a municipality may by ordinance regulate the subdivision of land within its territorial jurisdiction. In addition to final plat approval, the ordinance may include provisions for review and approval of sketch plans and preliminary plats. The ordinance may provide for different review procedures for differing classes of subdivisions. The ordinance may be adopted as part of a unified development ordinance or as a separate subdivision ordinance. Decisions on approval or denial of preliminary or final plats may be made only on the basis of standards explicitly set forth in the subdivision or unified development ordinance. Whenever the ordinance includes criteria for decisions that require application of judgement, those criteria must provide adequate guiding standards for the entity charged with plat approval. This authority is provided under NC GS 153-330 for counties and NC GS 160A-371 for municipalities.

2. Acquisition

The power of acquisition can be a useful tool for pursuing mitigation goals. Local governments may find the most effective method for completely "hazard-proofing" a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. North Carolina legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease, or eminent domain.

3. Taxation

Taxation is yet another power granted to local governments by North Carolina law which can be used as a hazard mitigation tool. The power of taxation extends beyond merely the collection of revenue. Many communities set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands) and can be used to discourage development in hazardous areas.

Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending,

or otherwise building or improving beach erosion control or flood and hurricane protection works within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of services a city deems necessary within its boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

4. Spending

The fourth major power that has been delegated from the North Carolina State General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles should be made a routine part of all spending decisions made by the local government, including annual budgets and Capital Improvement Plans.

A capital program is usually a timetable by which a city indicates the timing and level of municipal services it intends to provide over a specified duration. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend municipal services, a community can control its growth to some extent especially where the surrounding area is such that the provision of on-site sewage disposal and water supply are unusually expensive.

In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to municipal services.

A capital improvement program (CIP) that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs.

## *E. Fiscal Capability Review*

There are many diverse sources of funding available to communities to implement local hazard mitigation plans, including both government and private programs. Often an organization with a particular focus will fund only part of a project. However, with coordination, the community can combine the funding efforts of one program with those of another, thereby serving multiple missions. The grant and loan programs described in the following two pages of this plan are a significant, although certainly not a sole source of funding options.

While federal and national programs carry out the bulk of disaster relief programs that provide funds for mitigation, local governments are encouraged to open the search field as widely as possible, and include alternative funding sources to supplement the local hazard mitigation budget. For instance, local businesses and organizations will frequently support projects that benefit their customers or employees, or which constitute good "PR." Other groups or individuals may be willing to donate "in-kind" services, eliminating the need for cash. Often the in-kind and volunteer services of local community members can be counted toward the local share that is typically needed to match an outside source of funds.

Local governments may also engage in their own "fund-raising" efforts to pay for mitigation programs that benefit the community at large. In North Carolina, local governments are granted limited powers to raise revenue for public purpose. The General Assembly has conferred upon cities, towns, and counties the power to levy property taxes for various purposes, including: "ambulance services, rescue squads, and other emergency medical services; beach erosion and natural disasters (including shoreline protection, beach erosion control, and flood and hurricane protection); civil defense; drainage projects or programs; fire protection; hospitals; joint undertakings with other county, city, or political subdivisions; planning; sewage; solid waste; water; water resources; watershed improvement projects" N.C.G.S. §16A-209. These statutorily enumerated purposes make it clear that local governments are empowered to finance certain emergency management activities, including mitigation activities, with property taxes.

The following is a list and description of several programs which offer funding for hazard mitigation, redevelopment, and post disaster recovery:

### 1. Hazard Mitigation Grant Program (HMGP)

The Federal Disaster Assistance Act (Stafford Act) provides funds authorized by the federal government and made available by FEMA for a cost-share program to states. The HMGP provides 75% of the funds while the states provide 25% of the funds for mitigation measures through the post-disaster planning process. The Division of Emergency Management administers the program in this state. The state share may be met with cash

or in-kind services. The program is available only for areas affected by a Presidentially-declared disaster.

2. Disaster Preparedness Improvement Grant (DPIG)

This grant provides federal matching funds for communities to develop hazard mitigation plans, expand existing plans, update disaster preparation plans, and to prepare the administrative plans required to qualify for Hazard Mitigation Grant Program grants. Funds for the DPIG are provided by FEMA and the Division of Emergency Management administers the program in each state.

3. Flood Mitigation Assistance Program (FMAP) / Pre-Disaster Mitigation (HMGP)

The FMAP program provides grants for cost-effective measures to reduce or eliminate the long-term risk of flood damage to the built environment and real property. The program's main goal is to reduce repetitive losses to the National Flood Insurance Program. The FMAP is available to eligible communities every year, not just after a Presidentially-declared disaster. Funds for the FMAP are provided by FEMA and the Division of Emergency Management administers the program in each state.

The HMGP program is very similar to the FMAP, except that it is funded by a yearly appropriation from FEMA and may address all hazards. Application is made to the State of North Carolina Division of Emergency Management (NCDEM).

4. Public Assistance Program (PA)

The Public Assistance provides federal aid to communities to help save lives and property in the immediate aftermath of a disaster and to help rebuild damaged facilities. Grants cover eligible costs associated with the repair, replacement, and restoration of facilities owned by state and local governments and nonprofit organizations. The Public Assistance program is administered by FEMA.

5. Small Business Administration Disaster Assistance Program

This program provides loans to businesses affected by Presidentially-declared disasters. The program provides direct loans to businesses to repair or replace uninsured disaster damages to property owned by the business, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible. Nonprofit organizations are also eligible. The SBA administers the Disaster Assistance Program.

6. Community Development Block Grant (CDBG)

The CDBG program provides grants to entitlement communities (metropolitan cities and urban counties) for post-disaster hazard mitigation and recovery following a presidential declaration of a Major Disaster of Emergency. Funds can be used for activities such as acquisition, rehabilitation, or reconstruction of damaged properties and facilities and redevelopment of disaster-affected areas. Funds may also be used for emergency response activities, such as debris clearance and demolition and extraordinary increases in the level of necessary public services. HUD provides funds for the CDBG and the Division of Community Assistance administers the program in each state.

## *F. Political Acceptability Review*

This subsection of the plan is intended to address the participating communities' "political willpower" to address hazards threats in a proactive manner. This "political willpower" is a significant component of a community's capability to implement hazard mitigation. It is, however, a very difficult factor to assess and evaluate as it is constantly changing based on the turnover in elected officials and the (perceived and actual) frequency and severity of natural hazard events.

The following principles of political acceptability are applicable for all nine (9) local governments participating in this plan:

1. Independent of existing regulations that directly address hazard mitigation (e.g., floodplain management ordinance), hazard mitigation is not a goal that should be addressed *independent of* other goals and objectives of the local government, due to limited local government resources; and

2. Hazard mitigation should be considered and incorporated into policies, procedures and programs which affect land use and development, such as siting of roadways, siting and building of public facilities, zoning and subdivision ordinances, and extension of infrastructure necessary for growth; and

3. Local revenues are insufficient to support hazard mitigation projects for mitigation of existing hazards at the local level, however, Federal and State grant funds for priority hazard mitigation projects should be pursued when available.

4. One of local government's primary roles in implementing hazard mitigation is educating the public about the risks of natural hazards and how to reduce these risks and/or the costs of these risks.

# SECTION 5. VULNERABILITY ANALYSIS

This section of the HMP identifies specific locations throughout the County that are vulnerable to natural hazards through narrative, data and maps and establishes "Geographic Planning Areas", which are areas of particular vulnerability to natural hazards, and provides detailed data and analysis of these areas. These tasks are broken into the following subsections:

A) Developed Areas, Undeveloped Areas and Anticipated Growth Areas
B) Critical Facilities
C) Hazardous Locations
   1. Individual Hazard Areas
   2. All-Hazards Exposure
   3. Areas of Natural Hazard Risk Exposure (ANHRE)
D) Repetitive Loss Structures
E) Geographic Planning Areas

## *A. Developed Areas, Undeveloped Areas, and Anticipated Growth Areas*

Table 38 provides the Craven County population projections through 2030. The high growth population forecast includes an anticipated influx of military personnel and induced population growth as the result of military realignment expected to occur by 2011. Within the seven military growth task force counties of Carteret, Craven, Duplin, Jones, Onslow, Pamlico, and Pender, an influx of military related population of 36,000 is expected. Of this regional total, approximately 6,500 people will be located in Craven County. The base high growth scenario, excluding growth related to the military increase, is an annual growth rate of 0.011, which is 0.005 higher than the State Office of Planning reported annual growth rate of 0.006. The 0.011 base annual growth rate is midway between the forecast state annual growth rate of 0.0178 and the county's low scenario of 0.006.

**Table 38. Craven County (including municipalities) and North Carolina Population Projections**

| | 2000 | 2007 | 2010 | 2015 | 2020 | 2025 | 2030 | % Change | Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|
| Low Growth[1] Scenario County | 91,523 | 96,426 | 98,965 | 102,623 | 105,938 | 108,739 | 110,669 | 20.9% | .006 |
| High Growth[2] Scenario County | 91,523 | 96,426 | 103,9874 | 105,059 | 106,143 | 107,239 | 108,347 | 18.4% | .011 |
| North Carolina[1] | 8,049,313 | 9,069,370 | 9,539,095 | 10,263,686 | 11,004,303 | 11,751,384 | 12,352,728 | 53.5% | .0178 |

Source: [1]North Carolina Office of State Budget and Management. [2] Holland Consulting Planners, Inc.

This same growth will occur throughout Craven County, but most growth will occur in the US 70 corridor and in the municipalities.

## 1. Developed and Undeveloped Areas

Table 39 (below) provides, in acres, the area of unincorporated Craven County and each participating municipality (and its extra-territorial jurisdiction (ETJ), if one exists) that is developed and undeveloped.

**Table 39. Acres of Land, Developed and Undeveloped for unincorporated Craven County and Municipalities, 2009**

| | Undeveloped | | Developed* | | |
|---|---|---|---|---|---|
| | # Parcels | Acres | # Parcels | Acres | % Undeveloped |
| County | 7,998 | 15,770.08 | 21,972 | 397,396.85 | 3.80% |
| Bridgeton | 119 | 453.49 | 292 | 389.64 | 53.78% |
| Cove City | 90 | 101.76 | 243 | 276.38 | 26.90% |
| Dover | 85 | 45.51 | 255 | 508.35 | 8.21% |
| Havelock | 311 | 489.13 | 4,648 | 10,834.77 | 4.31% |
| New Bern | 3,685 | 5,877.82 | 11,362 | 10,164.72 | 36.63% |
| River Bend | 189 | 551.30 | 1,590 | 884.49 | 38.40% |
| Trent Woods | 275 | 267.12 | 1,886 | 1,379.97 | 16.21% |
| Vanceboro | 198 | 147.45 | 447 | 898.11 | 14.10% |
| TOTAL | 12,950 | 23,703.66 | 43,195 | 422,733.28 | 5.30% |

*Includes agricultural.
NOTE: Table 39 included in the 2004 HMP was based on building value; the new Table 39 is based on land use.
Source: Craven County GIS Dept; DCA, and current CAMA Land Use Plans.

Maps 2 (A through I), graphically depict the existing land use within each jurisdiction as well as the county overall. All land use data for municipalities are to corporate limits; ETJ data is included within the County.

The determination of vacant and developed land was determined with existing land use plans, municipal zoning, and the County's GIS. Determinations are based on use and not building value.

It is anticipated that the undeveloped areas indicated in Table 39 will be developed for the uses indicated in Table 40. However, it is impossible to forecast the number of structures and critical facilities.

**Table 40. Acres of Undeveloped Land by Allowable Future Use**

| | Residential | Commercial | Industrial | Other |
|---|---|---|---|---|
| Craven County | | NO COUNTYWIDE ZONING | | |
| Bridgeton | 17.07 | 420.77 | 6.05 | 0.46 |
| Cove City | | NOT ZONED | | |
| Dover | 45.19 | 0.32 | 0.00 | 0.00 |
| Havelock | 481.29 | 138.91 | 83.56 | 1.42 |
| New Bern | 5,913.91 | 538.00 | 140.36 | 10.87 |
| River Bend | 482.93 | 13.93 | 0.00 | 19.59 |
| Trent Woods | 271.00 | 265.19 | 0.00 | 6.86 |
| Vanceboro | 130.90 | 7.96 | 8.58 | 0.00 |

NOTE: Refer to Table 43 for description of zoning and undeveloped land located in flood hazard areas.
Source: Craven County and participating municipality zoning ordinance and Craven County GIS Department.

## 2. Anticipated Growth Areas

Map 3 depicts anticipated high growth areas in Craven County and portions of the participating municipalities. Table 41 provides the developed and undeveloped acreage in the anticipated growth areas depicted on Map 3, as well as the acres of anticipated growth areas which fall within a flood hazard area.

**Table 41. Anticipated Growth Areas for unincorporated Craven County and Municipalities, 2009**

| | Anticipated Growth Areas | | AGA Flood A/AE | | AGA Flood AEFW | |
|---|---|---|---|---|---|---|
| | Developed | Undeveloped | Developed | Undeveloped | Developed | Undeveloped |
| County | 31,214.70 | 1,907.34 | 4,271.85 | 240.35 | 1,555.31 | 10.59 |
| Bridgeton | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cove City | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Dover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Havelock | 1,191.54 | 336.89 | 89.52 | 85.69 | 0.00 | 0.00 |
| New Bern | 1,285.60 | 1,575.93 | 289.20 | 520.72 | 0.00 | 0.00 |
| River Bend | 82.59 | 21.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| Trent Woods | 559.68 | 75.86 | 61.17 | 11.44 | 0.00 | 0.00 |
| Vanceboro | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| TOTAL | 34,334.11 | 3,917.14 | 4,711.74 | 858.20 | 1,555.31 | 10.59 |

Source: Craven County GIS and Holland Consulting Planners, Inc.

For all communities, the depicted anticipated growth areas where established based on the following criteria:

1) Water, sewer, roads, and other public services are available or will very shortly (within five years) be available.
2) Permits for development have been filed and/or development permit activity in these areas has been high.
3) Recent, historical growth trends support future development.
4) Existing policies, such as Local Comprehensive Development Plans and Zoning Ordinances, project growth in these areas.

Descriptions of specific anticipated growth areas and the potential impact of natural hazards on these areas follow in Section C.3 (Areas of Natural Hazard Risk Exposure (ANHRE) of this plan below.

*B. Critical Facilities*

Of the properties located within Craven County, the damage or destruction of publicly owned facilities poses an immense potential of disrupting the day-to-day lives of the citizens of Craven County.

Critical facilities are defined for the purpose of this document as those facilities essential to the preservation of life and property during a disaster and or those facilities critical to the continuity of government as well as those necessary to ensure timely recovery. Some square footage dimensions are approximate.

The critical facilities in Craven County and its participating municipalities are provided as Maps 2 (A through I). Map references and salient information regarding critical facilities are provided as Appendix F to this plan. This listing provides the location and type of all critical facilities within the County. These facilities fall within all defined hazard areas.

*C. Hazardous Locations*

1. Individual Hazard Areas

Individual hazards to which only specific areas of the County are uniquely exposed are flooding, storm surge inundation, and wildfire.

*a. Flooding*

As stated above, flood hazard risk varies significantly within Craven County, but flooding risk is very high in and near the major population centers of New Bern, Havelock, Trent Woods and River Bend. The analysis of flood impact is based on FEMA-defined flood hazard areas. The review of flood hazard areas are an

indicator of the hazard associated with flooding resulting from hurricanes, nor'easters, dam/levee failure, and tsunamis.

Maps 2 (A through I) graphically depict the extent of the high risk flooding areas within the County as defined by the County's Flood Insurance Rate Maps (FIRMs) developed by the Federal Emergency Management Agency (FEMA). FEMA defines areas within "flood zones", based on varying levels of risk of flooding in each area (see below). Properties in zones "A" and "AE" are considered to be high-risk flood zones, as there is a 1% or greater chance of flooding each year. Properties in zone "X-500" have an approximately 0.2% or 1 in 500 chance of flooding each year.

- **Zone A:** Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage.
- **Zone AE:** The base floodplain where base flood elevations are provided.
- **Zone VE:** Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage.
- **Zone X500:** Areas of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods.
- **Zone X:** Areas of minimal flood hazard, usually depicted as above the 500-year flood level.

Tables 42 through 44 provide information on the number of acres in the FEMA-defined 100-year and 500-year floodplains by jurisdiction and the areas susceptible to storm surge inundation. Table 44 is based on Craven County tax records/data secured through the Craven County GIS system. The tax data was applied to the flood hazard areas for segregation of impacted properties.

**Table 42. Acres of Developed and Undeveloped Land in Various Flood Zones (A and AE)**
**Craven County and Municipalities, 2009**

| | Developed | | | Undeveloped | | |
|---|---|---|---|---|---|---|
| | A | AE | AEFW | A | AE | AEFW |
| Craven County | 49,966.13 | 43,055.00 | 7,200.23 | 5.11 | 3,425.61 | 125.14 |
| Bridgeton | 0.00 | 246.66 | 0.00 | 0.00 | 432.15 | 0.00 |
| Cove City | N/A | N/A | N/A | N/A | N/A | N/A |
| Dover | N/A | N/A | N/A | N/A | N/A | N/A |
| Havelock | 0.00 | 145.19 | 8.58 | 0.00 | 93.55 | 2.50 |

| | Developed | | | Undeveloped | | |
|---|---|---|---|---|---|---|
| | A | AE | AEFW | A | AE | AEFW |
| New Bern | 0.00 | 2,752.13 | 21.05 | 0.00 | 1,691.41 | 0.72 |
| River Bend | 0.00 | 238.52 | 0.00 | 0.00 | 137.96 | 0.00 |
| Trent Woods | 0.00 | 191.14 | 8.37 | 0.00 | 96.65 | 2.71 |
| Vanceboro | 0.00 | 312.87 | 5.87 | 0.00 | 10.49 | 10.71 |

Source: Craven County GIS and Holland Consulting Planners, Inc.

**Table 43. Acres of Undeveloped Land in 100-year floodplain (A and AE) by Zoning Classification Craven County and Municipalities, 2009**

| | AE | | | |
|---|---|---|---|---|
| | Residential | Commercial | Industrial | Other |
| Craven County | N/A | N/A | N/A | N/A |
| Bridgeton | 17.07 | 418.18 | 0.46 | 0 |
| Cove City | N/A | N/A | N/A | N/A |
| Dover | N/A | N/A | N/A | N/A |
| Havelock | 275.67 | 33.96 | 0 | 0.01 |
| New Bern | 1605.48 | 141.92 | 22.94 | 6.86 |
| River Bend | 119.96 | 1.54 | 0 | 16.45 |
| Trent Woods | 96.65 | 0 | 0 | 0 |
| Vanceboro | 10.28 | 0.2 | 0 | 0 |

Source: Craven County GIS and Holland Consulting Planners Inc.

**Table 44. Flood Damage Exposure for Craven County and Municipalities, 2009**

| | Flood Zone AE | | | |
|---|---|---|---|---|
| | # Structures | Building Value | Land Value | Property Value |
| **Craven County** | 3,354 | $756,773,128 | $258,255,010 | $1,015,028,138 |
| **Bridgeton** | 145 | $9,624,485 | $5,661,630 | $15,286,115 |
| **Cove City** | N/A | N/A | N/A | N/A |
| **Dover** | N/A | N/A | N/A | N/A |
| **Havelock** | 90 | $10,478,800 | $3,242,150 | $13,720,950 |
| **New Bern** | 2,002 | $183,984,115 | $82,064,950 | $266,049,065 |
| **River Bend** | 517 | $47,883,170 | $19,099,410 | $66,982,580 |
| **Trent Woods** | 193 | $32,126,571 | $18,226,940 | $50,353,511 |
| **Vanceboro** | 33 | $649,501 | $343,400 | $992,901 |

| | Flood Zone AEFW | | | |
|---|---|---|---|---|
| | # Structures | Building Value | Land Value | Property Value |
| **Craven County** | 86 | $6,489,346 | $19,604,960 | $26,094,306 |
| **Bridgeton** | 0 | 0 | 0 | 0 |
| **Cove City** | N/A | N/A | N/A | N/A |
| **Dover** | N/A | N/A | N/A | N/A |
| **Havelock** | 5 | $483,640 | $412,610 | $896,250 |
| **New Bern** | 4 | $121,750 | $54,360 | $176,110 |
| **River Bend** | 0 | 0 | 0 | 0 |
| **Trent Woods** | 5 | $424,670 | $261,480 | $686,150 |
| **Vanceboro** | 4 | $54,920 | $34,610 | $89,530 |

Source: Holland Consulting Planners and Craven County GIS Department.

### *b. Wildfires*

As noted above, the risk of wildfire damages in Craven County is mitigated by the fact that forested tracts are generally of manageable size, accessible to fire fighting equipment and personnel and circumscribed by roadways or waterways that limit the extent and severity of wildfires. There are, however, numerous areas of "urban-wildland interface" that pose a wildfire risk, particularly in those areas that are not covered by one of Craven County's incorporated fire departments.

Map 3 depicts areas particularly susceptible to wildfire risk. This map was developed in consultations with Stanley Kite, the County Fire Marshall who is experienced in wildfire evaluation and response in the County, and was reviewed by the MAC. Table 45 provides a tabular breakdown by County and municipal government of the data reflected in Map 3.

**Table 45. Acres of Developed and Undeveloped Land at Elevated Wildfire Risk, Craven County and Selected Municipalities, 2009**

| County/Municipality Name | Developed, at Elevated Wildfire Risk | Undeveloped, at Elevated Wildfire Risk |
|---|---|---|
| Unincorporated Craven County* | 12,009 | 78,846 |

*This table addresses the rural fire hazard areas. It should be noted that all municipalities within the county fall adjacent to forestlands. These areas are termed the "urban/wildland interface."
Source: Holland Consulting Planners, Inc.

*c. Storm Surge Inundation*

Maps 4 (A through H) depict the extent of storm surges during fast (i.e., 15.1 mph to 35 mph forward speed) and slow (1 to 15 mph forward speed) moving hurricanes, based on the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) modeling process. The SLOSH model is the universally accepted model for predicting hurricane storm surge used by the National Weather Service and the National Oceanic and Atmospheric Administration. Keep in mind that these maps represent the worst-case scenario and that no one hurricane will necessarily cause all of the flooding represented on the maps.

**Table 46. Acres of Developed Land at Elevated Storm Surge Inundation Risk, Craven County and Municipalities, 2009 (Slow and Fast Moving SLOSH Model)**

| | SLOSH Slow | | | SLOSH Fast | | |
|---|---|---|---|---|---|---|
| | 1 & 2 | 3 | 4 & 5 | 1 & 2 | 3 | 4 & 5 |
| **Craven County** | 41,544.51 | 59,949.00 | 94,293.74 | 24,385.06 | 51,179.18 | 77,066.75 |
| **Bridgeton** | 389.66 | 0.00 | 0.00 | 210.14 | 389.66 | 0.00 |
| **Cove City** | N/A | N/A | N/A | N/A | N/A | N/A |
| **Dover** | N/A | N/A | N/A | N/A | N/A | N/A |
| **Havelock** | 169.43 | 294.13 | 632.25 | 113.37 | 182.74 | 282.27 |
| **New Bern** | 3,726.84 | 4,158.28 | 5,176.63 | 2,526.04 | 3,627.35 | 4,169.35 |
| **River Bend** | 388.16 | 465.90 | 676.07 | 223.38 | 396.97 | 468.79 |
| **Trent Woods** | 408.11 | 921.06 | 1,348.17 | 110.90 | 262.18 | 812.52 |
| **Vanceboro** | 301.40 | 320.62 | 365.56 | 79.72 | 245.85 | 289.82 |

Source: Craven County GIS and Holland Consulting Planners, Inc.

