Bertie County
Multi - Jurisdictional
Hazard Mitigation Plan

Adopted September 20, 2004

Addressing:
Erosion
Dam & Levee Failures
Droughts & Heat Waves
Earthquakes
Flood
Hurricanes & Coastal Storms
Landslides and Sinkholes
Severe Storms & Tornadoes
Tsunamis
Volcanoes
Wildfires
Winter Storms & Freezes

THE WOOTEN COMPANY

BERTIE COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN

Including the Towns of
Askewville, Colerain, Kelford,
Lewiston Woodville, Powellsville, Roxobel, and Windsor

Board of Commissioners
Rick Harrell
J. Jasper Bazemore
Norman M. Cherry Sr.
Lewis C. Hoggard III
J. Wallace Perry

Hazard Mitigation Team Members
Zee Lamb, Bertie County Manager
Sterling Hancock, Bertie County Tax Administrator
Rickey Freeman, Bertie County Emergency Management
Meredith T. White, Town of Askewville
Kay Brantley, Town of Askewville
Burney Baker, Town of Colerain
Jo Ferguson, Town of Colerain
Wade Timothy Emory, Town of Kelford
Effie Vick, Town of Kelford
Carl A. Lee, Town of Lewiston Woodville
Neeton Nichols, Town of Lewiston Woodville
Thomas Asbell, Town of Powellsville
Helen Campbell, Town of Powellsville
Gary T. Johnson, Town of Roxobel
JoAnn S. Medford, Town of Roxobel
Robert B. Spivey, Town of Windsor
Allen Castelloe, Town of Windsor

Planning Assistance Provided By

THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

Including the towns of Askewville, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel and Windsor

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Community Capability Assessment

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Community Capability Assessment

Town of Windsor
Community Capability Assessment

I. Introduction/Planning Process

A. Statement of the Problem

Natural hazards are a part of the world in which we live. Floods, hurricanes, tornadoes, winter storms, wildfires, and other hazardous events are natural phenomena. Natural hazards are inevitable and there is little humans can do to control force and intensity. However, how the natural and the built environments interact with hazards is quite different.

The natural environment is amazingly recuperative from the forces of wind, rain, fire and earth and can regenerate with resiliency, restoring habitat and ecosystems in time for the next generation of plant and animal life to begin anew. The built environment, however, is not as resilient. Natural disasters occur when human activity in the form of buildings, infrastructure, agriculture and other land uses are located in the path of the destructive forces of nature.[I-1] Since the built environment is more susceptible to natural hazards and cannot recuperate like the natural environment, communities impacted by a natural hazard often recover only over a long period of time and at great social and economic cost.

In recent years, the frequency and impact of natural disasters has increased not because natural hazards occur more frequently but because more people are choosing to live and work in locations that put them and their property at risk. "By the year 2010 the number of people residing in the most hurricane-prone counties throughout the nation will have doubled. Likewise, while floods have caused a greater loss of life and property and have disrupted more families and communities than all other natural hazards combined, the rate of development in flood-prone areas continues to escalate, putting more people and property in danger." [I-2]

While natural hazards cannot be prevented, local communities can use various means to reduce the vulnerability of people and property to damage. Communities can reduce exposure to future natural hazards by managing the location and characteristics of both the existing and future built environment. By utilizing location and construction techniques, a community can mitigate negative impacts and reduce future damage to both human lives and property.

Preparing for natural hazards involves establishing a comprehensive emergency management system consisting of the following four component activities:

1. Preparedness activities undertaken to improve a community's ability to respond immediately after a disaster. Preparedness activities include the development of response procedures, design and installation of warning systems, exercises to test emergency operational procedures, and training of emergency personnel.
2. Response activities designed to meet the urgent needs of disaster victims. Response activities occur during the disaster and include rescue operations, evacuation, emergency medical care, and shelter programs.
3. Recovery activities designed to rebuild after a disaster. These activities include repairs to damaged public facilities such as roads and bridges, restoration of public services such as power and water, and other activities that help restore normal services to a community.
4. Hazard mitigation activities designed to reduce or eliminate damages from future hazardous events. These activities can occur before, during, and after a disaster and overlap all phases of emergency management.

Hazard mitigation is defined as "any action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards.[I-3] Mitigation activities are ongoing and overlap all phases of emergency management.