**Table 47. Acres of Undeveloped Land at Elevated Storm Surge Inundation Risk, Craven County and Municipalities, 2009 (Slow and Fast Moving SLOSH Model)**

| | SLOSH Slow | | | SLOSH Fast | | |
|---|---|---|---|---|---|---|
| | 1 & 2 | 3 | 4 & 5 | 1 & 2 | 3 | 4 & 5 |
| **Craven County** | 3,822.32 | 4,931.24 | 7,014.29 | 2,448.15 | 3,532.93 | 5,034.72 |
| **Bridgeton** | 453.49 | 0.00 | 0.00 | 452.27 | 453.49 | 0.00 |
| **Cove City** | N/A | N/A | N/A | N/A | N/A | N/A |
| **Dover** | N/A | N/A | N/A | N/A | N/A | N/A |
| **Havelock** | 81.10 | 93.38 | 147.71 | 60.91 | 82.39 | 92.10 |
| **New Bern** | 1,902.88 | 2,759.51 | 3,036.82 | 1,293.55 | 2,558.22 | 2,732.48 |
| **River Bend** | 180.24 | 187.94 | 299.15 | 163.66 | 178.71 | 188.66 |
| **Trent Woods** | 110.24 | 231.16 | 261.82 | 67.34 | 99.68 | 217.41 |
| **Vanceboro** | 17.43 | 22.25 | 58.48 | 9.34 | 17.97 | 20.15 |

Source: Craven County GIS and Holland Consulting Planners, Inc.

*d. Drought/Extreme Heat*

No analysis was performed to address the drought/extreme heat hazard. All properties and citizens are equally vulnerable to this risk within Craven County. The County and the participating municipalities will continue to monitor the drought situation in conjunction with the State of North Carolina to ensure that water supply resources are protected and maintained. The County has not been required at this point to enforce mandatory water restrictions. This issue is at the forefront of discussions relating to public health and safety within the County.

*e. Estuarine Erosion*

No formal analysis has been conducted with respect to estuarine shoreline erosion. It is difficult to provide data that will accurately portray an estimate of impact. The County will monitor erosion and address problems if and when they evolve.

2. All-Hazards Exposure

Several of the hazards outlined in Section 3 result in impacts that are not geographically targeted at a specific area or portion of the County. The entire County is prone to the effects of severe winter storms, severe thunderstorms, and tornados which are capable of paralyzing the functions of the County and municipal governments. These weather events may have adverse impacts on a very specific or very broad portion of the County. Thus, assessment of vulnerability should take into account the County's entire jurisdiction. Mapping of each of these three hazards was not provided. The rationale behind not providing mapping was that the entire geographic area of the County is subject to these events and such mapping would not prove much value.

It was determined by the MAC that the impact of the following hazards are not confined to specific portions of the County. These hazards may have varying degrees of impact; however, these hazards rarely result in evacuation efforts. The following provides a statement of probability/impact as outlined in Table 18 (Craven County Hazard Impact). This statement of impact is based on four primary factors: probability of occurrence, number of deaths, number of injuries, and amount of property damage.

- **Severe Winter Storms** – Limited
- **Thunderstorms** – Limited
- **Tornadoes** – Critical

Refer to Tables 39 and 40 for a summary of land use conditions within the all hazards exposure area.

### 3. Areas of Natural Hazard Risk Exposure (ANHRE)

The process of identifying ANHRE is central to the planning process that produced this document, and serves as the centerpiece of practical hazard mitigation in Craven County. The ANHRE are areas within the County that have historically flooded, been subject to wildfires, or been subject to other hazards or that have a high potential for future exposure to natural hazards that may result in property damage or loss of life. Areas were identified by a team of staff members from each community, including County/town administration, planning and public works, coordinated by the MAC representative from each community.

Prioritization criteria are based on the actual or potential frequency and severity of the natural hazard at each location, as described in Table 48.

**Table 48. Planning Model for the ANHRE Process**

| | **Frequency** | | |
|---|---|---|---|
| **Severity** | **High** | **Medium** | **Low** |
| **High** | High Priority | High/Medium Priority | Medium Priority |
| **Medium** | High/Medium Priority | Medium Priority | Low/Medium Priority |
| **Low** | Medium Priority | Low/Medium Priority | Low Priority |

The County believes that this process is politically supportable, as it focuses on hazards that have historically occurred rather than those that are solely speculative. Real people have suffered damages at the identified ANHRE sites or very likely may in the future. The process, therefore, makes the goals of mitigation concrete rather than abstract to political leaders and citizenry.

ANHRE for each participating community are provided as Appendix G to this plan. Map 5 depicts the ANHRE for each participating jurisdiction.

### *D. Repetitive Loss Structures*

As noted in the July 1, 2008 version of the Local Multi-Hazard Mitigation Guidance (also known as the "Blue Book") repetitive loss structures are those that have suffered damage from repeated hazard events. The only reliable source of information on repetitive loss structures are flood insurance claims data available through the National Flood Insurance Program (NFIP), administered by the NCDEM Mitigation Division.

The County obtained this data from NCDEM in January,2 010, and has mapped (by US Census Block group only, due to concerns regarding the Federal Privacy Act) the approximate location of repetitive loss structures (see Map 2A). There are currently 108 repetitive loss structures in Craven County (all of which are residential). The total building value for development located within repetitive loss areas of concentration as shown on Map 2A is $84,698,299. The locally adopted CAMA Land Use Plans address redevelopment policies following hazard events.

### *E. Geographic Planning Areas*

Each participating municipality and unincorporated Craven County will constitute its own Geographic Planning Area (GPA). Henceforth in this document, each GPA will be identified by the community name (e.g., City of New Bern). The reason for this decision is that different governing bodies are responsible for growth and development decisions in each GPA and that multiple GPAs within one jurisdiction would unduly focus on one hazard or one area over others when all hazards will be addressed in a prioritized fashion as described in Section 7 of this HMP.

# SECTION 6. ACCEPTABILITY ASSESSMENT

## A. Introduction

This section of the HMP identifies high priority areas of focus for the "action," sections of the plan by providing an overview of conclusions formed from the data and analysis provided in Sections 2 through 5.

As noted in Section 1 of this plan, five public meetings of the County-wide Mitigation Advisory Committee (MAC) were held on hazard mitigation needs, issues, and priorities. All meetings of the MAC were advertised and open to the public. In addition, the County has a website dedicated to the preparation of the HMP update (http://www.cravencountymitigation.info). A County-wide Public Information Meeting was advertised and conducted on December 21, 2009. This meeting was televised on local access television. Public notice was made for all meetings in the New Bern *Sun Journal* and through posting of notices in the administrative offices of each local government.

At these meetings, and through a series of meetings between HCP staff and local officials and staff and the data collection processes in Section 2 through 5 above, the following acceptability assessment was confirmed from the 2004 HMP as current and accurate.

## B. Vulnerability Statement

- The sounds, rivers, streams, lakes, and estuaries of Craven County are among its finest and most defining features. They constitute, in many ways, the economic foundation of the area, due to their role in the siting of industry and the attraction of new residents, especially retirees. Therefore, development in high hazard areas abutting and nearby the aforementioned water features has exploded over the past thirty (30) years. This development, along with older developments along inland creeks, rivers and streams, are particularly susceptible to the impacts of floods caused by storm surge, heavy rainfall, or a combination of these two. Craven County is particularly susceptible to the effects of storm surge flooding due to the shape (e.g., many concave shoreline sections) and nature (e.g., easily overwashed coast in many sections) of the County's coastline and rivers.

  While sustainable and responsible development in hazard prone areas can proceed, the continuation and enhancement of measures designed to mitigate the impacts of flooding are very much warranted. These include retrofitting and/or acquisition/demolition of existing structures in high-hazard areas that do not meet

current flood elevation and building code standards, open-space preservation in high-hazard areas, carefully designed zoning and subdivision standards that allow clustering and other mitigation measures in high hazard areas, and highly effective alert and sheltering systems.

- Effective forest management, prudent zoning and subdivision regulations and excellent fire coverage have helped minimize the impact of wildfires in the County. Additionally, the risk of wildfire damages in Craven County is mitigated by the fact that forested tracts are generally of manageable size, accessible to fire fighting equipment and personnel, and circumscribed by roadways or waterways that limit the extent and severity of wildfires. But many developing areas of the County, however, are outside of existing fire control areas such as the National Forest areas.

  The municipalities in Craven County have significantly less forestland within their corporate limits and extraterritorial jurisdictions (ETJs) than in the unincorporated County, but some municipal governments' boundaries exist at the "urban/wildland interface" – the area where human development meets undeveloped, forested areas that provide fuel for fires. This "urban/wildland interface" presents the greatest risk to life and property from wildfires. The County includes 448,941 acres of forestland. The Croatan National Forest alone occupies 54,405 acres in Craven County.

  This situation calls for consideration of public education efforts regarding wildfire risk reduction and the consideration of subdivision regulations in "urban-wildland interface" areas that require fire breaks, the use of fire-resistant materials, and other reasonable and cost-effective measures to reduce the risk of wildfires.

- Due to a combination of the frequency of winter storms and thunderstorms with high winds and damaging microbursts of rain, the threat of tree limbs and other debris damaging electrical generation facilities is one of the most significant hazards faced by Craven County and its constituent jurisdictions. Power outages caused by such events debilitate commerce and endanger health and safety due to the failure of critical infrastructure such as sewer lift stations and water pumps and life support equipment (especially at private homes). This situation is exacerbated by the fact that there are six (6) different electric service providers in Craven County.

This situation calls for increased coordination with utility companies and other service providers to ensure maximum coordination of activities, especially limb/tree removal close to electric transmission lines, planned deployment of available resources for snow/ice removal equipment and supplies, and increased/improved sheltering opportunities for vulnerable populations.

- Tornados pose significant risk to the County. Increased warning devices and public education efforts should be considered.

- Man-made hazards exist throughout the County including, but not limited to, airport/aircraft operations, rail corridors, primary highway corridors, and hazardous material sites. The problems associated with those man-made hazards are intensified by the natural hazards discussed in this plan.

- Hurricanes are a significant risk to the County, resulting in damages from both high winds and flooding.

### *C. Statement of Commitment*

The County and all participating municipalities are committed to reducing the impact of natural and man-made hazards, with the following broad principals in mind:

- Hazard mitigation is, first and foremost, the responsibility of the individual. As such, goals and strategies that focus on individual initiative and public education will be paramount.

- Due to limited local financial capabilities, State and Federal funding sources will be the primary source of funds to implement hazard mitigation projects for the foreseeable future.

- Hazard mitigation should be pursued, in general, as one of many overall community goals (e.g., economic development, improvement of housing conditions) when pursuing a particular policy or program.

- The MAC will continue to function as a working committee responsible for monitoring the effective implementation of this HMP update.

# SECTION 7. MITIGATION STRATEGIES AND POLICIES

## A. 2004 Mitigation Program Progress Report

**The following progress report outlines implementation status for all strategies documented in the 2004 Craven County Multi-Jurisdictional Hazard Mitigation Plan. This progress report is the first status update in relation to Craven County's mitigation planning program. The statements preceding the implementation summaries have been taken directly from the 2004 HMP. Specific items were not denoted at the action item level in the 2004 plan and were instead drafted as high level strategies. Accordingly, the new strategies outlined in Section 7.C take the 2004 strategies into account but have been revised to reflect the current needs of the County. All implementation statements and updated strategies have been based on the direction of the MAC, and, in addition, the MAC's identified action items introduce a level of detail not articulated in the previous plan.**

### 1. Public Participation

Craven County and the participating municipalities have endeavored to involve the citizenry in developing programs which will provide adequate response to natural and man-made hazards. The Mitigation Advisory Committee (MAC) has met at least three (3) times each year and, in some years, quarterly to review plans and actions related to mitigation. All meetings have been open to the public.

Mitigation related actions taken by participating jurisdictions have included: updating comprehensive land use plans, updating flood hazard ordinances, improving/adopting local ordinances to regulate stormwater runoff and improve drainage, and adopting land use regulatory controls which preserve/protect natural hazard areas. Public hearings related to these actions were held by the appropriate jurisdiction(s).

### 2. Monitoring and Evaluation

Since the adoption of the August 10, 2004, Craven County Multi-Jurisdictional Hazard Mitigation Plan, the MAC has monitored compliance with the 2004 HMP policies. The success of the jurisdiction's compliance is summarized in the following section. As a result of monitoring plan implementation, the County and the municipalities have improved the mitigation related database(s), secured additional mitigation related funding, and improved participation in mitigation related programs such as the Community Rating System.

## 3. Mitigation Strategy Progress

The following section provides a status update regarding the mitigation strategies outlined in the 2004 Craven County Multi-Jurisdictional Hazard Mitigation Plan. Some of the strategies which have been completed are not in this HMP update. If a strategy was deemed to be ongoing, or was not completed, then it will remain within the update or will be modified to satisfy current conditions, and will be considered for implementation within the next five years. The status outlined under each 2004 policy can be defined as follows:

- **Completed** – This policy was completed in full, and is not reflected in the 2010 update.
- **Completed/Ongoing** – This policy was completed through implementation of the 2004 plan; however, the policy requires ongoing monitoring and evaluation.
- **Eliminated** – This policy has been completely eliminated through this update.
- **Revised** – This policy is reflected in the 2010 update, but has been revised to better reflect the MAC's intent and current needs.

**Policy #1:** Review of Adequacy of Zoning, Subdivision, and Flood Damage Prevention Ordinances for Control of Flooding Hazards

*The County and all participating municipalities have adopted/modified their flood hazard regulations to ensure consistency with the state model flood hazard mitigation ordinance.*

Status: Completed/Ongoing

**Policy #2:** Actively support full participation in the County's Special Needs Registry

*The Craven County Emergency Service Department maintains a special needs registry which includes residents of incorporated and unincorporated areas. In 2010, Craven County Social Services and Adult Services will start a registry.*

Status: Completed/Ongoing

**Policy #3:** Development (or update) of a Parks and Recreation Master Plan, incorporating purchase and development of flood-prone lands for recreational activities as a priority.

*All participating jurisdictions either have their own CAMA/Comprehensive plan or are included in the County's CAMA/Comprehensive plan. These plans address recreational facilities, including those located in floodprone areas.*

Status: Revised

**Policy #4:** Consideration of Adoption of a Comprehensive Stormwater Management Program (SMP)

*Since the preparation of the 2004 Multi-Jurisdictional Hazard Mitigation Plan, the state of North Carolina adopted the North Carolina Coastal Stormwater Management Rules. The participating jurisdictions comply with the state coastal rules.*

Status: Completed

**Policy #5:** Consideration of Adoption or Refinement of a Capital Improvements Program

*The participating jurisdictions have addressed capital improvements budgeting during the preparation of their annual budgets.*

Status: Revised

**Policy #6:** Work with the State Office of Dam Safety (ODS) to: a) Ensure that all dams in Craven County for which the ODS has jurisdiction are inspected on a regular basis; b) Ensure that ODS notifies the Craven County Emergency Management (EM) office of all ODS jurisdictional dams classified as "high hazard" or "distressed" dams; c) Attempt to ensure that all high hazard or distressed dams in the County have an updated and implemented operations and maintenance plan and emergency action plans; and d) Provide the County EM office with an inventory of all ODS jurisdictional dams in the County.

*The participating jurisdictions have continued to work with the North Carolina Office of Dam Safety.*

Status: Completed/Ongoing

**Policy #7:** Work with the North Carolina Department of Transportation (NCDOT) Division Two Highway Operations unit and convene a working group (County-wide or local) to develop solutions to localized drainage issues caused (in part or in whole) by NCDOT maintained drainage facilities.

*A working group was not established with NCDOT to address drainage problems.*

Status: Revised

**Policy #8:** Review "Firewise" zoning and subdivision standards and report on their appropriateness for incorporation into existing (or new) zoning and subdivision ordinances.

*The MAC discussed "firewise" zoning but specific standards have not been incorporated into any local ordinances.*

Status: Revised

**Policy #9:** Implement public education efforts designed to help inform the public of their exposure to natural hazards and to inform them of actions they can take to mitigate the damages to their health and property from natural hazards.

*The following implementing actions have been accomplished and are recognized through the Community Rating System:*

- *Craven County, New Bern, River Bend, and Havelock (all CRS participants) furnish inquirers with flood zone information from the community's latest FIRM, publicizing the service annually and maintaining records.*

- *An outreach brochure is mailed annually to all properties in the community's Special Flood Hazard Area (SFHA). The community also provides flood information through displays at county offices and the library, information posted on the County website, and presentations to civic groups and property owner associations.*

- *The local real estate agents provide disclosure of flood hazards to prospective buyers.*

- *Documents relating to floodplain management are available in the reference section of the Craven County Library.*

- *The community provides technical advice and assistance to interested property owners and annually publicizes the service.*

Status: Revised

**Policy #10:** Work with local American Red Cross (ARC) officials to develop a plan and implementation goals for ensuring that all County-sponsored shelters meet ARC shelter operations standards for wind resistance, flood resistance, and access by 2010.

*The Craven County EMS maintains close contact with the American Red Cross (ARC). In addition, a representative of the ARC has been added to the MAC during this HMP update process.*

Status: Revised

**Policy #11:** Convene a working group with electric service providers in the County and produce a report, with specific recommendations and detailed implementation timelines, that addresses the issues of 1) disaster preparedness techniques (e.g.: tree trimming, pole replacement) and 2) communication with County officials during and immediately after a natural hazard event that results in loss of electrical power.

*The working group with electric service providers has not been convened. However, mitigation and recovery efforts have been closely coordinated with the electric providers.*

Status: Revised

**Policy #12:** Apply for funding from the Hazard Mitigation Grant Program (HMGP) or other Federal/State funding for at least two (2) of the top priority ANHRE identified in Section III of this plan IF they are eligible and in a project category identified by the State of North Carolina as being of high priority

*Craven County and the participating jurisdictions have pursued available mitigation funds including severe repetitive loss funds and funding to prepare this plan update. Some SRL properties receiving assistance are located in the ANHRE's.*

Status: Completed/Ongoing

**Policy #13:** Ensure that elevation certificate data, data related to mitigation measures implemented (e.g., acquisition/elevation of property), and floodplain data are available through the Internet on Craven County's Government Geographic Information System (GIS) website: (http://gismaps2.cravencounty.com/maps/map.asp).

*The County and the participating municipalities have maintained elevation certification data and have received CRS points/consideration.*

Status: Completed/Ongoing

**Policy #14:** Encourage surveyors, local government officials, engineers, and land planners to become familiar with the NFIP land use and building standards by attending annual workshops presented by the NC Division of Emergency Management (DEM).

*The County has, through on-going working relationships, encouraged familiarity with NFIP land use and building standards.*

Status: Revised

**Policy #15:** Become (Towns of Trent Woods, River Bend and Bridgeton) or remain (Craven County, Cities of New Bern and Havelock) a participant in the Community Rating System (CRS) program of the National Flood Insurance Program (NFIP).

*The County and the following municipalities participate in the CRS: Havelock, New Bern, and River Bend.*

Status: Completed/Ongoing

**Policy #16A:** Ensure that each local governing body designates a representative to a County-wide Mitigation Advisory Committee (MAC) member and alternate to perform the tasks specified in this policy by November 1, 2004

**Policy #16B:** Convene the MAC no later than October 1, 2005 to complete the following tasks: A) Review the consistency and effectiveness of existing Mitigation, Disaster Recovery and Mitigation plans contained in local CAMA plans and in local emergency operations plans; B) Identify ways that hazard mitigation can be further incorporated into these plans; and C) Identify ways that increased inter-governmental cooperation and coordination between local government units in Craven County may assist in implementing hazard mitigation in the pre and post disaster environment.

**Policy #16C:** Each local government will either reaffirm and/or revise the policies contained in each local government's CAMA Land Use Plan regarding Storm Hazard Mitigation and Disaster Recovery and incorporate them into this plan by action of local governing body by September 1, 2005.

*All participating jurisdictions have continuously had representatives on the MAC. The updated CAMA Land Use Plan recognize and are consistent with the 2004 mitigation plan.*

Status: Completed/Ongoing

**Policy #17:** The responsible party will coordinate with each department head in the local government and produce a report on ways in which hazard mitigation goals, objectives and tasks can be incorporated into existing policies and implemented through existing programs and personnel.

*The individual jurisdiction MAC representatives have been responsible for conveying/coordinating mitigation goals, objectives, and tasks to the local jurisdictions.*

Status: Revised

*B. Goals and Objectives*

Goals are statements of desirable future conditions that are to be achieved. They are broad in scope and assist in setting county and municipal priorities. Objectives are more tangible and specific than goals. The goals contained herein provide the basis for the objectives, and corresponding implementation action items that are included in this plan, some of which are already being administered and implemented through existing county and municipal initiatives.

The overall hazard mitigation planning effort is focused on providing Craven County and the municipalities of New Bern, Havelock, Trent Woods, River Bend, Bridgeton, Vanceboro, Dover, and Cove City with an action plan that will strive toward the achievement of these goals. In order to establish this plan, the MAC was charged with developing objectives and specific implementing actions tied to each of these goal statements.

In working through this update, the MAC reviewed all goals and objectives for applicability and relevance to current conditions. Based on the following listing, several new goals and objectives were established to broaden the scope of mitigation strategies addressed through this update.

The following provides definitions of how the goals, objectives, and implementing actions relate to one another:

- **Goals** – A broad based statement of intent that establishes the direction for the Craven County Multi-Jurisdictional Hazard Mitigation Plan. Goals state desired outcomes for the overall implementation process.

- **Objectives** – The stated means of achieving each defined goal, or tasks to be executed in the process of achieving stated goals.

- **Implementing Actions** – A project specific strategy aimed at mitigation and involving a specific entity, interest, and funding mechanism.

The following goals are adopted by this plan (***E*** = existing/unchanged from 2004 HMP goal; ***N*** = new goal):

1. Reduce the risk of loss of life and personal injury from natural hazards. ***(E)***
2. Reduce the risk and impact of future natural disasters by regulating development in known high hazard areas. ***(E)***
3. Maintain critical facilities in functional order. ***(N)***
4. Protect infrastructure from damage. ***(N)***
5. Ensure that hazard mitigation is considered when redevelopment occurs after a natural disaster. ***(E)***
6. Provide education to citizens that empowers them to protect themselves and their families from natural hazards. ***(E)***
7. Fulfill Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance. ***(N)***
8. Improve interjurisdictional cooperation and coordination, especially regarding the reduction of natural hazard impacts. ***(N)***

As the MAC worked through the development of this action plan, the group concentrated on six primary mitigation focus areas. These focus areas define the various aspects of mitigation, and provide guidance toward the development of comprehensive solutions to mitigation planning.

- **Prevention Mechanisms** include regulatory methods such as planning and zoning, building regulations, open space planning, land development regulations, and stormwater management.

- **Property Protection** actions diminish the risk of structural damage through acquisition of land, relocation of buildings, modifying high-risk structures, and floodproofing high-risk structures.

- **Natural Resource Protection** can soften hazard impacts through mechanisms such as erosion and sediment control or wetlands protection.

- **Emergency Services** measures include warning, response capacity, critical infrastructures protection, and health and safety maintenance.

- **Structural Mitigation** controls natural hazards through projects such as reservoirs, levees, diversions, channel modifications and storm sewers.

- **Public Education/Information** includes providing hazard maps and information, outreach programs, real estate disclosure, technical assistance and education.

Table 49 outlines all objectives and implementing actions developed through the Craven County hazard mitigation planning process. The table provides a description of each objective and implementing actions aimed at furthering each. The table also provides guidance relating to funding sources, parties responsible for implementation, priority, and identification of which goals and mitigation focus areas are being addressed through each implementation action.

The objectives in Table 49 have been ranked based on input received from the MAC through the planning process. Each implementing action has been provided a priority of low, medium, or high according to the institutional capability, financial feasibility of implementation and need for action to support effective mitigation planning. Those rankings are defined as follows:

- **High Priority**: Highly cost-effective, administratively feasible and politically feasible policies that should be implemented in fiscal years 2010/2011 to 2011/2012 and be continued.

- **Medium Priority**: Policies that have at least two of the following characteristics (but not all three) and that should be implemented in fiscal years 2012/2013 to 2014/2015:
  - Highly cost-effective; or
  - Administratively feasible, given current levels of staffing and resources; or
  - Are politically popular and supportable given the current environment.

- **Low Priority**: Policies that have at least one of the following characteristics (but not two or three) and that should be implemented in the next five (5) years (by the end of 2014/2015):
  - Highly cost-effective; or
  - Administratively feasible, given current levels of staffing and resources; or
  - Are politically popular and supportable given the current environment.

  NOTE: Policies will be implemented earlier if resources are available.

Objectives were generated by and approved by the MAC. The MAC considered the applicability of each objective to the local governments. The following summarizes the mitigation objectives (***E*** = existing/unchanged from 2004 HMP objective; ***N*** = new objective):

**Objective 1**: Ensure that sheltering facilities are well publicized, accessible, and meet national standards for safety and supply. ***(E)***

**Objective 2**: Reduce the frequency of electrical outages and the length of time such outages last. ***(E)***

**Objective 3**: Preserve open space in floodplain areas. ***(E)***

**Objective 4**: Reduce the risk of damage from wildfires (including under fires) to existing and future development. ***(E)***

**Objective 5**: Reduce flooding and erosion vulnerability through land development initiatives, maintenance, and improvement of storm drainage. ***(N)***

**Objective 6**: Improve the public awareness and understanding of local vulnerability to hazards and improve disaster warning/post-disaster information efforts. ***(E)***

**Objective 7**: Ensure effective local/interagency communication and response during disaster events. ***(N)***

**Objective 8**: Identify specific potential man-made hazards and mitigate potential risks. ***(E)***

**Objective 9:** Improve all participating jurisdictions' general hazard mitigation capability. ***(N)***

## C. Hazard Mitigation Objectives and Action Items

**Table 49. Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 1: Ensure that sheltering facilities are well publicized, accessible and meet national standards for safety and supply. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Implementing Actions | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| In concert with the American Red Cross (ARC), maintain an annually updated list of all ARC approved shelters. ***(N)*** | 1,6,8 | | Emergency Services | All Hazards | Staff Resources, General Funding | High/ FY10-12 | Craven County Department of Social Services in concert with the American Red Cross |
| Continuously maintain, on the County's website, instructional information on ensuring that onsite sheltering is as safe an option as possible. ***(N)*** | 1,6,8 | | Emergency Services | All Hazards | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 2: Reduce the frequency of electrical outages and the length of time such outages last. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Implementing Actions | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Maintain continuous contact/working relationship with electric service providers in the County to address the following (1) disaster preparedness techniques (e.g tree trimming, vegetation planting requirements, pole replacement), (2) Identify critical electrical facilities needing retrofit or upgrade and map with elevation reference marks and (3) communication with County officials during and immediately after a natural hazard event that results in loss of electrical power. The MAC will meet at least once per year with electric service providers. ***(N)*** | 3,4,8 | | Emergency Services | Wind/Ice Storms | Staff Resources, General Funding, Utility Provider Funding | Medium/ FY12-14 | Craven County Planning Department, Municipal Managers/Administrators or Mayors, and Electrical Utility Providers |
| Improve capability of secondary power source at all County and Municipal Critical Facilities (all buildings). ***(N)*** | 3,8 | | Emergency Services | All Hazards | Staff Resources, General Funding, State Funding, Federal Funding | Medium/ FY12-14 | Craven County Planning Department, Municipal Managers/Administrators or Mayors, Public Works Director |
| Maintain a representative of the public electric authority on the MAC. ***(N)*** | 4,8 | | Emergency Services | All Hazards | Staff Resources, General Funding | Low/ FY14-15 | MAC |
| Retrofit all County and Municipal facilities for lightning protection (existing buildings). ***(N)*** | 3,8 | | Property Protection and Emergency Services | Lightning/ Fire | Staff Resources, General Funding | Low/ FY14-15 | Craven County Planning Department, Municipal Managers/Administrators or Mayors, Public Works Director |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 3: Preserve open space in floodplain areas. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Implementing Actions | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Support conservation easements on all flood prone property and impose such easements on all properties acquired with public assistance funds. ***(N)*** | 1,2,5,7 | NFIP/ 420 | Prevention Mechanisms | Flooding | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department, Municipal Managers/Administrators or Mayors, Public Works Director |
| Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA land use plans). ***(N)*** | 1,2,4,7 | NFIP/ 420 | Prevention Mechanisms and Natural Resource Protection | Flooding/ Erosion | Staff Resources, General Funding | Low/ FY14-15 | Craven County Planning Department, Municipal Managers/Administrators or Mayors |
| Provide annual review of development restrictions in floodplain areas and maintain initiatives to ensure limited residential and commercial development in the floodplains and protection of critical facilities. Specifically address soil testing for engineered foundations, minimum lot size, critical facility protection, manufactured home park requirements including anchoring and elevation, and freeboard requirements (new buildings). ***(N)*** | 1,2,5 | NFIP/ 430 | Prevention Mechanisms, Property Protection, and Natural Resource Protection | Flooding/ Erosion | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department, Municipal Managers/Administrators or Mayors |
| Publicize and maintain maps of floodplain and flood prone areas on the county website and at building inspection offices and in public libraries. Provide copies of the flood maps to the public. ***(N)*** | 1,5,7,8 | NFIP/ 320,350 | Prevention Mechanisms, Property Protection, and Natural Resource Protection | Flooding/ Erosion | Staff Resources, General Funding | Medium/ FY12-14 | Craven County Planning Department and Municipalities where there are flood areas |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 4: Reduce the risk of damage from wildfires (including underfires) to existing and future development. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Implementing Actions | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Map all areas in proximity to National Forest Areas including types of land use and construction. ***(N)*** | 1,2,4 | | Property Protection | Fire | Staff Resources, General Funding | Medium/ FY12-14 | Craven County Planning Department |
| The MAC will review "firewise" zoning and subdivision standards and recommend their appropriateness for incorporation into existing (or new) zoning subdivision or UDO ordinances. (Source http://www.firewise.org ) This will include the establishment of buffers around National Forest Areas (new buildings). ***(E)*** | 1,2,4 | | Property Protection | Fire | Staff Resources, General Funding | Medium/ FY12-14 | MAC in concert with the County and Participating Municipalities |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 5: Reduce flooding and erosion vulnerability through land use development initiatives, maintenance and improvement of storm drainage. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Implementing Actions | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Annually review County and Municipal Zoning, Subdivision, UDO, and Flood Damage Prevention Ordinances for improved control of flooding hazards, including identifying/responding to new flood data (new buildings). ***(N)*** | 1,2,3,7 | NFIP/ 410,430 | Prevention Mechanisms, Property Protection | All Hazards | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department, Municipal Managers/Administrators or Mayors |
| Adopt and annually update a capital improvement plan with an emphasis on mitigation for critical facilities including relocation and retrofitting (all buildings). NOTE: Subject to funding availability ***(E)*** | 1,2,3,4,7 | | Prevention Mechanisms | All Hazards | Staff Resources, General Funding | Medium/ FY12-14 | Craven County Planning Department, Municipal Managers/Administrators or Mayors |
| At the staff level work with the North Carolina Department of Transportation (NCDOT) to identify and develop resolutions for drainage issues created by NCDOT facilities, including inspections of channels, retention basins, and, as needed, pursue debris removal. ***(E)*** | 1,3,4 | NFIP/ 540 | Prevention Mechanisms | Flooding | Staff Resources, General Funding | Medium/ FY12-14 | MAC, Craven County and participating municipalities coordinate with the transportation regional planning organization |
| Apply for all available funding from the Hazard Mitigation Grant Program (HMGP) and funds to assist with the mitigation of severe repetitive loss properties to relocate structures out of the floodplain (existing buildings). ***(E)*** | 1,2,3,4 | NFIP/ 520 | Property Protection | Flooding | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department, Municipal Managers/Administrators or Mayors |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 5 continued: Reduce flooding and erosion vulnerability through land use development initiatives, maintenance and improvement of storm drainage. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA) within both incorporated and unincorporated portions of the County. All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined special flood hazard area without the submittal of the required elevation certificate (new buildings). ***(E)*** | 1,2 | NFIP/ 310 | Prevention Mechanisms, Property Protection | Flooding | Staff Resources, General Funding | High/ FY10-12 | Craven County, New Bern, Havelock, and River Bend Building Inspections Departments |
| Identify and map municipal stormwater "hot spots" and coordinate with capital improvement planning for upgrade of substandard storm drainage components. ***(N)*** | 1,4,7 | NFIP/ 540 | Structural Mitigation | Flooding/ Erosion | Staff Resources, General Funding | Medium/ FY12-14 | Municipal Managers/ Administrators, or Mayors |
| Continue to comply with North Carolina State Coastal stormwater regulations (new buildings). ***(N)*** | 2,5 | NFIP/ 450 | Prevention Mechanisms | Flooding/ Erosion | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department, and Municipal Managers/Administrators, or Mayors |
| Continuously maintain information concerning the County's flood data maintenance efforts, including GIS/tax parcel data. ***(N)*** | 1,2,6 | NFIP/ 440 | Prevention Mechanisms, Property Protection, Public Education/ Information | All Hazards | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department and Tax Office |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 6: Improve the public understanding of local vulnerability to hazards and improve disaster warning/post-disaster information efforts. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Hold an annual public hazard mitigation meeting, attended by the MAC and participating jurisdictions to educate the public and elected officials and receive comments about the location of high risk facilities/development, the jurisdictions overall vulnerability to natural and manmade hazards, and the jurisdiction's hazard mitigation efforts. ***(N)*** | 6,7 | NFIP | Public Education/ Information | All Hazards | Staff Resources, General Funding | High/ FY10-12 | MAC with Craven County Planning Department support |
| Maintain a map information service involving the following: (1) Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including providing information on whether a given property is located within a flood hazard area. (2) Provide information regarding the flood insurance purchase requirement on the county's website. (3) Maintain historical and current FIRM's. (4) Locally advertise once annually in the local newspaper. (5) Provide information to inquirers about local floodplain management requirements. (6) Include in the county's newsletter (all property owners) and on the county's website a letter on flood insurance. (7) Notify property owners within a flood prone area that they are subject to flooding (all buildings). ***(E)*** | 6,7 | NFIP/ 330 | Public Education/ Information | Flooding | Existing Department and Staff Resources | High/ FY10-12 | Craven County Planning Department, and Craven County Inspections Department |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 6 continued: Improve the public understanding of local vulnerability to hazards and improve disaster warning/post-disaster information efforts. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Craven County will provide comprehensive services regarding planning and development activities within the defined SFHA. These services will include (1) Providing site specific flood and flood related information on an as needed basis, (2) Building Inspections department will maintain a list of contractors with experience in floodproofing and retrofit techniques, (3) Building Inspections department will maintain materials providing an overview of how to select a qualified contractor, (4) Make site visits upon request to review occurrences of flooding, drainage, and sewer problems--if applicable, inspector should provide one-on-one advice to the property owner, (5) Provide advice and assistance regarding CRS Activity 530, (6) Advertise the availability of services once annually within the local newspaper, and (7) Maintain a log of all individuals assisted through these services, including site visits (all buildings). ***(N)*** | 6,7 | NFIP/ 360 | Public Education/ Information | Flooding | Staff Resources, General Funding | Medium/ FY12-14 | As applicable, Craven County Planning Director Craven County, New Bern, and Havelock Inspections Departments |
| Craven County will make information regarding hazards and development regulations within the floodplains through the following: (1) The County Planning Director will ensure that the local library maintains information relating to flooding and flood protection and (2) The County will provide a link on their website to FEMA resources addressing flooding and flood protection (all buildings). ***(N)*** | 6,7 | NFIP/ 350 | Public Education/ Information | Flooding | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Director and Craven County Public Library |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 6 continued: Improve the public understanding of local vulnerability to hazards and improve disaster warning/post-disaster information efforts. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Craven County will establish and maintain flood warning systems. ***(N)*** | 1 | NFIP/ 610 | Prevention Mechanisms, Property Protection, Public Education/ Information | Flooding | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Department, and Municipal Managers/Administrators, or Mayors |
| Craven County will work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The County will provide these agencies with brochures documenting the concerns relating to development located within flood prone areas (existing buildings). ***(E)*** | 1,6,7 | NFIP/ 340 | Public Education/ Information | Flooding | Staff Resources, General Funding | High/ FY10-12 | Craven County Planning Director and Municipal Managers/Administrators, or Mayors |
| Craven County will coordinate with the Craven County School System Hazards Awareness Educational Programs for use by educators within the Craven County School System. ***(N)*** | 1,6,7 | NFIP/ 330 | Public Education/ Information | All Hazards | Staff Resources, General Funding | Low/ FY14-15 | MAC with Staff Support from the Craven County Planning Department and participating municipalities |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 7: Ensure effective local/interagency communication and response during disaster events. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Continue to rely on the Craven County Emergency Operations Plan (EOP) for effective disaster event communication. ***(N)*** | 1,6,7,8 | | Emergency Services | All Hazards | Staff Resources, General Funding | Medium/ FY12-14 | Craven County EMS Director |
| Establish county-wide program, including a public service campaign prompting citizens to register their unlisted or mobile telephone numbers. ***(N)*** | 1,6 | | Emergency Services | All Hazards | Staff Resources, General Funding | Medium/ FY12-14 | Craven County EMS Director |
| Maintain a registry of special needs individuals which has been coordinated with the Craven County Department of Social Services. This list will include: (1) Persons on life support systems, (2) Persons dependent on electricity for medical equipment, and (3) Persons with severe mental handicap or mental illness. ***(N)*** | 1, 8 | | Emergency Services | All Hazards | Staff Resources, General Funding | High/ FY10-12 | Craven County EMS Director |
| Craven County in conjunction with all participating municipal jurisdictions participating in this document will work on the five year implementation of this plan. At the end of this five year period, the county will undertake efforts to update this plan including the following ten (10) planning steps: (1) Organize to prepare the plan, (2) Involve the public, (3) Coordinate with other agencies, (4) Assess the hazard, (5) Assess the problem, (6) Set goals, (7) Review possible activities, (8) Draft an action plan, (9) Adopt the plan, and (10) Implement, evaluate, and revise. ***(N)*** | 1,2,3,4,5, 6,7,8 | NFIP/ 510 | Prevention, Property Protection, Resource Protection, Emergency Services, Structural Mitigation, Public Education/ Information | All Hazards | Staff Resources, General Funding | Medium/ FY12-14 | Craven County Planning Department |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 8: Identify specific potential man-made hazards and mitigate potential risks. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Maintain dialogue with the Craven Regional Airport Authority to effectively regulate land use as the County continues to grow and encroach upon the airport environs defined by the Craven County Zoning and Height Ordinance. ***(N)*** | 1, 3, 7 | | Emergency Services, Property Protection | Manmade Hazards | Staff Resources, General Funding | Low/ FY14-15 | Craven County Planning Department |
| Maintain dialogue with the Cherry Point Marine Corps Air Station (MCAS) personnel to effectively regulate land use as the County continues to grow and encroach upon the airport environs defined by the Craven County Zoning and Height Ordinance and the Marine Corps Air Station Zoning Ordinance. ***(N)*** | 1, 3, 7 | | Emergency Services, Property Protection | Manmade Hazards | Staff Resources, General Funding | Low/ FY14-15 | Craven County Planning Department |
| Craven County will continue to support the NC Office of Dam Safety's efforts to monitor and inspect all dams throughout the state. The county will rely on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable. ***(E)*** | 1, 4, 7 | NFIP/ 630 | Emergency Services, Property Protection | Manmade Hazards | Staff Resources, General Funding | Low/ FY14-15 | NC Office of Dam Safety |

**Table 49 continued: Craven County Hazard Mitigation Objectives and Action Items** (***E*** = existing/unchanged from 2004 HMP; ***N*** = new)

| Objective 9: Improve all participants' general hazard mitigation capability. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Action Item | Mitigation Goals Addressed | NFIP Compliance Activity/CRS Activity | Focus Areas | Hazards Addressed | Supplemental Funding Options (Appendix H) | Priority/ Schedule | Responsible Party |
| Support storm hazard mitigation policies provided in the 2008 Craven County, Bridgeton, and New Bern CAMA Land Use Plans (all buildings). ***(N)*** | 1, 2, 3 | NFIP/ 510 | Prevention Mechanisms, Property Protection, and Natural Resource Protection | All hazards | Staff Resources | High/ FY10-12 | Craven County Planning Department and Municipal Managers/Administrators or Mayors |
| Continue to enforce the International Building Code, to include requiring that new structures or structures undergoing significant renovation (renovations or expansion exceeding 50% of fair market value) meet code requirements including wind-related risks (all buildings). ***(N)*** | 1, 2 | | Prevention Mechanisms and Property Protection | Wind (including nor'easters/ hurricanes), Thunderstorms, Flooding | Staff Resources | High/ FY10-12 | Craven County Planning Department and Municipal Managers/Administrators or Mayors |
| Continuously maintain current state approved water supply plans. ***(N)*** | 3, 4 | | Natural Resource Protection | Drought | Staff Resources | High/ FY10-12 | Craven County Planning Department and Municipal Managers/Administrators or Mayors |

## *D. Summary CRS Rating of Strategies*

The following provides a summary of how the proposed strategies interfere with and support the CRS Rating System. The points shown for each activity are system-wide averages and may vary for Craven County.

**Table 50. CRS Rating System Summary**

| CRS Number | CRS Activity | National Average Points Awarded | CRS Documentation |
|---|---|---|---|
| 310 | Elevation Certificates | 69 | All required elevation certificates shall be kept on file within the Craven County and CRS participating municipalities Building Inspections Department. |
| 320 | Map Information Service | 138 | The Craven County Planning Director and CRS participating municipalities shall maintain the following information relating to the map information service:<br>• Maintain a log of inquiries including: date, FIRM zone of subject property, address/location of subject property, indication that inquirer was informed of insurance purchase requirement.<br>• Maintain records of all agencies who have inquired, or were provided information.<br>• Maintain copies of historical and current FIRM's within the Craven County Planning and Inspections departments.<br>• File a copy of the affidavit documenting that this service was publicized in the local newspaper once annually. |
| 330 | Outreach Activities | 90 | Craven County Planning Director and CRS participating municipalities shall maintain a copy of the following information:<br>• a copy of the notice mailed to all property owners located within an SFHA<br>• a listing of all property owners the notice was mailed to<br>• a notice certifying the date the notices were mailed<br>• maintain copies of the outreach projects conducted during the year |
| 340 | Hazard Disclosure | 19 | Craven County Planning Director and CRS participating municipalities shall maintain a copy of the following information relating to hazard disclosure:<br>• disclosure statements from five local real estate agents stating that it is their agencies policy to inform clients if a property is located within an SFHA<br>• a copy of the brochure that the county has disseminated to real estate agents |

| CRS Number | CRS Activity | National Average Points Awarded | CRS Documentation |
|---|---|---|---|
| 350 | Flood Protection Information | 24 | Craven County Planning Director and CRS participating municipalities shall maintain the following information regarding the provision of flood protection insurance:<br>• a listing of publication dates for all materials on file at the local library<br>• a statement from the Librarian that the flood related materials are listed within the libraries resource management system |
| 360 | Flood Protection Assistance | 53 | Craven County Planning Director and CRS participating municipalities shall maintain the following information regarding the provision of flood protection assistance program:<br>• affidavit of publication for the advertisement regarding the provision of flood protection assistance<br>• a copy of the contractor's list on file in the Building Inspections Department<br>• a copy of the document outlining how to hire a contractor on file in the Building Inspections Department |
| 410 | Additional Flood Data | 86 | Craven County Planning Director and CRS participating municipalities shall maintain the following information regarding additional flood data:<br>• Develop new flood elevation, floodway delineations, wave heights, or other regulatory flood hazard data for an area not mapped in detail by the flood insurance study.<br>• Have a more restrictive mapping standard. |
| 420 | Open Space Preservation | 191 | Craven County Planning Director and CRS participating municipalities shall maintain the following information regarding the current inventory of open space parcels:<br>• a copy of all deed restrictions in place for all properties acquired through FEMA sponsored acquisition projects to prevent future development<br>• maintain a map for the file showing all open space parcels within the county |
| 430 | Higher Regulatory Standards | 166 | • Maintain records of annual review by the MAC and participating jurisdictions<br>• Maintain records of revisions to all local ordinances |
| 440 | Flood Date Maintenance | 79 | The Craven County Planning Director and CRS participating municipalities shall maintain the following information regarding the flood data maintenance efforts:<br>• a hard copy of all digital tax parcel records maintained within the GIS<br>• a summary of what data is included within the County's GIS |

| CRS Number | CRS Activity | National Average Points Awarded | CRS Documentation |
|---|---|---|---|
| 450 | Stormwater Management | 98 | • Document at the county and municipal level, where applicable, review of development proposals for consistency with North Carolina State Coastal stormwater drainage management rules which regulate size and improve water quality<br>• Maintain documentation correspondence indicating coordination with the North Carolina Division of Water Quality |
| 510 | Floodplain Management Planning | 115 | Maintain a current certified Craven County Multi-Jurisdictional Hazard Mitigation Plan |
| 520 | Acquisition and Relocation | 213 | • Document identification of properties suitable for acquisition and relocation<br>• Actively pursue available funding to assist with property acquisition and relocation |
| 540 | Drainage System Maintenance | 232 | • Maintain records of inspections conducted in concert with NCDOT and resulting actions taken to remove debris.<br>• Incorporate provisions for continuous maintenance of retention ponds into local ordinances, including debris removal<br>• Maintain records of all county and municipal stormwater projects |
| 610 | Flood Warning Program | 93 | Provide early flood warnings to the public, and have a detailed flood response plan keyed to flood crest predictions. |
| 630 | Dam Safety | 66 | No documentation required. |

Craven County and the participating municipalities are currently limited to a rating of eight (8) because of the lack of provisions for wind driven debris/damage on the mainland areas of the state.

Table 51 provides a summary of CRS points awarded by jurisdiction for the County and the municipalities who participate in the CRS program.

**Table 51. CRS Points Awarded by Jurisdiction**

| Activity | Craven County | Havelock | New Bern* | River Bend |
|---|---|---|---|---|
| **310 Elevation Certificates** | 122 | 56 | * | 74 |
| **320 Map Information Service** | 140 | 140 | * | 140 |
| **330 Outreach Projects** | 159 | 189 | * | 177 |
| **340 Hazard Disclosure** | 56 | 5 | * | 5 |
| **350 Flood Protection Information** | 18 | 20 | * | 49 |
| **360 Flood Protection Assistance** | 10 | 0 | * | 0 |
| **410 Additional Flood Data** | 11 | 0 | * | 11 |
| **420 Open Space Preservation** | 46 | 0 | * | 182 |
| **430 Higher Regulatory Standards** | 260 | 0 | * | 240 |
| **440 Flood Data Maintenance** | 105 | 84 | * | 81 |
| **450 Stormwater Management** | 32 | 68 | * | 0 |
| **510 Floodplain Management Planning** | 138 | 0 | * | 138 |
| **520 Acquisition and Relocation** | 40 | 0 | * | 0 |
| **540 Drainage System Maintenance** | 15 | 330 | * | 230 |
| **610 Flood Warning Program** | 0 | 117 | * | 0 |
| **630 Dam Safety** | 58 | 60 | * | 52 |
| **Total Awarded Points** | 1210 | 1069 | * | 1379 |

*The City of New Bern is awaiting receipt of their current CRS Verification Report.