Hazard mitigation includes three types of activities:

1. Structural mitigation – constructing dam and levee projects to protect against flooding, constructing disaster-resistant structures, and retrofitting existing structures to withstand future hazardous events;
2. Non-structural mitigation - development of land use plans, zoning ordinances, subdivision regulations, and tax incentives and disincentives to discourage development in high-hazard risk areas; and
3. Educational programs – educating the public about potential natural hazards, the importance of mitigation, and how to prepare to withstand a disaster.

"A fundamental premise of mitigation strategy is that current dollars invested in mitigation activities will significantly reduce the demand for future dollars by reducing the amount needed for emergency recovery, repair, and reconstruction following a disaster. Mitigation also calls for conservation of natural and ecologically sensitive areas (such as wetlands, floodplains, and dunes) which enables the environment to absorb some of the impact of hazard events. In this manner, mitigation programs help communities attain a level of sustainability, ensuring long-term economic vitality and environmental health for the community as a whole." [I-4]

The concept of sustainable development has emerged in recent years as a means to emphasize the need to regain a balance between the built and natural environment. Sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[I-5] Sustainable development centers on the type of development rather than quantity and is not intended to be a no-growth or slow-growth initiative.

"Sustainable development through mitigation is not an impediment to growth. By building a community that is resilient to natural hazards, citizens strengthen the local economy. A locality that reduces its vulnerability will experience less restoration time, shortened business downtime, and less social disruption following a disaster, freeing resources that would otherwise be devoted to response and recovery, and more quickly improving citizens' lives." [I-6]

B. Purpose of the Plan

The purpose of the Plan is:

1. To demonstrate local commitment to hazard mitigation planning principles;
2. To reduce natural hazard vulnerability by reducing the potential for future damages and economic losses;
3. To speed recovery and redevelopment following future natural hazard events;
4. To comply with both State and Federal legislative requirements for local hazard mitigation planning; and
5. To qualify for additional grant funding, in both pre-disaster and post-disaster situations.

C. Authority

The Bertie County Multi-Jurisdictional Plan was adopted by the Bertie County Board of Commissioners and the respective elected boards of the towns of Askewville, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, and Windsor under the authority and police powers granted to the counties and municipalities of the State of North Carolina by North Carolina General Statutes (N.C.G.S., Chapter 153A and Chapter 160A).

D. Participants in the Planning Process

The planning process was overseen by the Bertie County Multi-Jurisdictional Hazard Mitigation Planning Team (Team) which met regularly during the planning process. Through a public meeting/newspaper advertisement, the County invited neighboring communities, agencies, business, academia, nonprofits, and other interested parties to be involved in the planning process.

HMP Team Members

Local Government/Agency	Name	Position
Bertie County	Rickey Freeman	Emergency Management Coordinator
Bertie County	Zee Lamb	County Manager
Bertie County	Sterling Hancock	Tax Administrator
Bertie County	Lydia Hoggard	Finance Officer
Bertie County	Morris Rascoe	Assistant County Manager
Bertie County	Steve Biggs	Economic Development Director
Bertie County	G. T. Pittman	Building Inspector
Bertie County	Phil Hoggard	Chief Tax Mapper
Bertie County	Richard W. Rhodes	County Extension Director
Town of Askewville	Kay Brantley	Town Clerk
Town of Colerain	Burney Baker	Mayor
Town of Kelford	Norman D. Parker	Mayor
Town of Lewiston Woodville	Neeton Nichols	Town Clerk
Town of Powellsville	Thomas Asbell	Mayor
Town of Roxobel	Gary T. Johnson	Mayor
Town of Windsor	Allen Castelloe	Town Administrator
The Wooten Company	Patt Crissman, AICP/ASLA	Project Manager
The Wooten Company	Ashton Slate	Associate Planner

E. Description of the Planning Process

In 2002, Bertie County employed The Wooten Company to serve as consulting planner for the development of the multi-jurisdictional plan. The consulting planner served as the planning process facilitator by organizing meetings, drafting plan sections for County and towns review, making plan revisions based on review comments, and compiling the full draft plan for final review. Bertie County and the four participating municipalities worked as a team with the consulting planner to create draft plans for each of the participating jurisdictions. The County emergency management coordinator served as committee chair.

The comprehensive planning process was organized to ensure that individual mitigation projects and initiatives undertaken by the County and participating municipalities are carried out in a cooperative manner such that all local initiatives work together and no single action or project detracts from the overall goal of creating a safer environment for all citizens of Bertie County. The planning process also played an important part in generating community understanding of and support for hazard mitigation by creating a forum for discussion and publicizing the need for hazard mitigation planning.