# SECTION 8. PLAN MAINTENANCE AND IMPLEMENTATION PROCEDURES

## A. Implementation

Implementation of the Craven County Multi-Jurisdictional Hazard Mitigation Plan will commence with adoption of the document by the County and all participating jurisdictions. Resolutions of Adoption are provided as Appendix D of the plan (to be added upon adoption).

Upon adoption, the Craven County Multi-Jurisdictional Hazard Mitigation Plan faces the truest test of its worth, implementation. Implementation implies two concepts: action and priority. These are closely related. While this plan puts forth many worthwhile and high priority recommendations, the decision about which action to undertake first will be the first task facing the Mitigation Advisory Committee (MAC). There are two factors to consider in making that decision; the priority of the item and available funding. Thus, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success.

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other county and municipal plans and regulatory mechanisms, such as Capital Improvements Plans and Land Use Plans. The County and participating municipalities will utilize this plan as a starting point toward implementing policies and programs to reduce losses to life and property from man-made and natural hazards.

**Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development.** This integration is accomplished by constant efforts to network, identify, and highlight the multi-objective benefits to each program, and its stakeholders. This effort is achieved through the routine actions of monitoring implementation efforts, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and review of County and municipal programs for coordination and regional multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how any required local match or participation requirement can be met. When funding does become available, the MAC will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, local funding options, state or federal earmarked funds, and grant programs, including those that can serve or support multi-objective implementing actions.

## *B. Role of the Mitigation Advisory Committee in Implementation and Maintenance*

With adoption of this plan, the MAC will be charged with plan implementation and maintenance. The MAC, led by Donald R. Baumgardner of the Craven County Planning Department or his designee, agrees to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Continuously monitor multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the Craven County Board of Commissioners; and
- Inform and solicit input from the public; and
- Meet at least quarterly.

The MAC does not have any powers over County or municipal staff; it is purely an advisory body. Its primary duty is to see the plan successfully carried out and to report to the community governing board and the public on the status of plan implementation and mitigation opportunities for the County/municipalities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County and municipal websites.

## *C. Maintenance*

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized. In order to track progress and update the mitigation strategies identified in the policy section of the plan, the participating jurisdictions will revisit this plan on a bi-annual basis and after a hazard event. The Planning Director or his designee is responsible for initiating this review and will consult with members of the MAC. This monitoring and updating will take place through a formal review by the MAC twice annually, and a five-year written update to be submitted to the NCEM and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to project implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to County/municipal inventories; and
- Incorporate new project recommendations or changes in project prioritization.
- Respond to any data deficiencies identified in NCEM and FEMA review of this plan.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the MAC will use the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting on a bi-annual basis to the MAC on project status and provide input on whether the project as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.

- If the project does not meet identified objectives, the MAC will determine what additional measures may be implemented and an assigned individual will be responsible for defining project scope, implementing the project, monitoring success of the project, and making any required modifications to the plan.

Changes will be made to the plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with established criteria, the time frame, County priorities, and/or funding resources. Priorities that were identified as potential mitigation strategies will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation.

Updating of the plan will be by written changes and submissions, as the MAC deems appropriate and necessary, and as approved by the Craven County Board of Commissioners or the participating jurisdictions' governing board, if applicable. In keeping with the process of adopting the plan, a public involvement process to receive public comment on plan maintenance and updating will be held once annually, and the final product will be adopted by the County and all participating municipalities.

### *D. Continued Public Involvement*

Continued public involvement is also imperative to the overall success of the plan's implementation. The update process provides an opportunity to publicize success stories from plan implementation and seek additional public comment. A public hearing(s) to receive public comment on plan maintenance and updating will be held once within the context of the defined bi-annual review process. When the MAC reconvenes for updates, they will coordinate with all stakeholders participating in the planning process – including those that joined the committee since the planning process began (if applicable). The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, and press releases to local media.

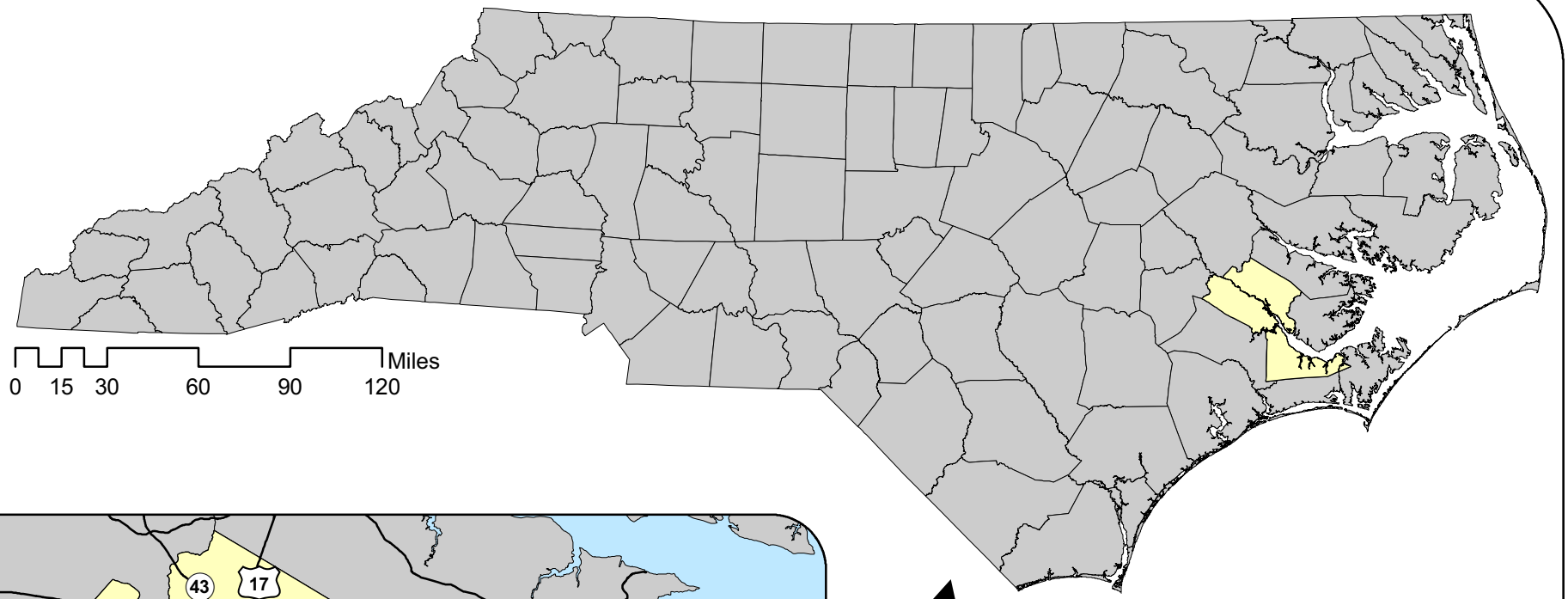
### *E. Incorporation of Existing Planning Mechanisms*

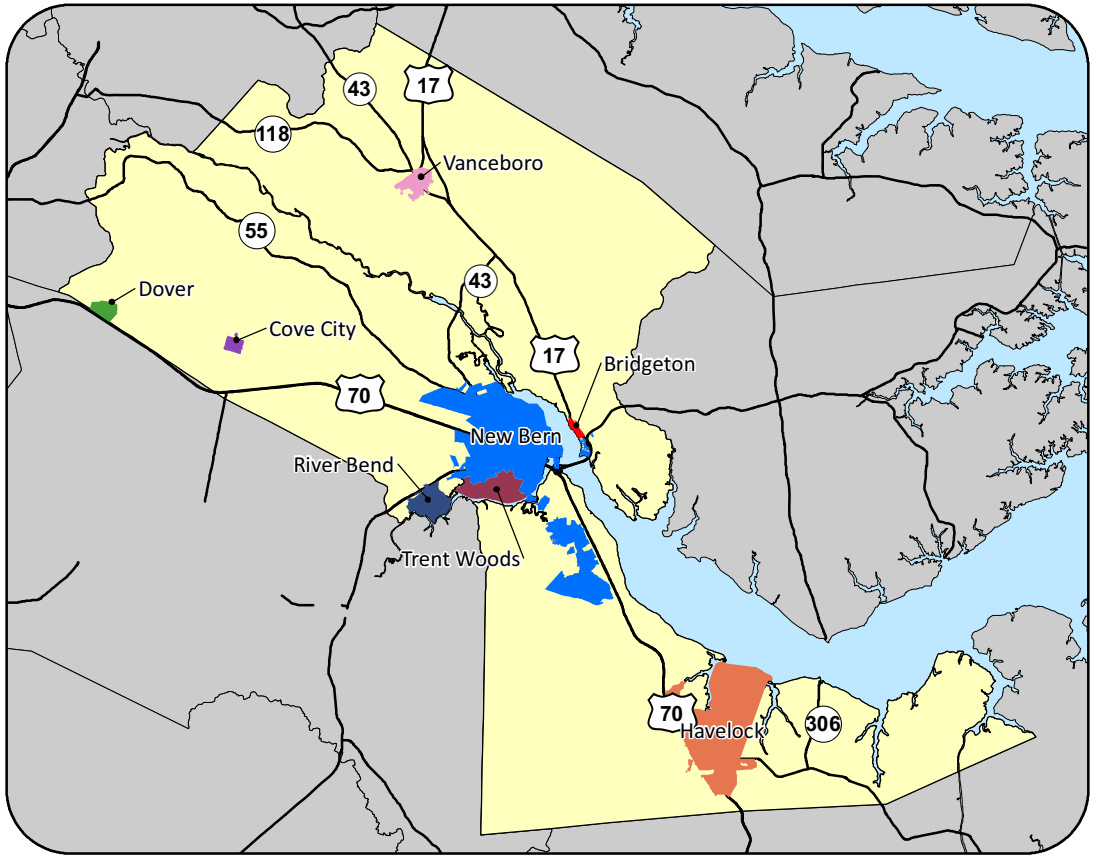
The MAC, which will meet on a quarterly basis, will provide a mechanism for ensuring that the actions identified in this plan are incorporated into ongoing County and municipal planning activities. The participating jurisdictions currently utilize comprehensive land use planning (CAMA plans) and building codes to guide and control development in the communities. After the County and participating municipalities adopt the Multi-Jurisdictional Hazard Mitigation Plan, these existing mechanisms will have hazard mitigation strategies integrated into them.

After the adoption of the HMP, the participating jurisdictions will work with the State Building Code office to make sure the jurisdictions adopt, and enforce, the minimum standards established in the new State Building Code. This is to ensure that live/safety criteria are met for new construction.

The capital improvements planning that may occur in the future will also contribute to the goals in the HMP. The jurisdictions will work with capital improvement planners to secure high-hazard areas for low risk uses.

Within the HMP planning/implementation period, the formal adoption of the HMP policies will be an objective of each participating jurisdiction.




# Craven County, NC

# Hazard Mitigation Plan Regional Location

**Map 1**

Craven County

1712

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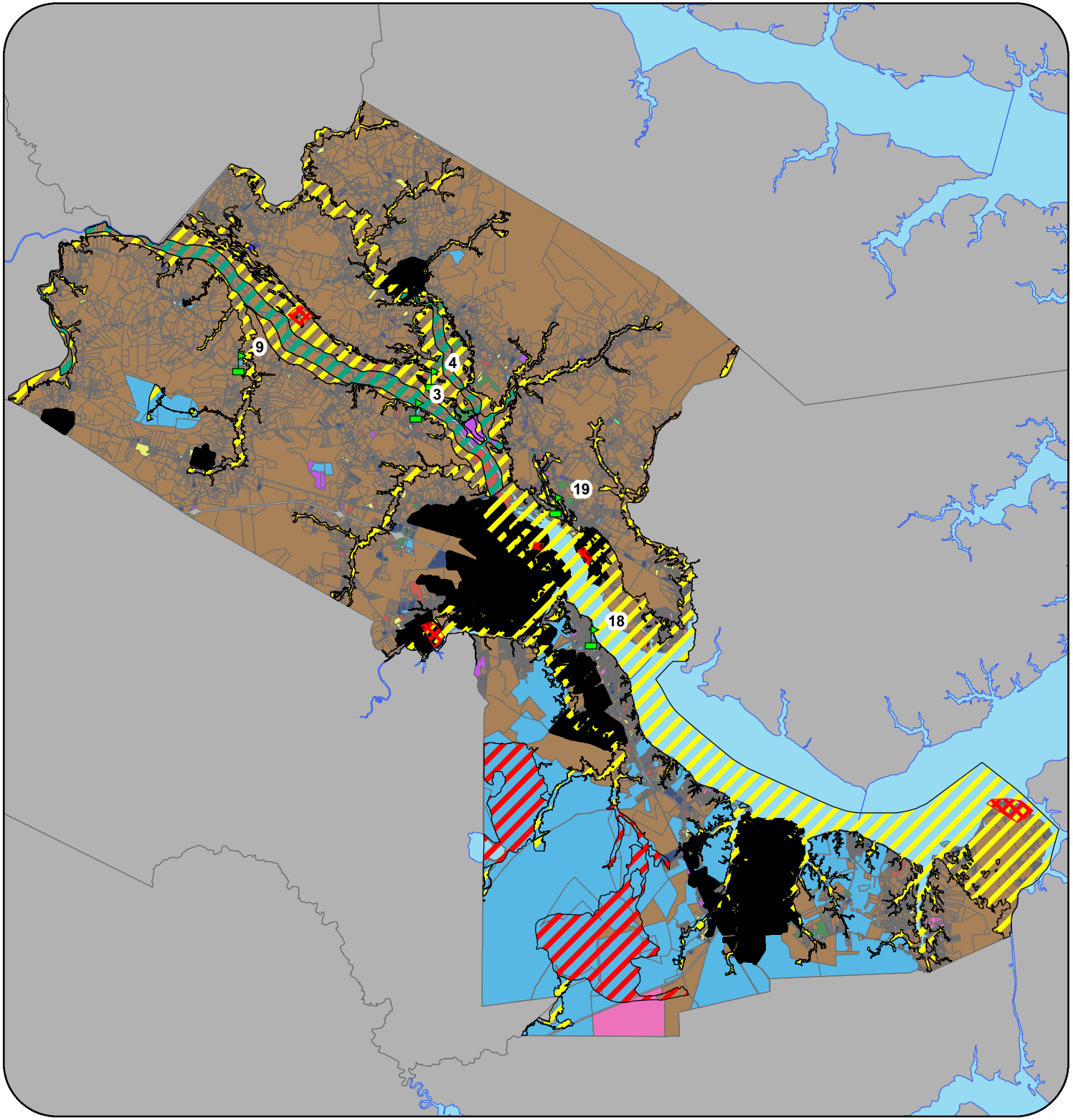
N
W E
S




**Map 2A**

Craven County

# Craven County Hazard Mitigation Plan

## *County Existing Land Use, Critical Facilities & Flood Zones*

**Legend**

- Municipalities
- Surrounding Counties
- * Repetitive Loss Areas
- Hydrology
- Schools

**Flood Zone**

- A
- AE
- AEFW

**Land Use**

- Agricultural
- Commercial
- Industrial
- Muilti-Family
- Mobile Home
- O&I
- Recreactional
- Single Family
- Utility
- Vacant

* Also See Map 5

N
W E
S

1 inch = 6 miles

0 1.5 3 6 9 12 Miles

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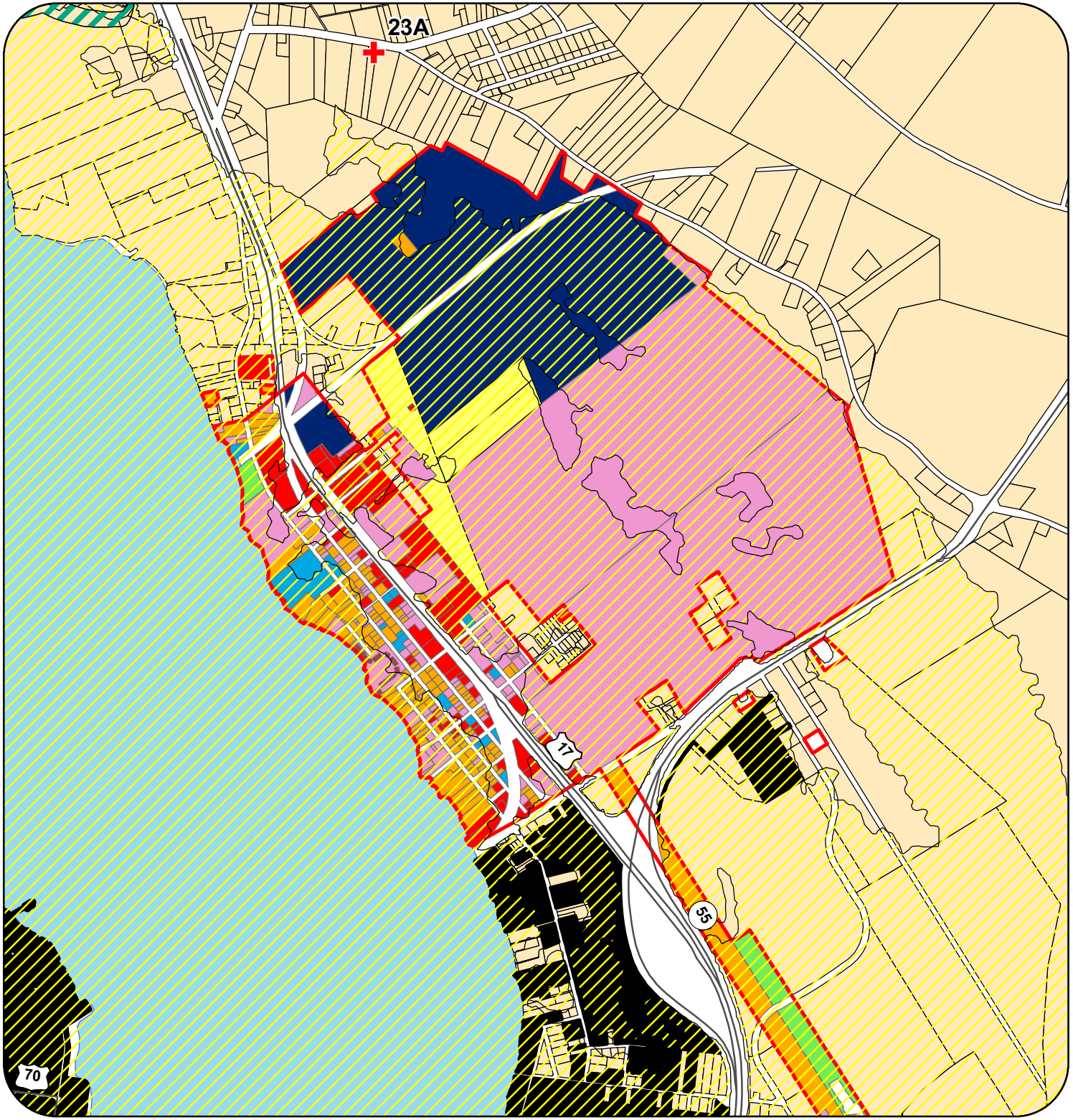


**Map 2B**

Craven County

# Craven County Hazard Mitigation Plan

## *Bridgeton Existing Land Use, Critical Facilities & Flood Zones*

**Legend**

- County Parcels
- New Bern
- Town Limits
- Hydrology

**Critical Facilities**

- Fire Stations

**Flood Zone**

- A
- AE
- AEFW

**Land Use**

- Agriculture
- Commercial
- Industrial
- O&I
- Recreational
- Residential
- Vacant

N
W E
S

1 inch = 1,649 feet

0 500 1,000 2,000 3,000 4,000 Feet

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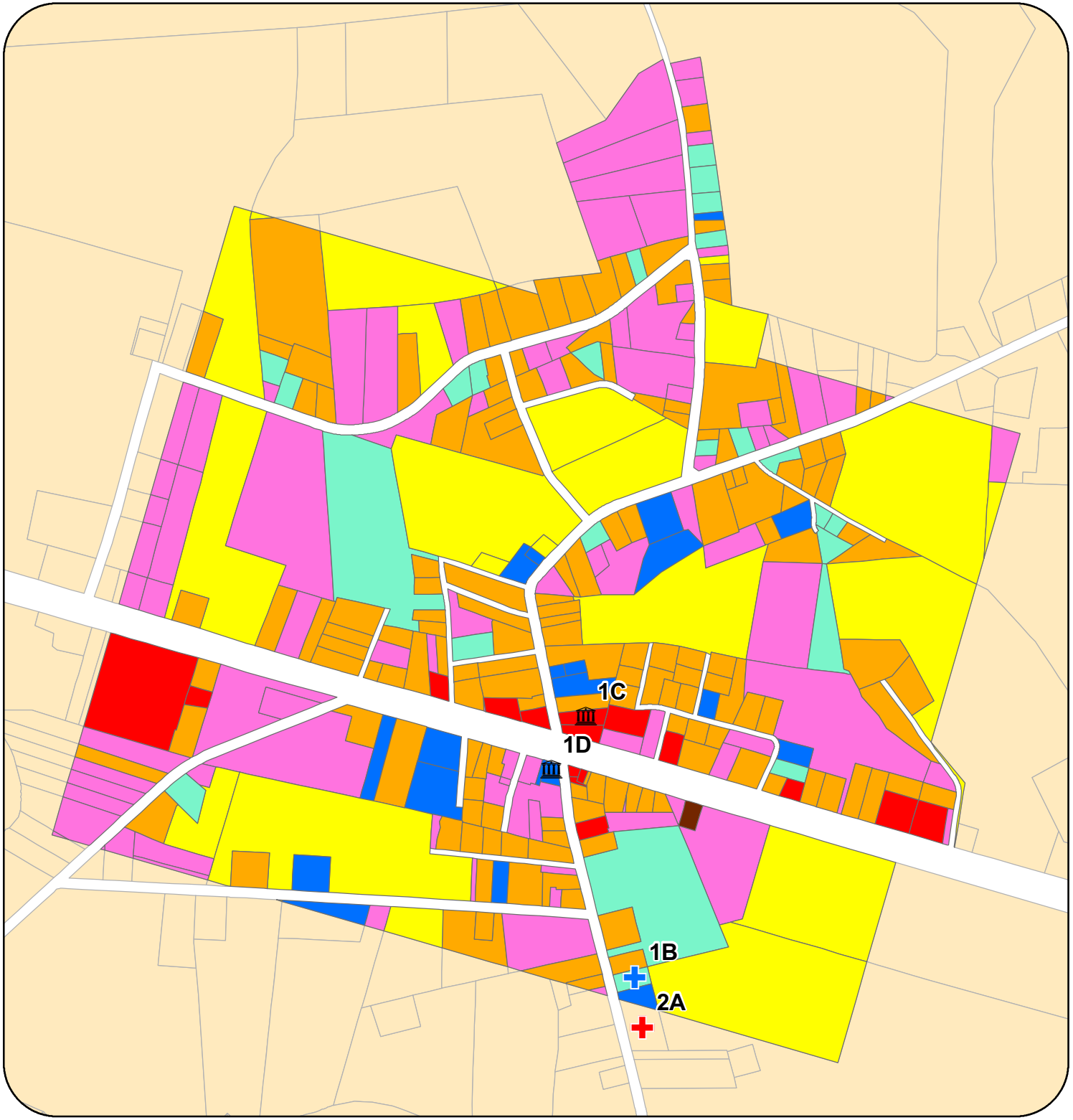
Map 2C

Craven County

# Craven County Hazard Mitigation Plan

## *Cove City Existing Land Use & Critical Facilities*




**Legend**

County Parcels

**Critical Facilities**

- Community
- Fire
- Medical

**Land Use**

- Agriculture
- Commercial
- Mobile Home
- O&I
- Single-Family
- Utility
- Vacant

N
W
E
S

1 inch = 778 feet

0 230 460 920 1,380 1,840 Feet

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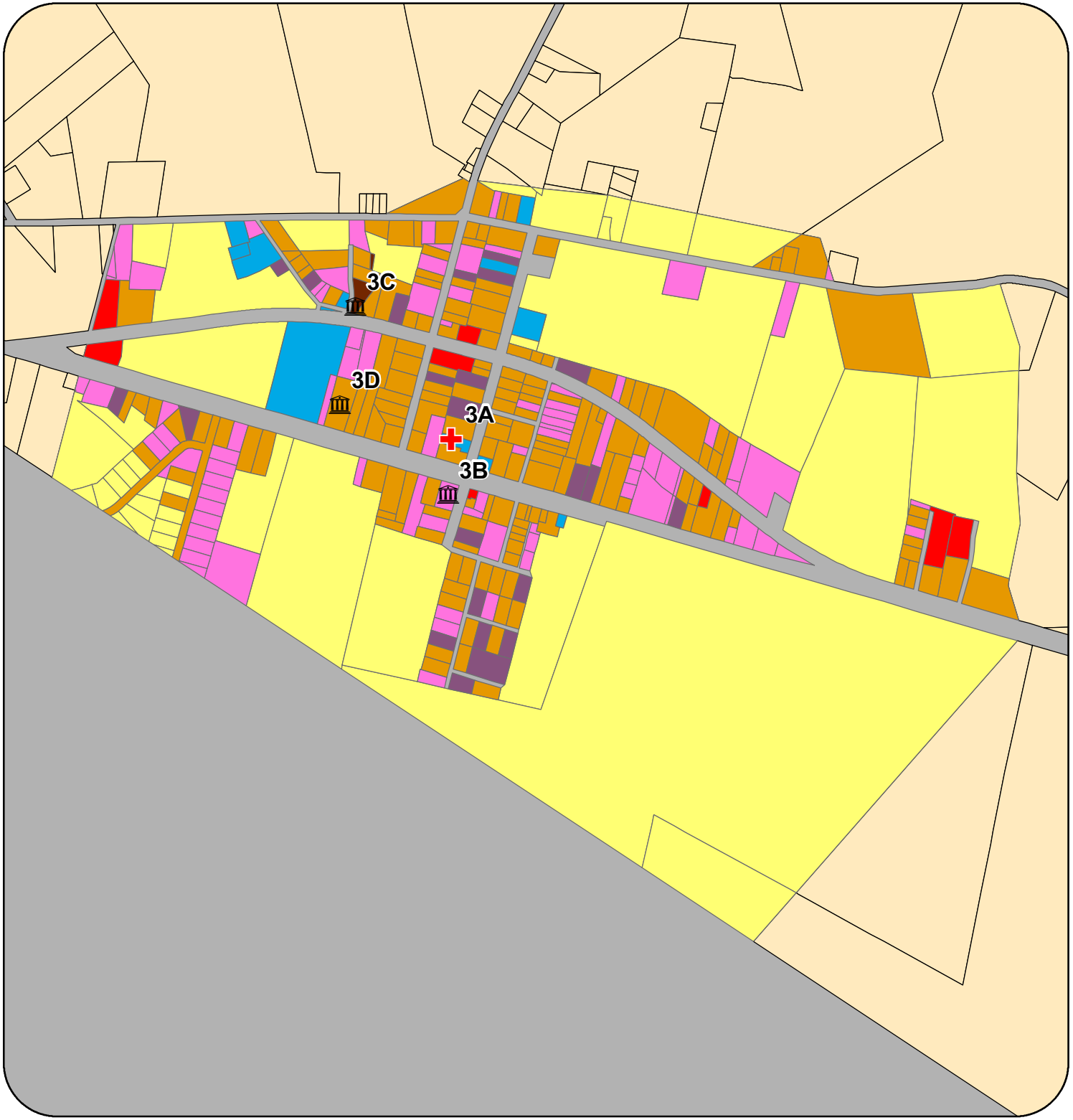
Map 2D

Craven County

# Craven County Hazard Mitigation Plan

## *Dover Existing Land Use & Critical Facilities*




**Legend**

- County Parcels
- Surrounding County

**Critical Facilities**

- Municipal
- Fire/Town Hall

**Land Use**

- Agriculture
- Commercial
- Mobile Home
- O&I
- Single-Family
- Utility
- Vacant

N
W E
S

1 inch = 1,026 feet

0 305 610 1,220 1,830 2,440 Feet

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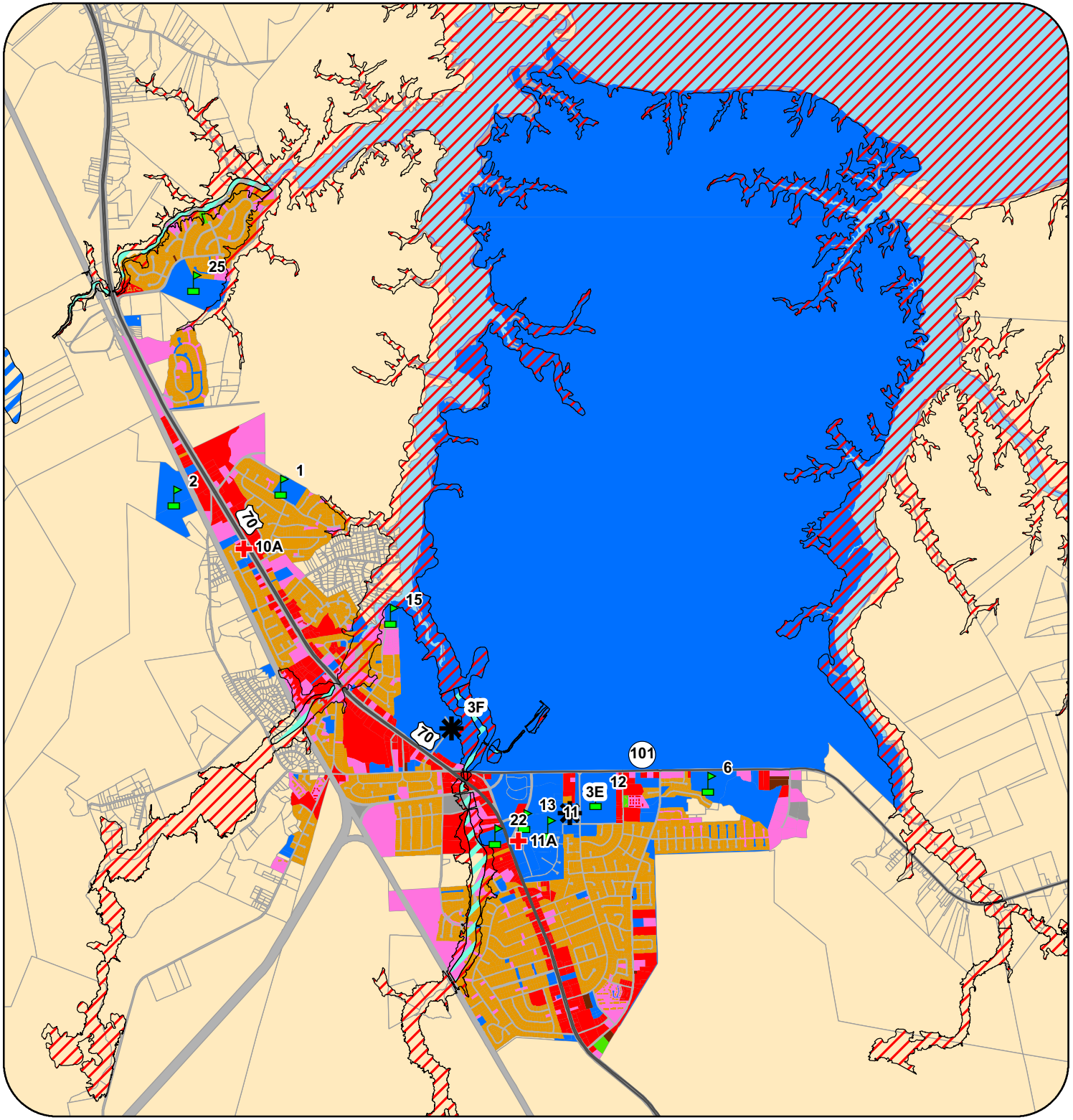
Map 2E

Craven County

# Craven County Hazard Mitigation Plan

## *Havelock Existing Land Use, Critical Facilities & Flood Zones*




**Legend**

- County Parcels
- Surrounding Counties
- Hydrology

**Critical Facilities**

- Fire/Municipal
- Schools
- Other

**Land Use**

- Commercial
- Industrial
- O&I
- Recreational
- Residential
- Utility
- Vacant

**Flood Zone**

- A
- AE
- AEFW

N
W E
S

1 inch = 4,819 feet

0 0.25 0.5 1 1.5 2 Miles

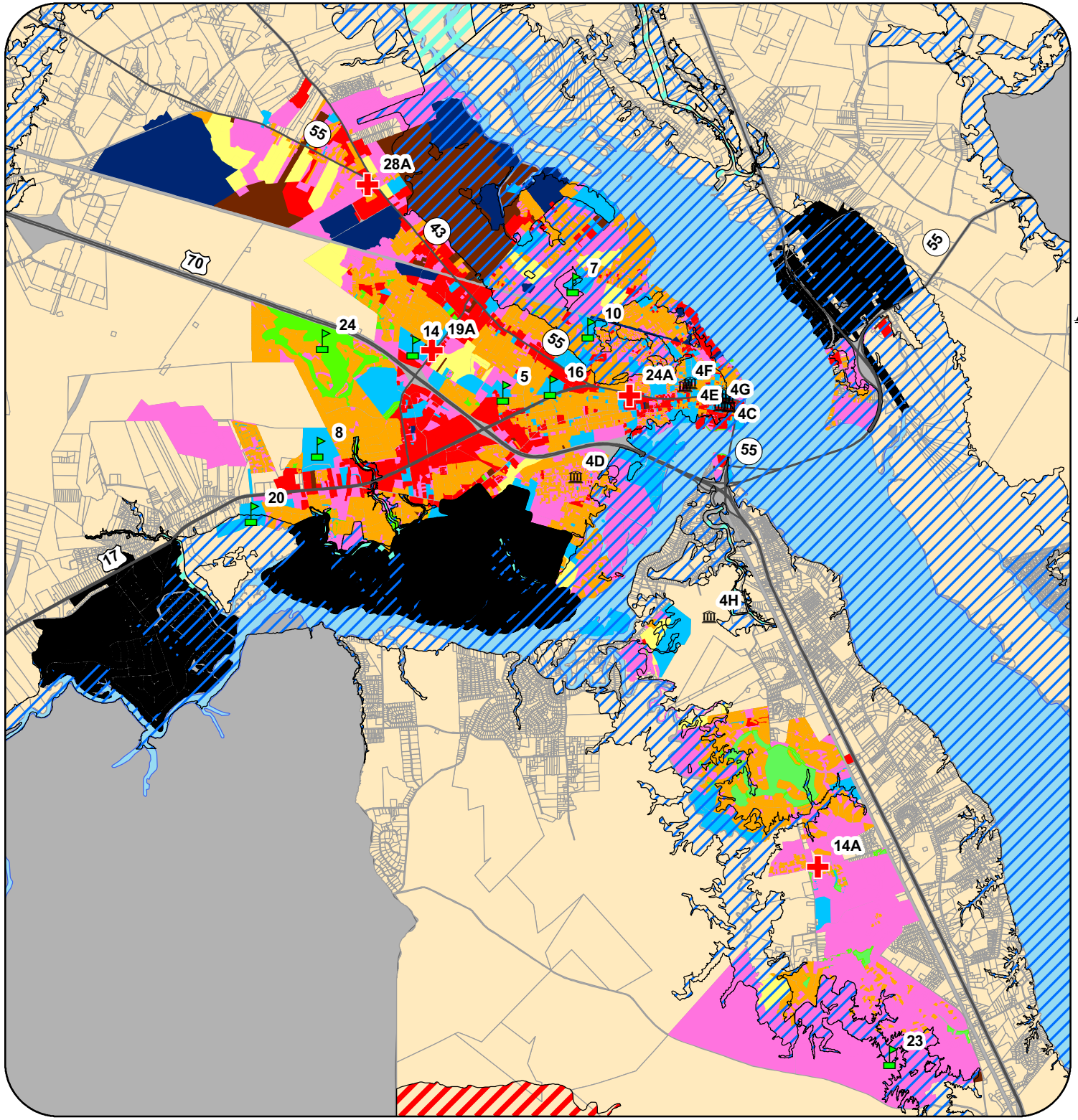
HCP Holland Consulting Planners, Inc.

Map 2F

Craven County

# Craven County Hazard Mitigation Plan

## *New Bern Existing Land Use, Flood Zones & Critical Facilities*




**Legend**

- Surrounding Counties
- County Parcels
- Municipalities
- Hydrology

**Critical Facilities**

- Municipal/Other
- Schools
- Fire Stations

**Flood Zone**

- A
- AE
- AEFW

**Land Use**

- Agriculture
- Commercial
- Industrial
- O&I
- Recreational
- Residential
- Utility
- Vacant

N
W
E
S

1 inch = 1 miles

0 0.4 0.8 1.6 2.4 3.2 Miles

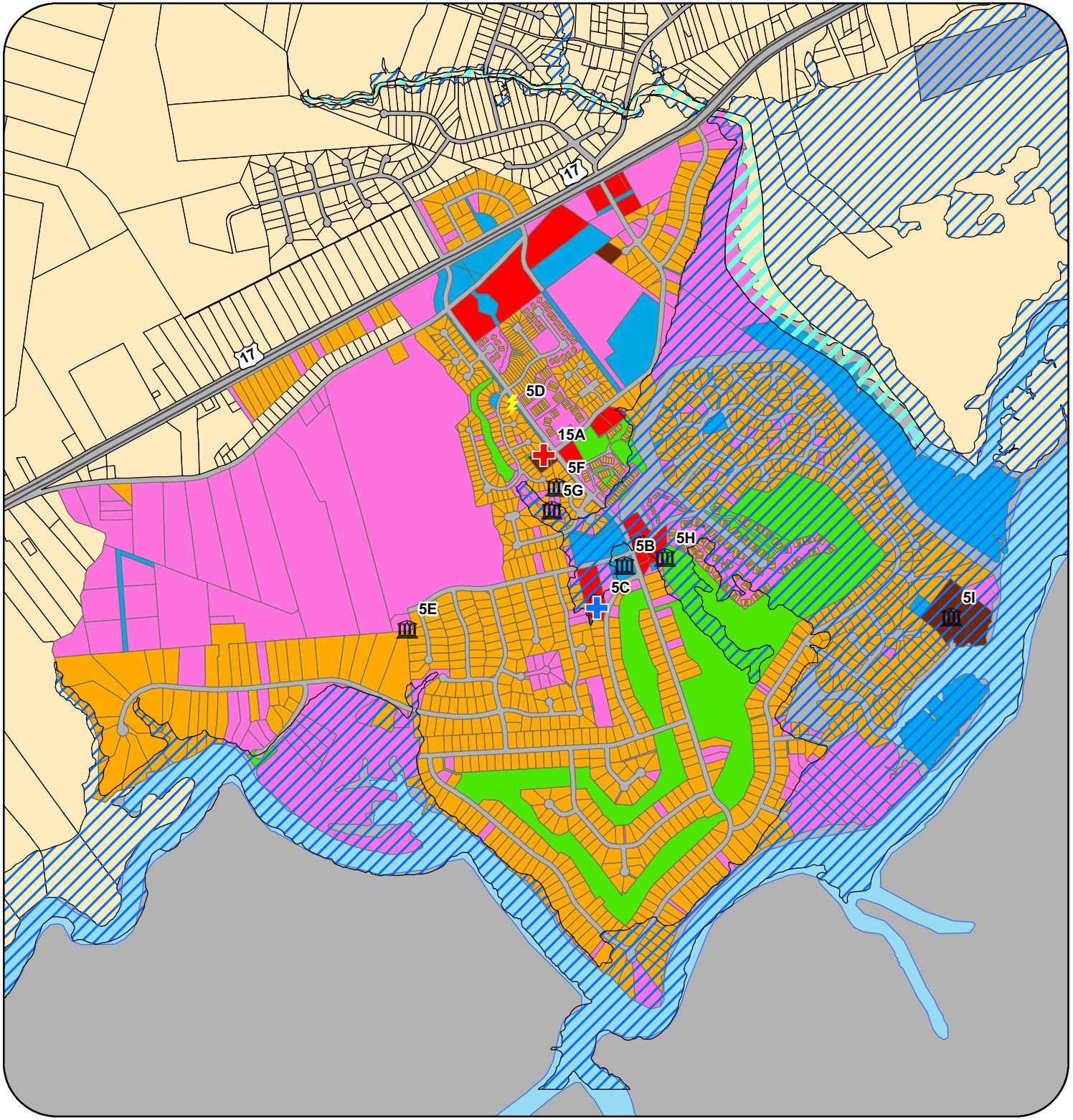
HCP Holland Consulting Planners, Inc.

Map 2G

Craven County

# Craven County Hazard Mitigation Plan

## *River Bend Existing Land Use Critical Facilities & Flood Zones*




**Legend**

- County Parcels
- Surrounding Counties
- Hydrology

**Facility**

- Municipal
- Police
- Communications
- Fire

**Flood Zone**

- A
- AE
- AEFW

**Land Use**

- Commercial
- O&I
- Recreational
- Residential
- Utility
- Vacant

N
W E
S

1 inch = 1,703 feet

0 500 1,000 2,000 3,000 4,000 Feet

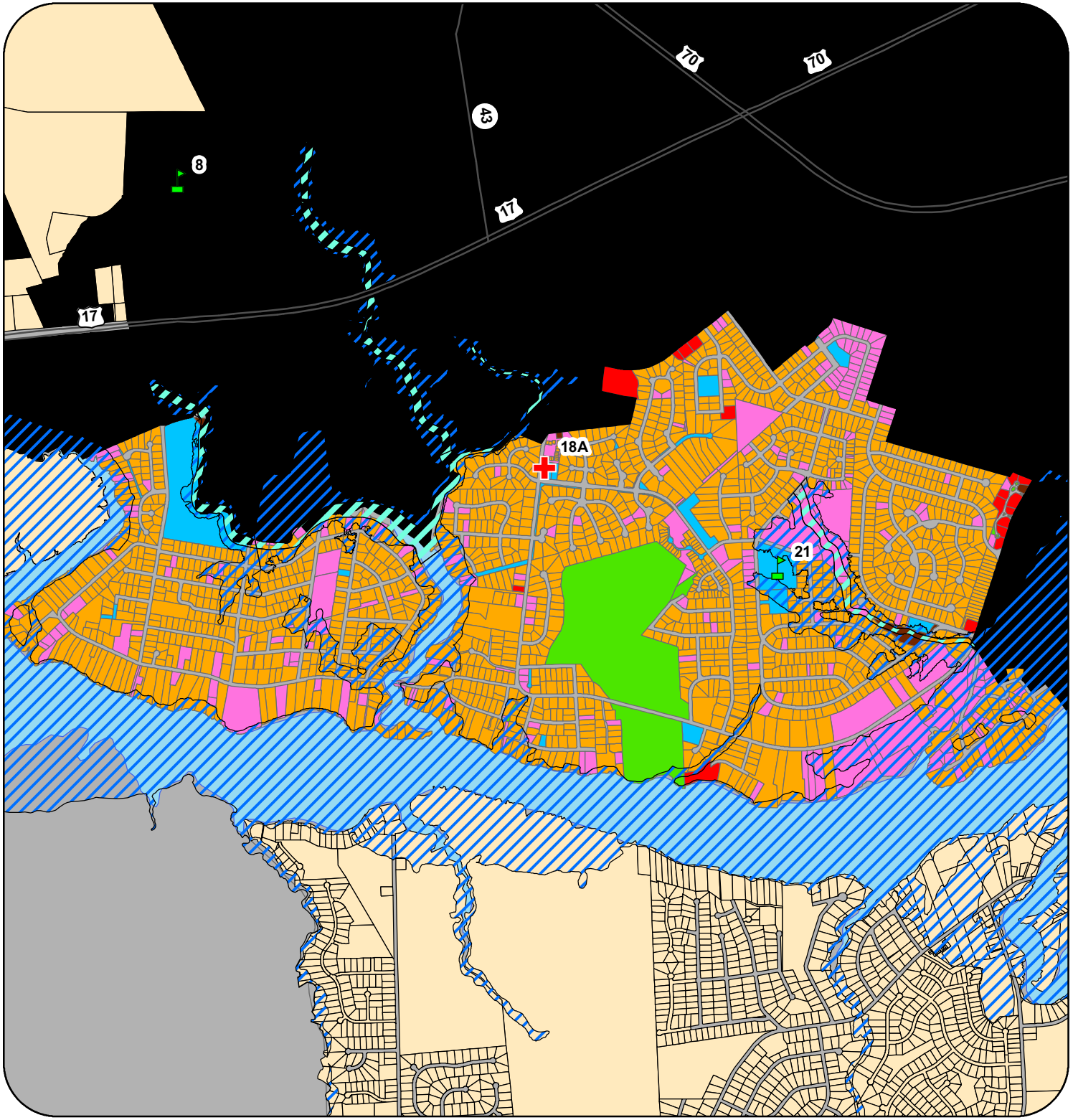
HCP Holland Consulting Planners, Inc.

Map 2H

Craven County

# Craven County Hazard Mitigation Plan

## *Trent Woods Existing Land Use, Critical Facilities & Flood Zones*




**Legend**

- County Parcels
- New Bern
- Surrounding Counties
- Hydrology

**Critical Facilities**

- Fire/Town Hall/Police
- Schools

**Land Use**

- Commercial
- O&I
- Recreational
- Residential
- Utility
- Vacant

**Flood Zone**

- A
- AE
- AEFW

N
W E
S

1 inch = 2,309 feet

0 700 1,400 2,800 4,200 5,600 Feet

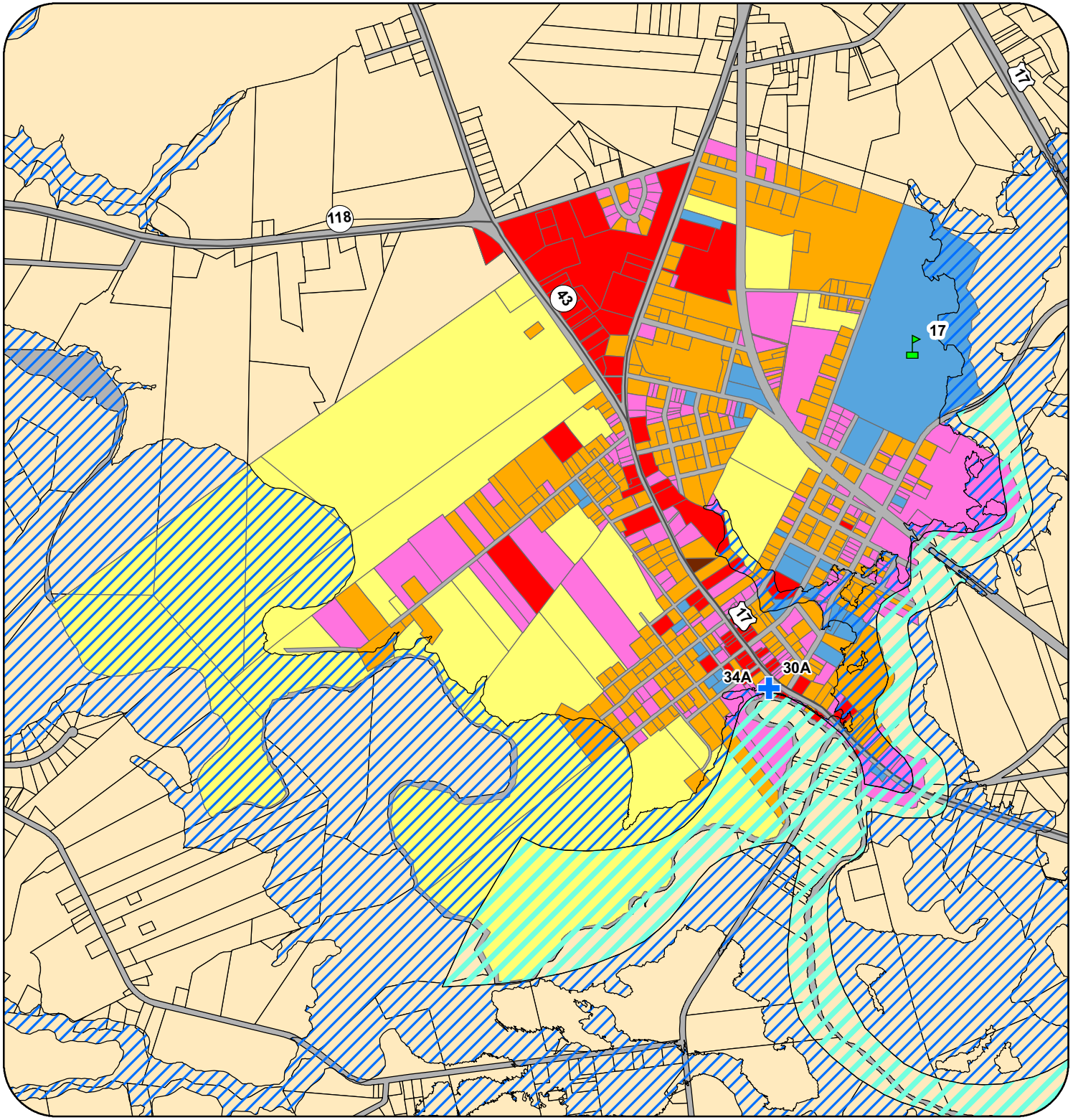
HCP Holland Consulting Planners, Inc.

Map 21

Craven County

# Craven County Hazard Mitigation Plan

## *Vanceboro Existing Land Use Critical Facilities & Flood Zones*




**Legend**

- County Parcels
- Surrounding Counties
- Hydrology

**Critical Facilities**

- Police/ Town Hall
- Fire/Rescue
- Schools

**Flood Zone**

- A
- AE
- AEFW

**Land Use**

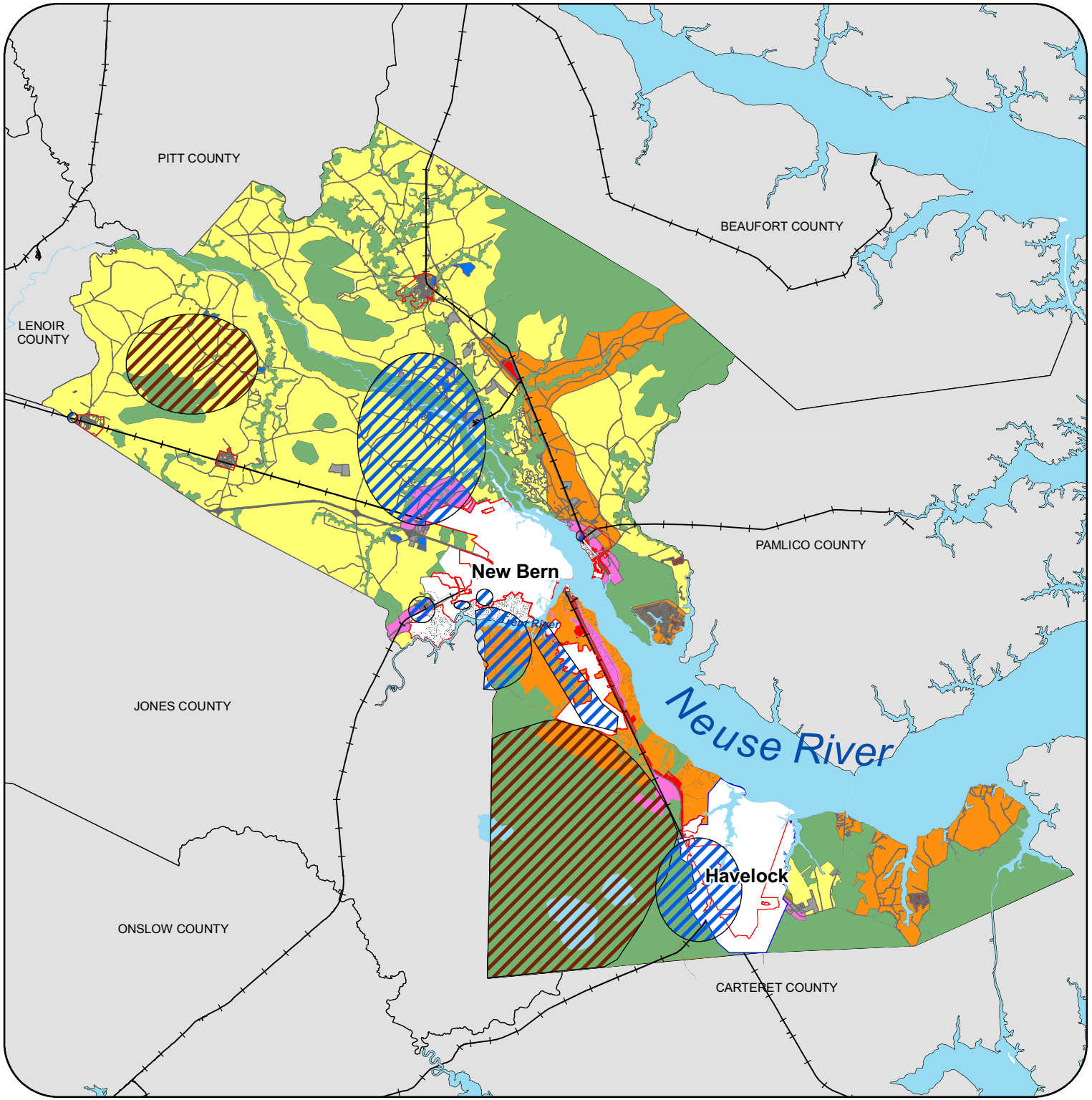
- Agriculture
- Commercial
- Residential
- O&I
- Utility
- Vacant

N
W
E
S

1 inch = 1,492 feet

0 465 930 1,860 2,790 3,720 Feet

HCP Holland Consulting Planners, Inc.




**Map 3**

Craven County

# Craven County Hazard Mitigation Plan

## Future Land Use, Wildfire & Areas of Anticipated Growth

**Legend**

- Municipal City Limits
- Railroad
- Anticipated Growth Areas
- Wildfire

**Future Land Use**

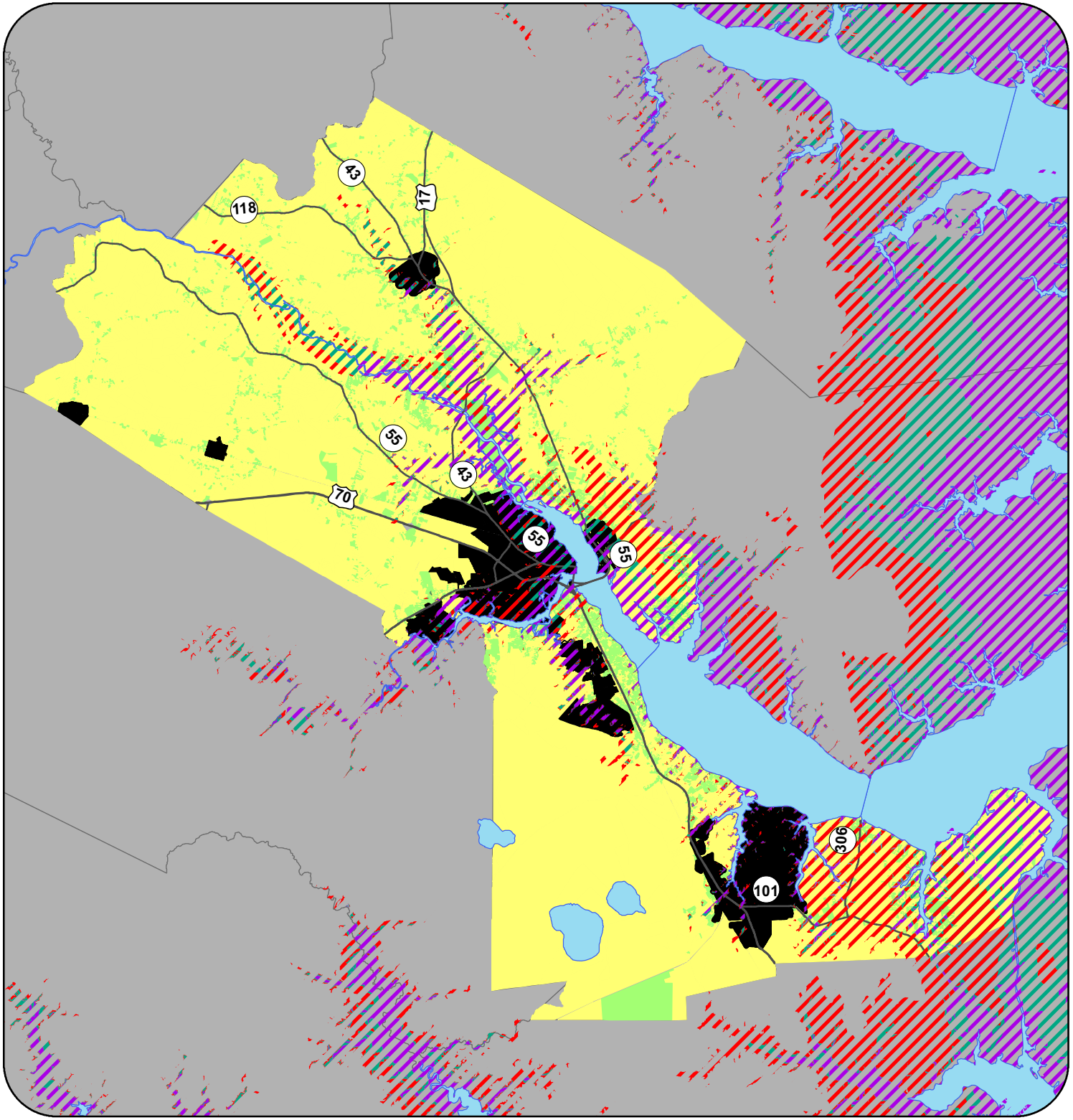
- Commercial
- Conservation
- Industrial
- Agriculture/ Low Density Residential
- Mixed Use
- Office and Institutional
- Recreational
- Residential
- Military

N
W E
S

1 inch = 6 miles

0 1.5 3 6 9 12 Miles

HCP Holland Consulting Planners, Inc.




**Map 4A**

Craven County

# Craven County Hazard Mitigation Plan

## *County Existing Land Use & SLOSH Fast*

**Legend**

- Surrounding Counties
- Municipalities
- Major Roads
- Hydrology

**Storm Surge**

- Category 1-2
- Category 3
- Category 4-5

**Land Use**

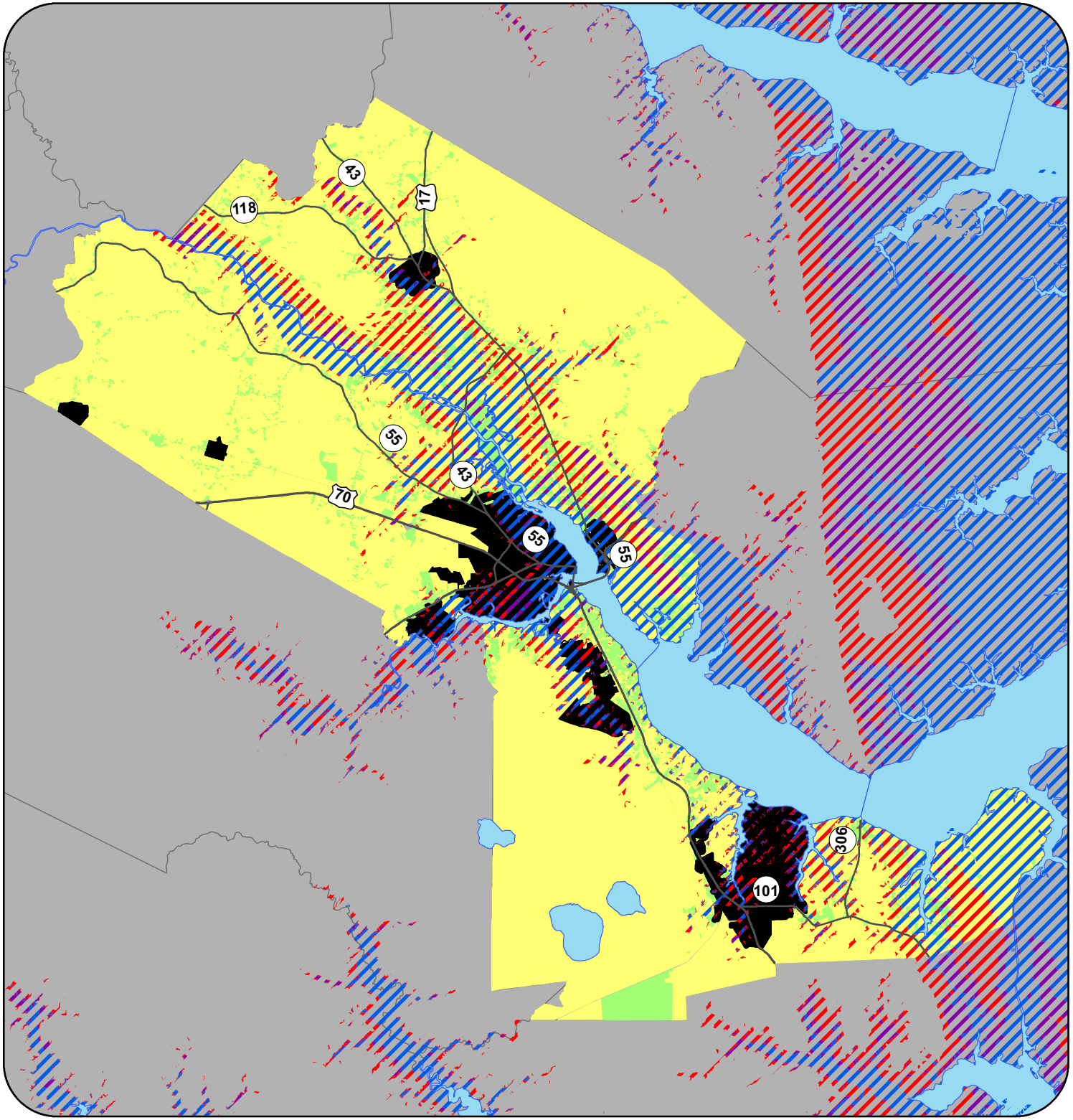
- Agriculture/LDR/Open Space
- Developed

N
W E
S

1 inch = 6 miles

0 1.5 3 6 9 12 Miles

HCP Holland Consulting Planners, Inc.




**Map 4B**

Craven County

# Craven County Hazard Mitigation Plan

## *County Existing Land Use & SLOSH Slow*

**Legend**

- Surrounding Counties
- Municipalities
- Hydrology
- Major Roads

**Storm Surge**

- Category 1-2
- Category 3
- Category 4-5

**Land Use**

- Agriculture/LDR/Open Space
- Developed

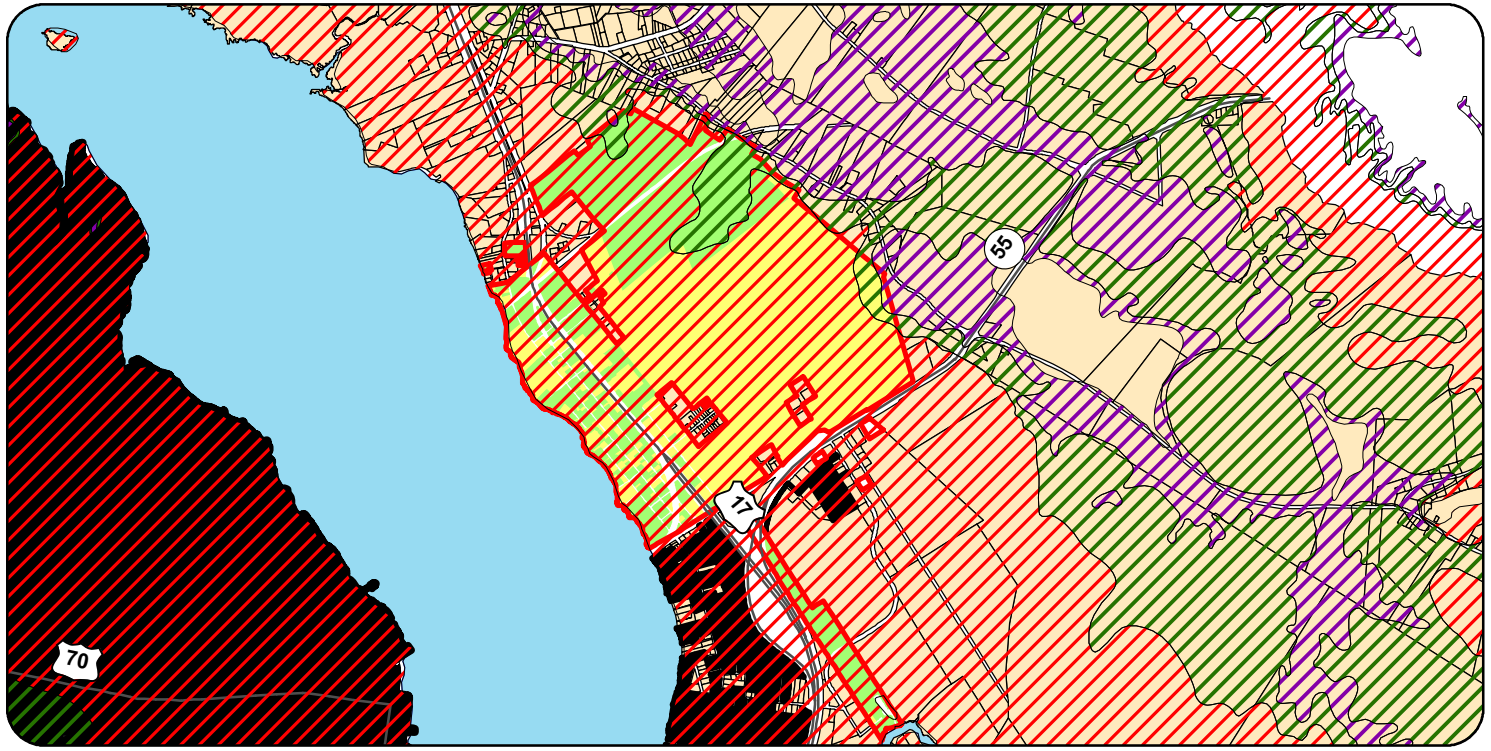
N
W E
S

1 inch = 6 miles

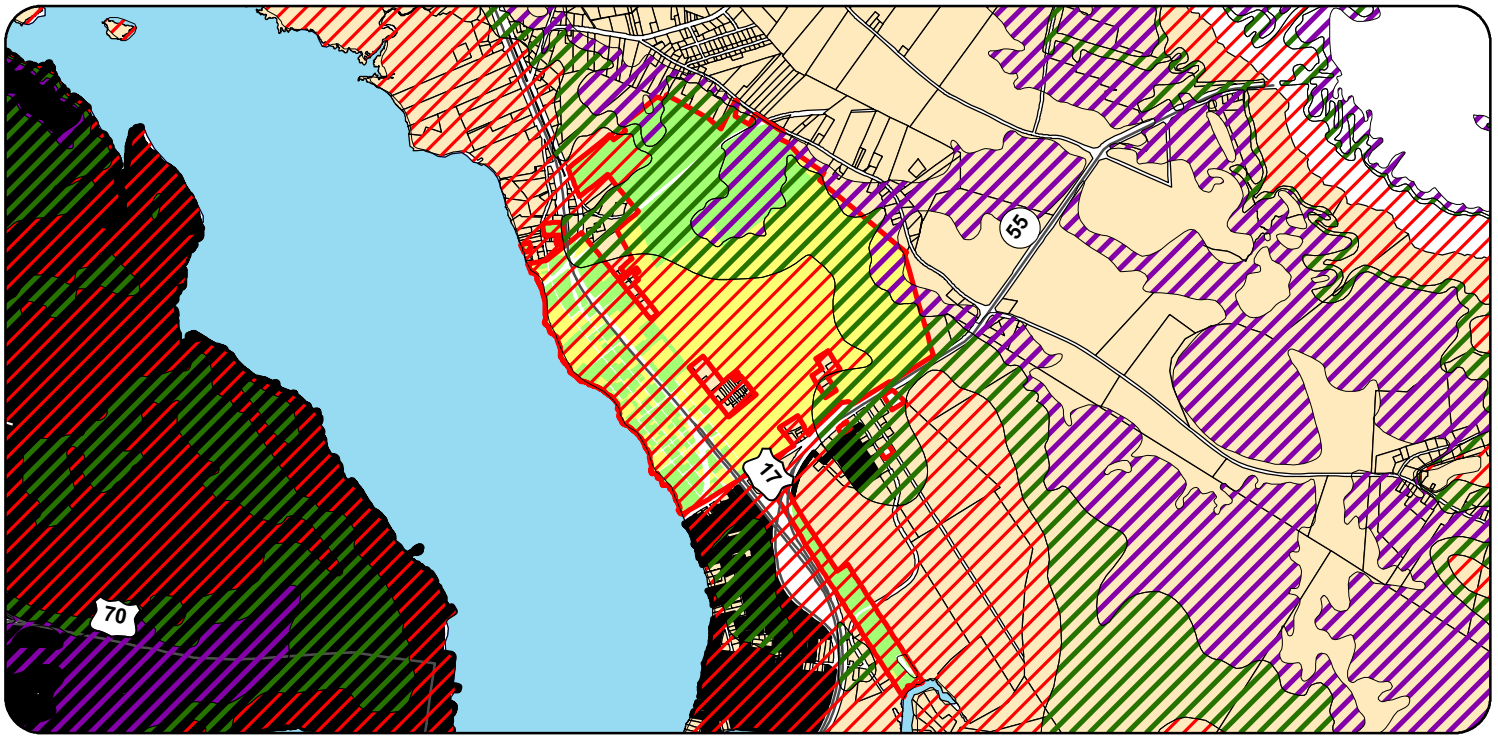
0 1.5 3 6 9 12 Miles

HCP Holland Consulting Planners, Inc.

**SLOSH Slow**




**SLOSH Fast**




**Map 4C**

Craven County

# Craven County Hazard Mitigation Plan

## *Bridgeton Existing Land Use, SLOSH Slow & SLOSH Fast*

**Legend**

- County Parcels
- Town Limits
- New Bern
- Hydrology
- SLOSH-S Category 1 & 2
- SLOSH-S Category 3
- SLOSH-S Category 4 & 5

**Land Use**

- Agriculture/LDR/Open Space
- Developed

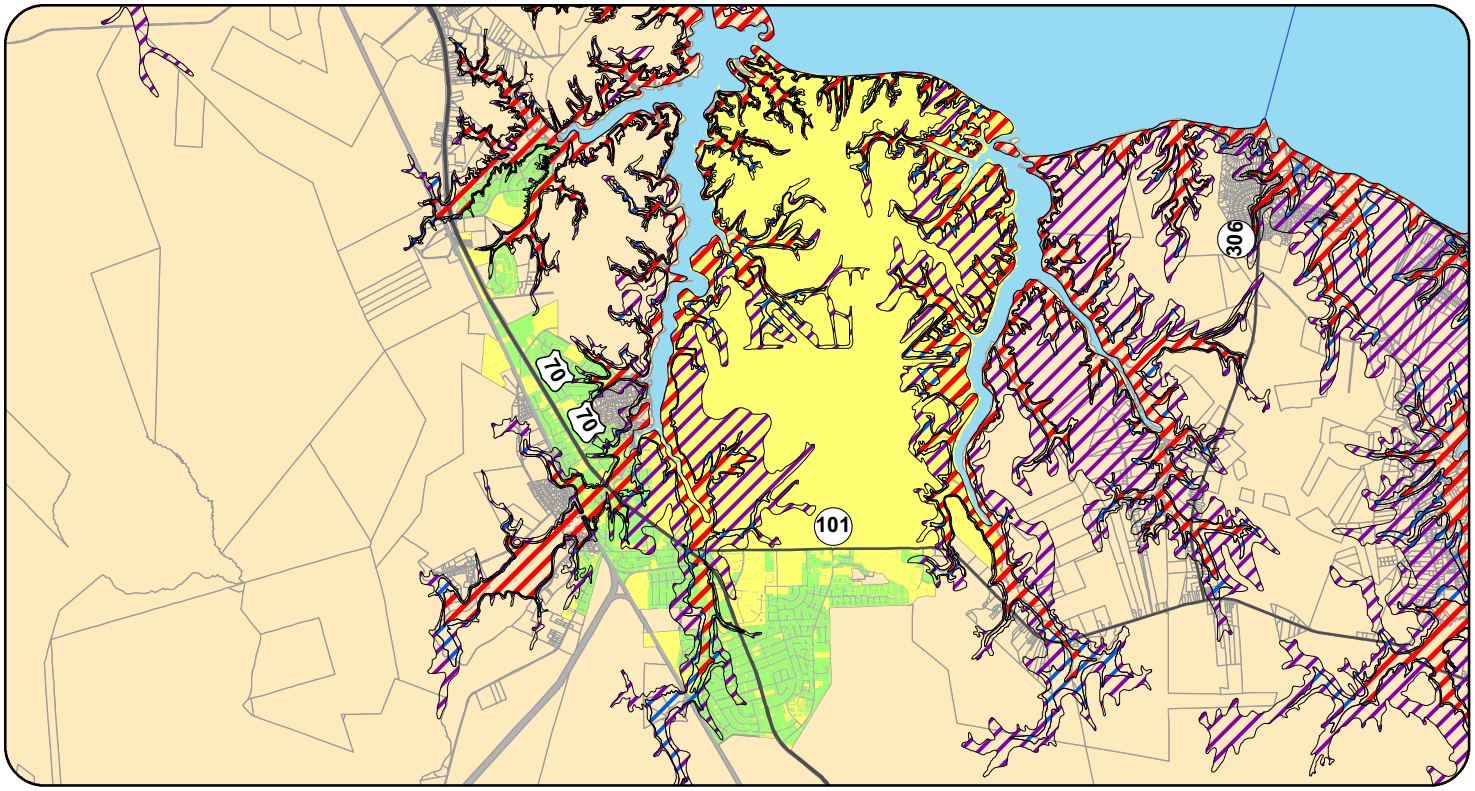
N
W E
S

1 inch = 3,679 feet

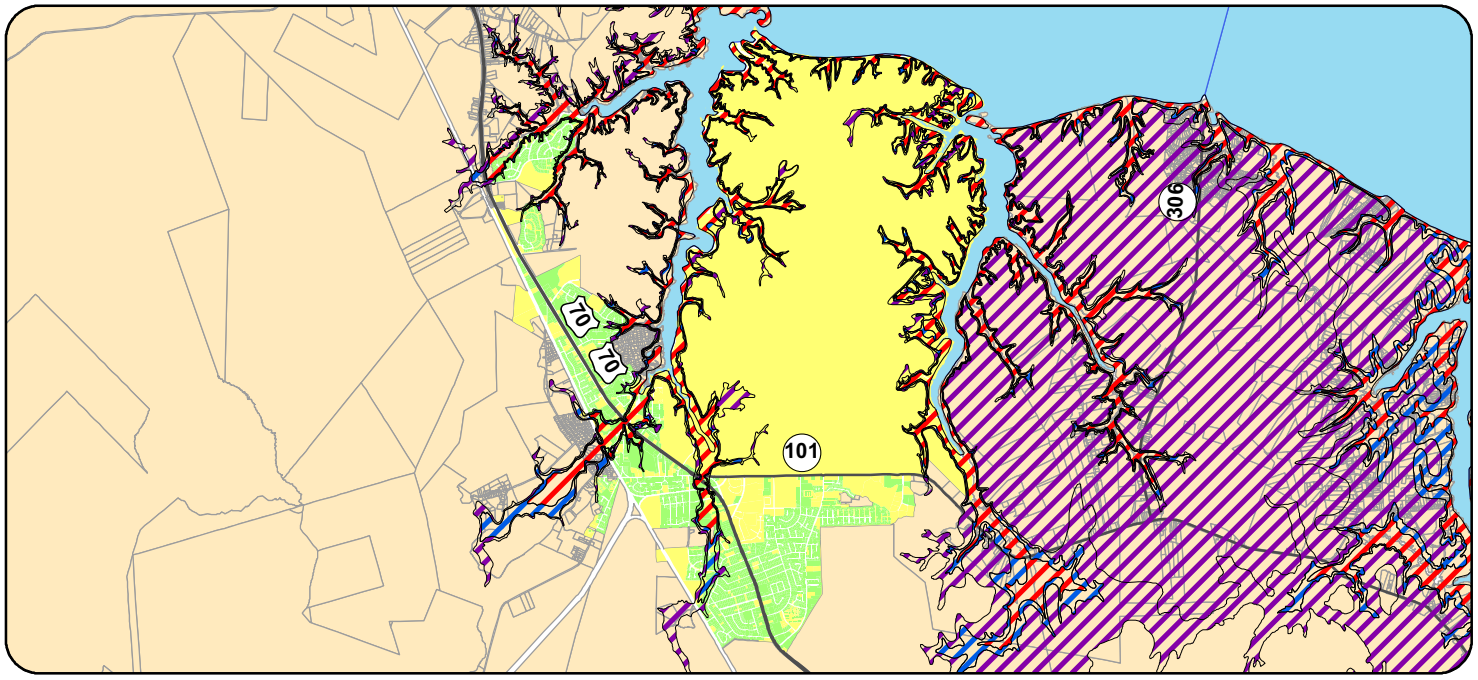
0 0.2 0.4 0.8 1.2 1.6 Miles

HCP Holland Consulting Planners, Inc.

**SLOSH Slow**




**SLOSH Fast**




**Map 4D**

Craven County

# Craven County Hazard Mitigation Plan

***Havelock Existing Land Use, SLOSH Slow & SLOSH Fast***

**Legend**

- County Parcels
- Surrounding Counties
- Hydrology
- SLOSH Category 1 & 2
- SLOSH Category 3
- SLOSH Category 4 & 5

**Land Use**

- Agriculture/LDR/Open Space
- Developed

N
W E
S

1 inch = 2 miles

0 0.5 1 2 3 4 Miles

HCP Holland Consulting Planners, Inc.

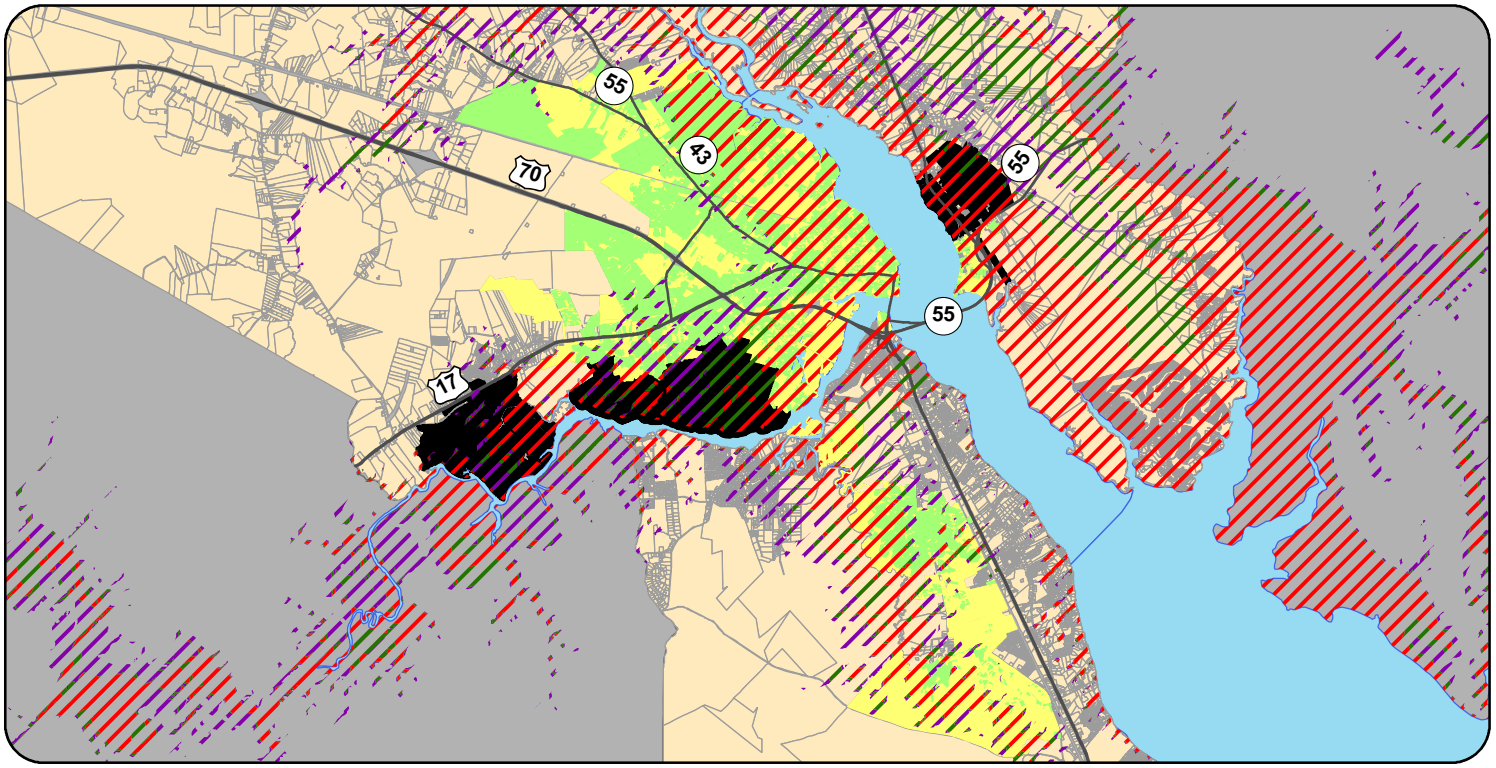
Map 4E

Craven County

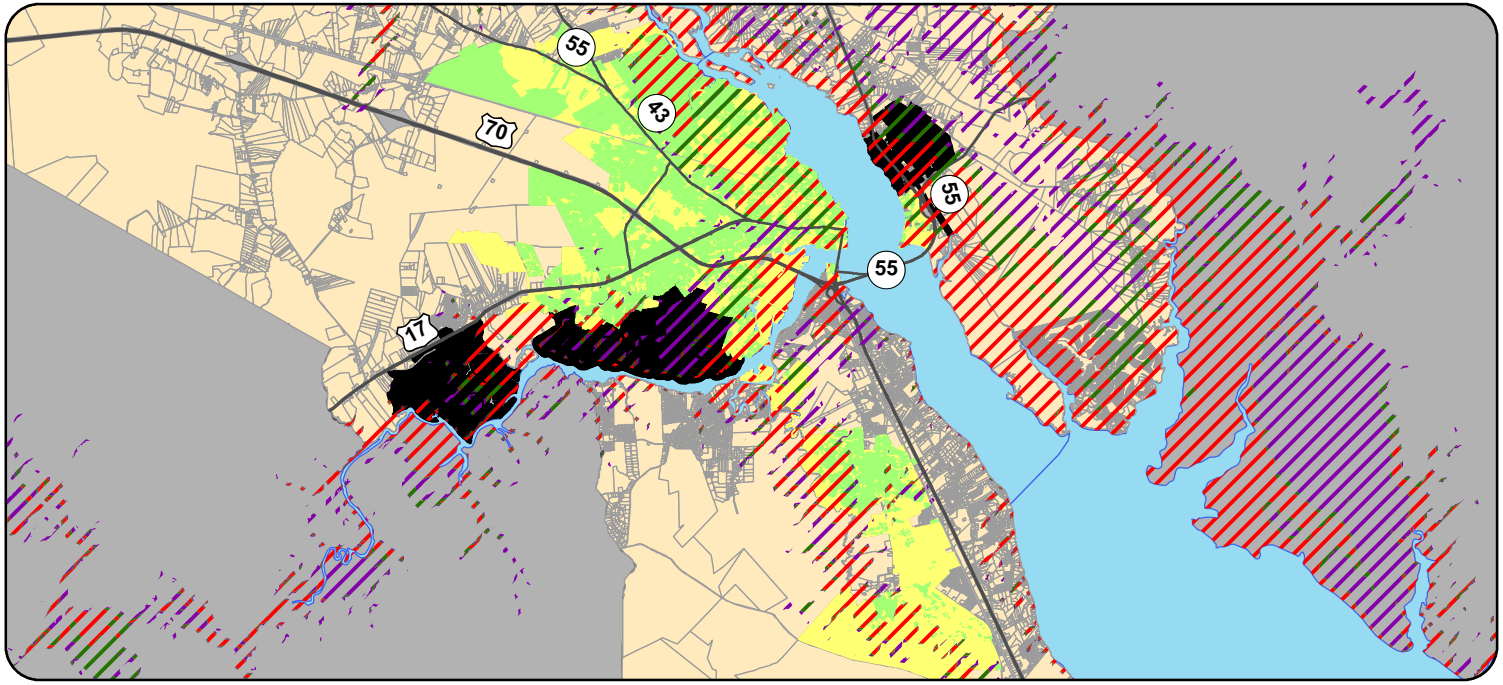
# Craven County Hazard Mitigation Plan

## *New Bern Existing Land Use, SLOSH Slow & SLOSH Fast*

**SLOSH Slow**




**SLOSH Fast**




**Legend**

- County Parcels
- Surrounding Counties
- Municipalities
- Hydrology
- SLOSH Category 1 & 2
- SLOSH Category 3
- SLOSH Category 4 & 5

**Land Use**

- Agriculture/LDR/Open Space
- Developed

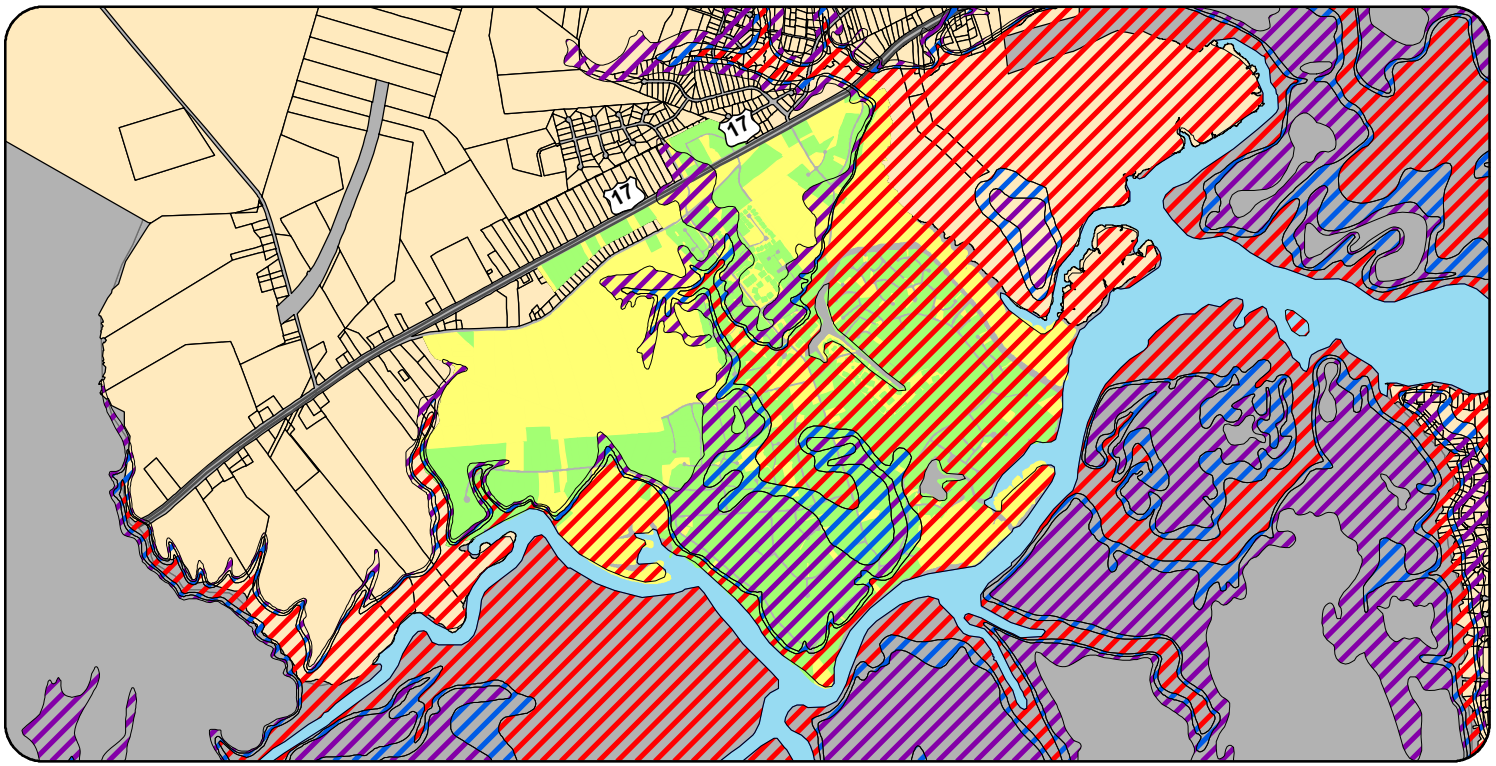
N
W E
S

1 inch = 3 miles

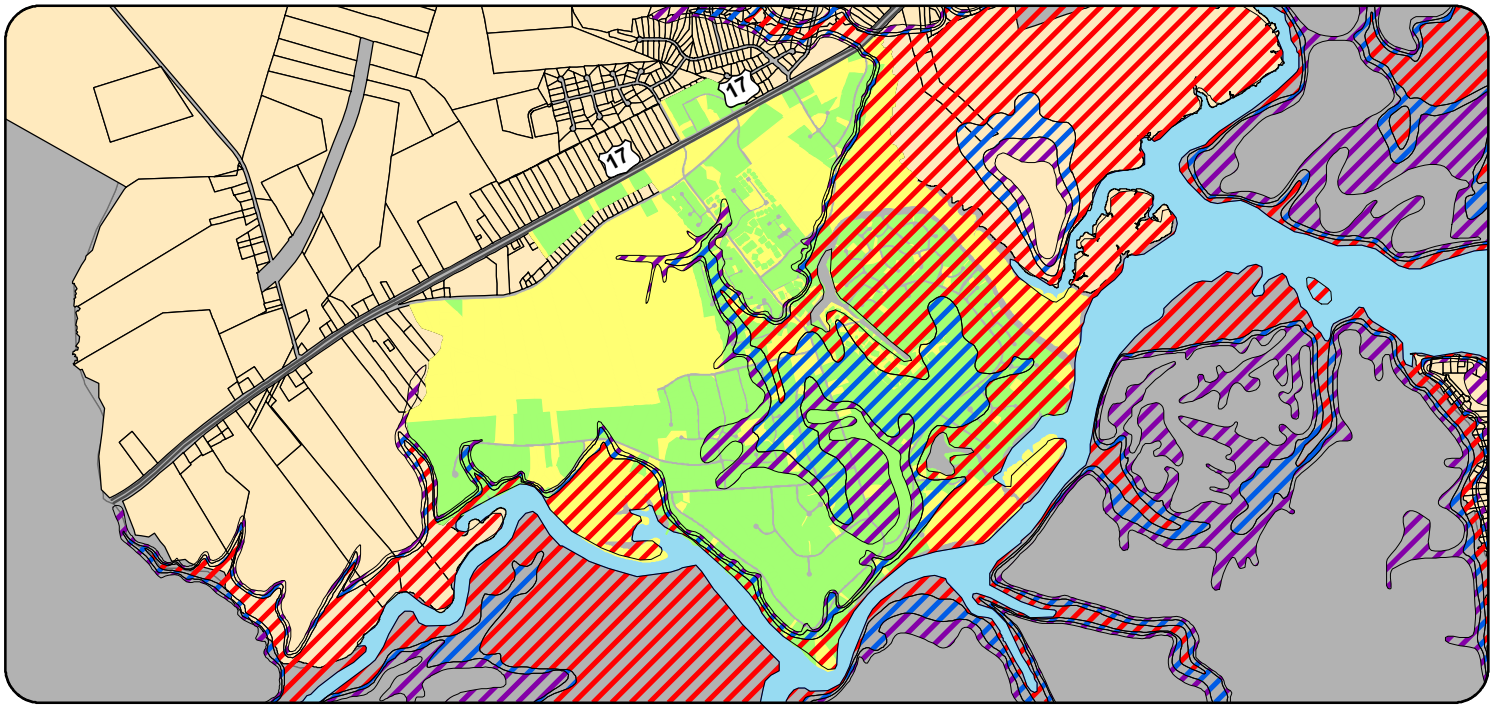
0 1 2 4 6 Miles

HCP Holland Consulting Planners, Inc.

**SLOSH Slow**




**SLOSH Fast**




**Map 4F**

Craven County

# Craven County Hazard Mitigation Plan

***River Bend Existing Land Use, SLOSH Slow & SLOSH Fast***

**Legend**

- County Parcels
- Surrounding Counties
- Hydrology
- SLOSH Category 1 & 2
- SLOSH Category 3
- SLOSH Category 4 & 5

**Land Use**

- Agriculture/LDR/Open Space
- Developed

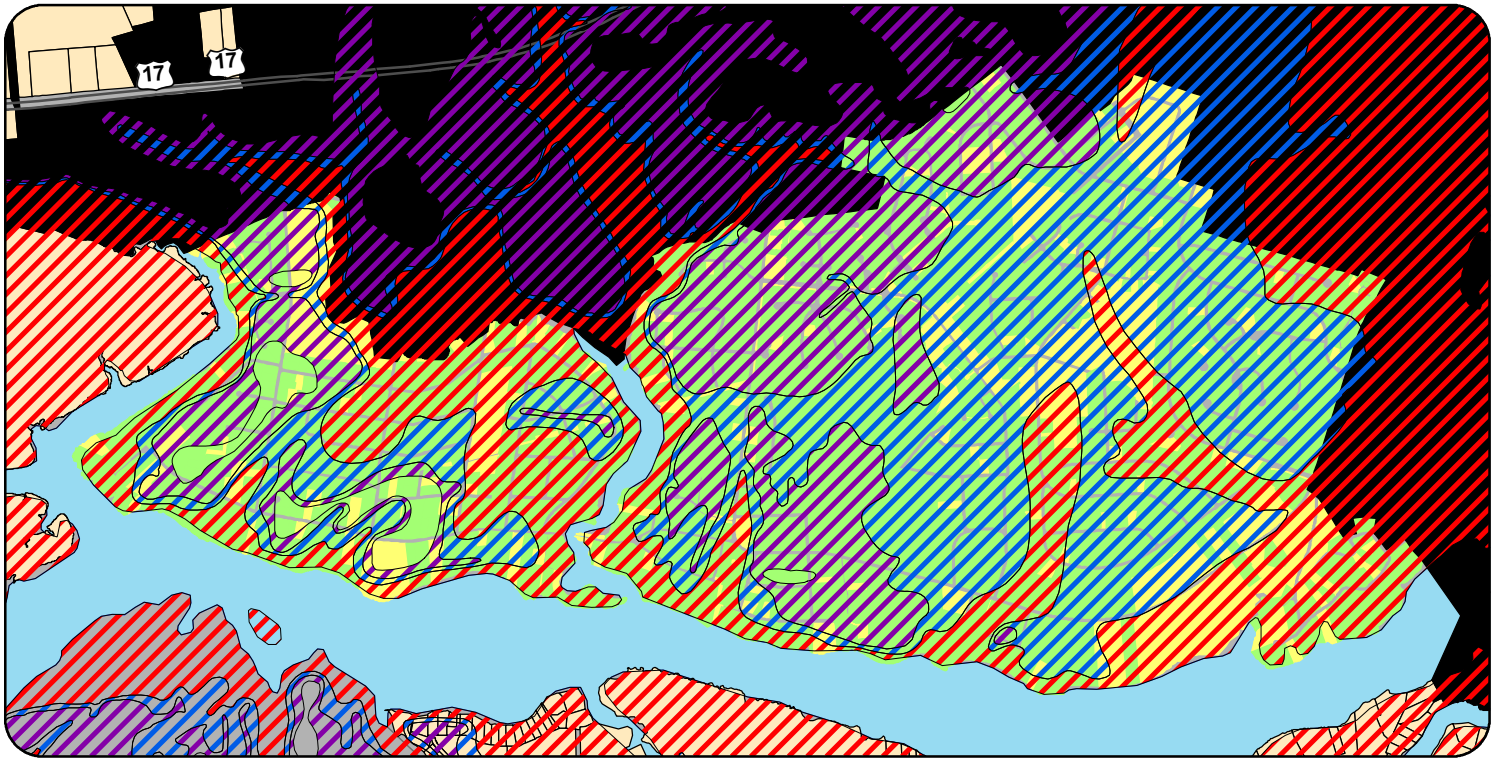
N
W E
S

1 inch = 3,472 feet

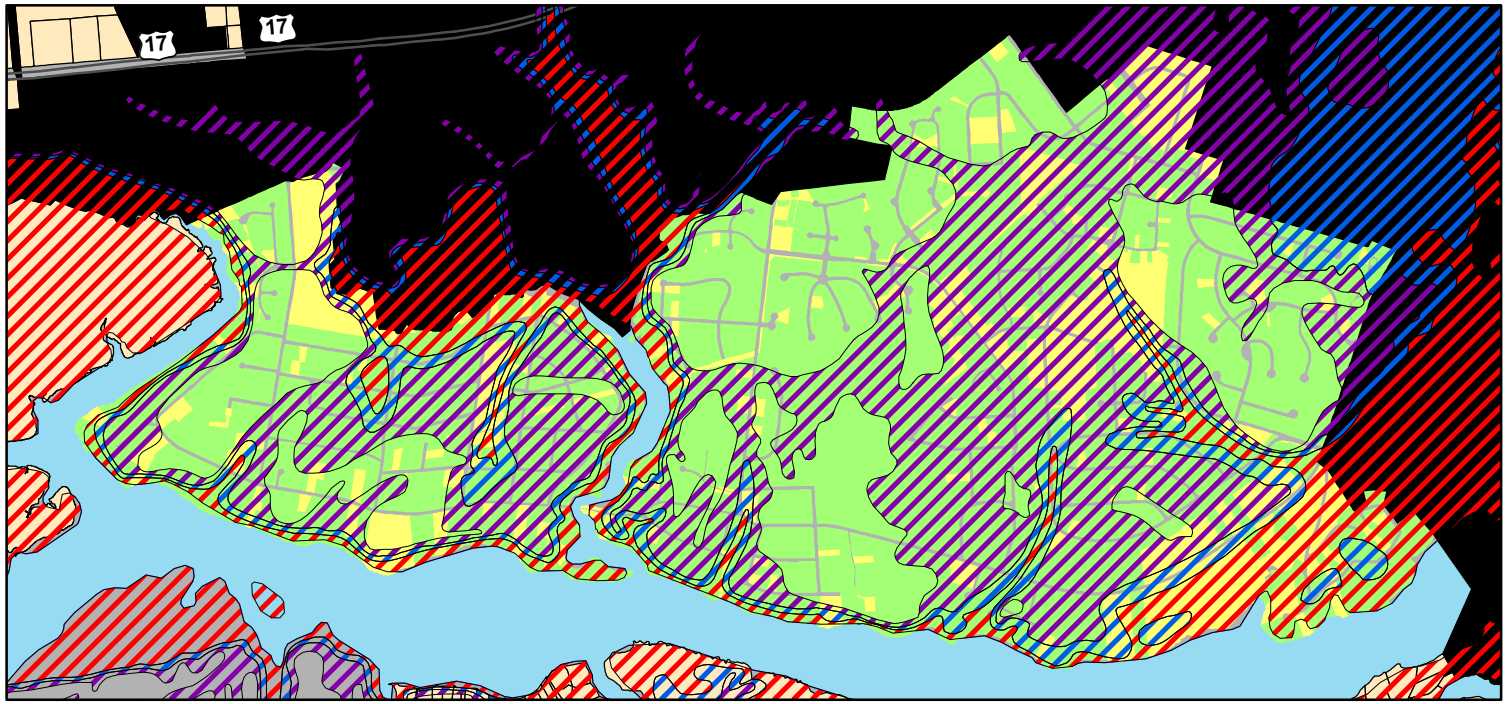
0 0.2 0.4 0.8 1.2 1.6 Miles

HCP Holland Consulting Planners, Inc.

**SLOSH Slow**




**SLOSH Fast**




**Map 4G**

Craven County

# Craven County Hazard Mitigation Plan

***Trent Woods Existing Land Use, SLOSH Slow & SLOSH Fast***

**Legend**

- County Parcels
- Newbern
- Surrounding Counties
- Hydrology
- SLOSH Category 1 & 2
- SLOSH Category 3
- SLOSH Category 4 & 5

**Land Use**

- Agriculture/LDR/Open Space
- Developed

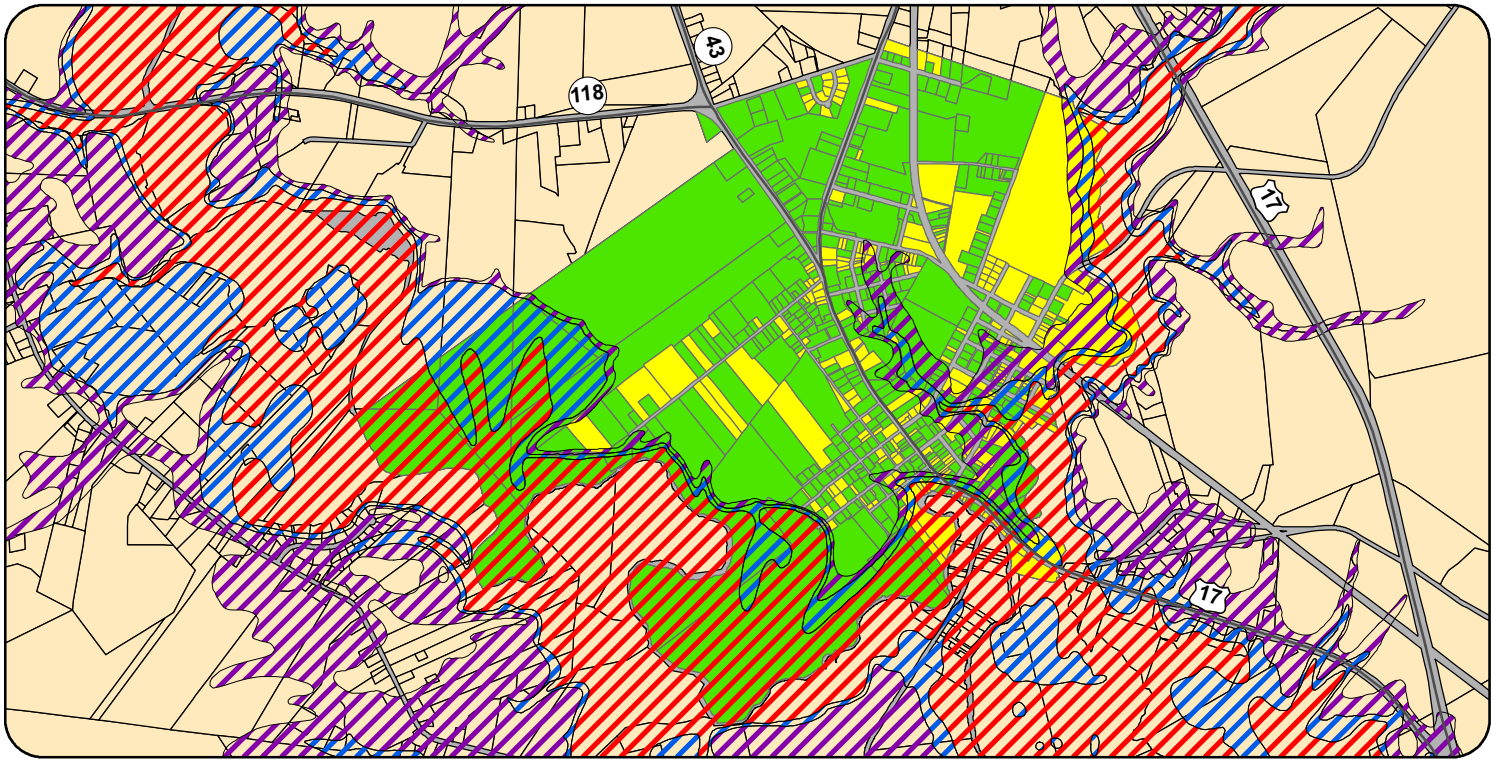
N
W E
S

1 inch = 2,543 feet

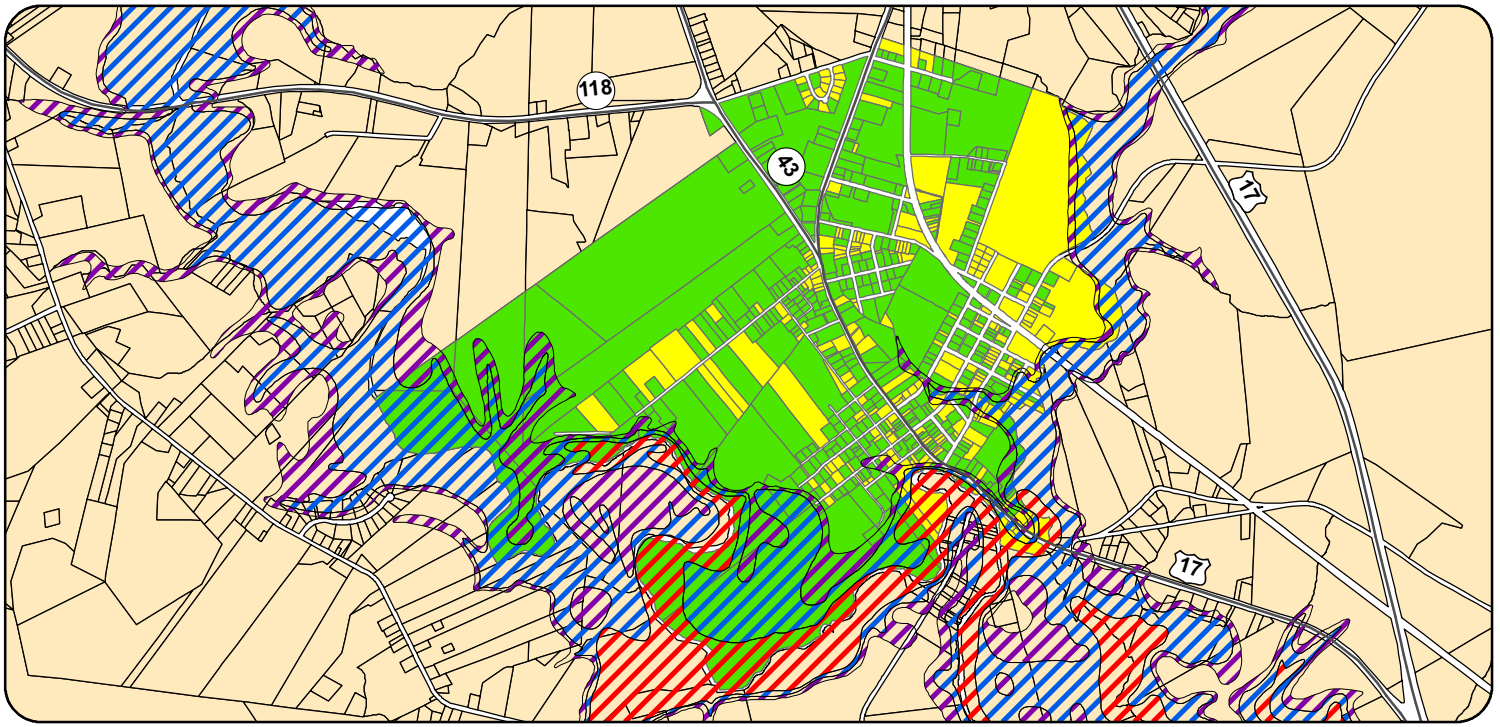
0 0.125 0.25 0.5 0.75 1 Miles

HCP Holland Consulting Planners, Inc.

**SLOSH Slow**




**SLOSH Fast**




**Map 4H**

Craven County

# Craven County Hazard Mitigation Plan

***Vanceboro Existing Land Use, SLOSH Slow & SLOSH Fast***

## Legend

- County Parcels
- Surrounding Counties
- Hydrology
- SLOSH Category 1 & 2
- SLOSH Category 3
- SLOSH Category 4 & 5

## Land Use

- Agriculture/LDR/Open Space
- Developed

N
W E
S

1 inch = 2,566 feet

0 750 1,500 3,000 4,500 6,000 Feet

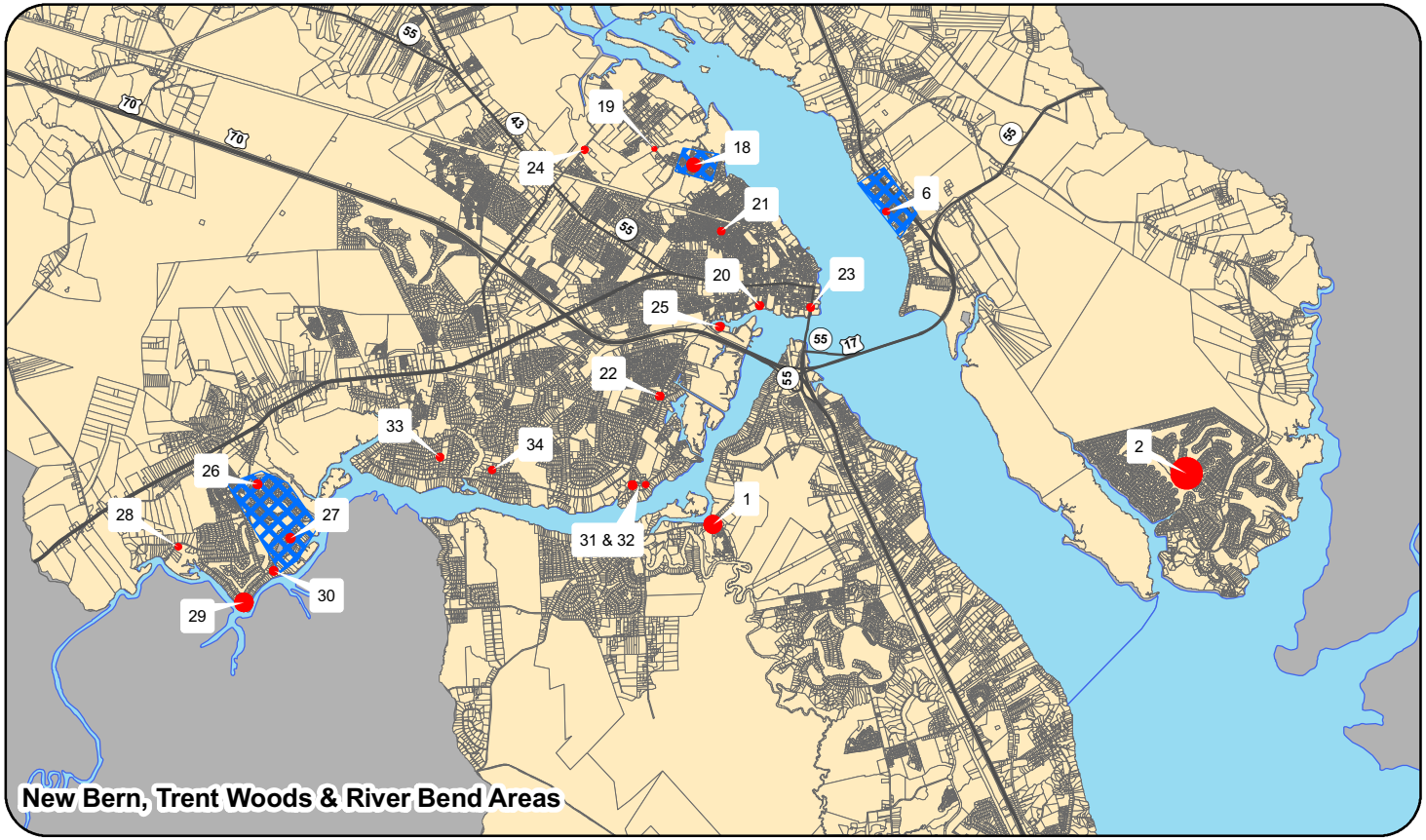
HCP Holland Consulting Planners, Inc.

Map 5

Craven County

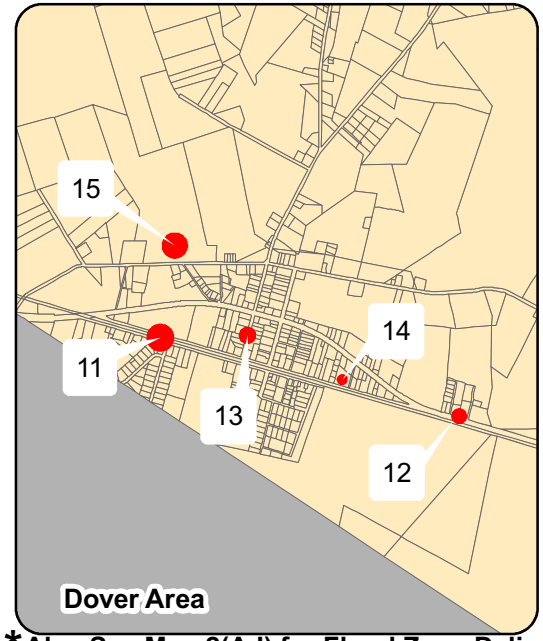
# Craven County Hazard Mitigation Plan

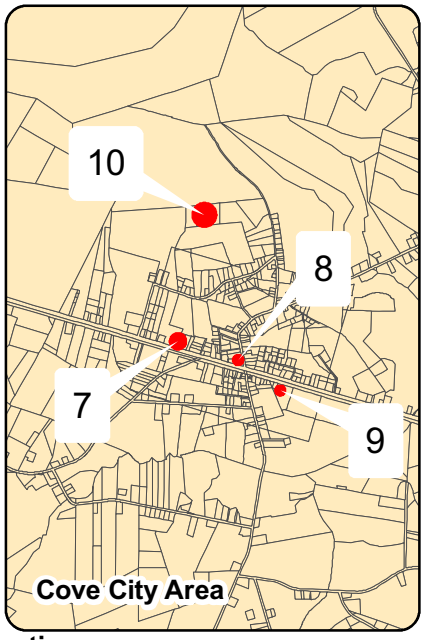
## *Areas of Natural Hazard Risk Exposures & Concentrated Repetitive Loss Areas*

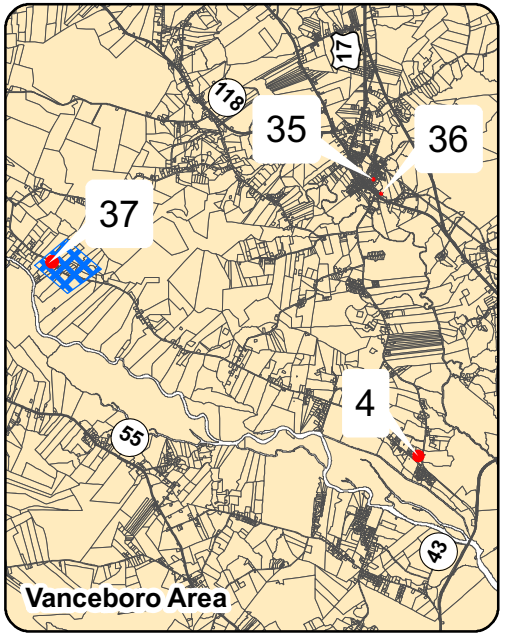


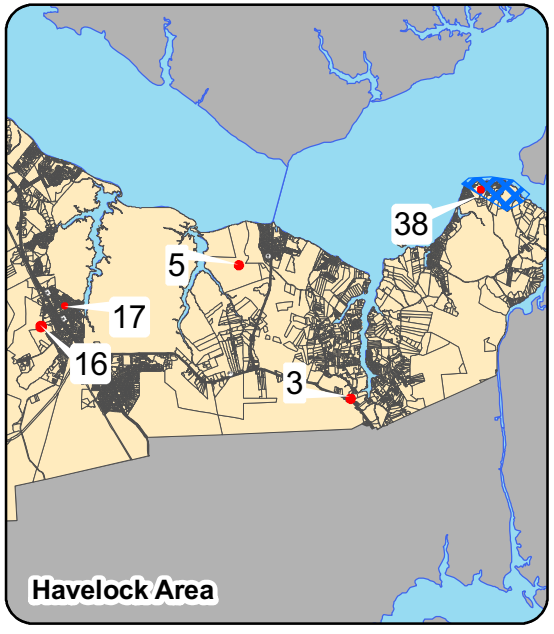

**Legend**

- Repetitive Loss Areas *
- Areas of Natural Hazard Risk Exposure**
- Roads
- County Parcels
- Hydrology
- Surrounding Counties




*Also See Map 2(A-I) for Flood Zone Delineation

**See Appendix G

HCP Holland Consulting Planners, Inc.

## Appendix A

## Maps

**Map 1 - Regional Location Map**
**Map 2A - County Existing Land Use, Critical Facilities, and Flood Zones**
**Map 2B - Bridgeton Existing Land Use, Critical Facilities, and Flood Zones**
**Map 2C - Cove City Existing Land Use and Critical Facilities**
**Map 2D - Dover Existing Land Use and Critical Facilities**
**Map 2E - Havelock Existing Land Use, Critical Facilities, and Flood Zones**
**Map 2F - New Bern Existing Land Use, Flood Zones, and Critical Facilities**
**Map 2G - River Bend Existing Land Use, Critical Facilities, and Flood Zones**
**Map 2H - Trent Woods Existing Land Use, Critical Facilities, and Flood Zones**
**Map 2I - Vanceboro Existing Land Use, Critical Facilities, and Flood Zones**
**Map 3 - Future Land Use, Wildfire, and Areas of Anticipated Growth**
**Map 4A - County Existing Land Use and SLOSH Fast**
**Map 4B - County Existing Land Use and SLOSH Slow**
**Map 4C - Bridgeton Existing Land Use, SLOSH Slow, and SLOSH Fast**
**Map 4D - Havelock Existing Land Use, SLOSH Slow, and SLOSH Fast**
**Map 4E - New Bern Existing Land Use, SLOSH Slow, and SLOSH Fast**
**Map 4F - River Bend Existing Land Use, SLOSH Slow, and SLOSH Fast**
**Map 4G - Trent Woods Existing Land Use, SLOSH Slow, and SLOSH Fast**
**Map 4H - Vanceboro Existing Land Use, SLOSH Slow, and SLOSH Fast**
**Map 5 - Craven County Areas of Natural Hazards**