Public Input

1st Public Meeting

On September 15, 2003, Bertie County and the participating municipalities gave public notice of the start of the hazard mitigation planning process at the Bertie County Board of Commissioners' public meeting. The meeting was advertised in the local newspaper and at municipal public board meetings.

At the meeting, the Emergency Management Coordinator made a presentation describing the purpose of the hazard mitigation planning process and the schedule for plan development. The section of the Plan on hazard identification and analysis was also presented. No public comments were received.

In addition to the meeting, public announcements of the meeting provided an address and phone number for persons who were unable to attend the meeting but who wanted to receive more information about the planning process. During the planning process, drafts of the plan were also available for public review at the Bertie County Emergency Management office.

Once the draft Plan received NCEM approval, the County advertised and held a public hearing to receive public comment on the Plan. The Board of Commissioners held a public hearing on August 16, 2004 and on September 20, 2004; the County Board of Commissioners adopted the Plan (see attached resolution of adoption).

HMP Team Meetings

The Hazard Mitigation Planning (HMP) Team, consisting of representatives of the County and each participating municipality, met at the Bertie County Office Building in Windsor four times between February 2002 and November 2003 (Table I-1). The County and each of the participating municipalities also reviewed drafts and provided information to the consulting planner through emails, phone conversations, and fax.

Table I-1: Plan Meeting Schedule

Meeting Date	Group	Topic
February 19, 2002	HMP Team	Project initiation.
March 12, 2002	HMP Team	Discussion/review of draft sections.
July 20, 2003	HMP Team	Project re-initiation; discussion/review of progress to date.
November 7, 2003	HMP Team	Review of draft conclusions, goals and objectives.
August 16, 2004	Bertie County Board of Commissioners	Public hearing.
September 20, 2004	County Commissioners	Plan adoption.
October 12, 2004	Town of Askewville	Plan adoption.
October 25, 2004	Town of Colerain	Plan adoption.
September 13, 2004	Town of Kelford	Plan adoption.
October 18, 2004	Town of Lewiston Woodville	Plan adoption.
September 7, 2004	Town of Powellsville	Plan adoption.
November 9, 2004	Town of Roxobel	Plan adoption.
October 26, 2004	Town of Windsor	Plan adoption.

The Team followed the planning steps as outlined in "Keeping Natural Hazards from Becoming Disasters – A Mitigation Planning Guidebook for Local Governments", NC Division of Emergency Management.

Step 1. Hazard Identification and Analysis
This step involved describing and analyzing the twelve natural hazards to which Bertie County and the four participating municipalities could be susceptible. Appendix A, which represents the results of this planning step, includes historical data on past hazard events and establishes an individual hazard profile and risk index for each hazard based upon frequency, magnitude and impact. The summary risk assessment at the end of Appendix A serves as the foundation for concentrating and prioritizing local mitigation efforts.

Step 2. Community Vulnerability Assessment
This step involved research and mapping, using best available data, to determine and assess current conditions within each participating community. Appendix B, which contains the results of this planning step, includes a description of community characteristics, an assessment of current conditions, a list of critical facilities, projections for future growth and summary conclusions including an assessment of both current (2000) and projected (2020) future conditions for each participating community. Appendix B also contains two summary maps that depict 1) multi-hazards (floodplains and past hazard events that lend themselves to mapping, e.g., tornado touchdowns); and 2) critical facilities (those facilities without which each community could not continue to function for long).

Step 3. Community Capabilities Assessment
The step included a comprehensive examination and evaluation of individual capacities to implement mitigation strategies, a review of local government authority for hazard mitigation planning, a description of each local government organization and staff, a review of technical and fiscal capabilities, and a summary statement of each community's local commitment to hazard mitigation planning. The purpose of this step, represented in Appendix C, was to identify any gaps or weaknesses in local programs or regulations, to determine if any existing programs/regulations had the effect of hindering hazard mitigation, and to identify programs/regulations that could be revised or amended to strengthen local hazard mitigation efforts.

Step 4. Form Interim Conclusions
At the conclusion of Steps 1 – 3, the HMP Team developed summary conclusions regarding individual vulnerability to natural hazards and individual capabilities for dealing with hazards.

Step 5. Community Goals and Objectives
Steps 1 through 3 also established the foundation for moving forward with developing an action program for each community to undertake. The HMP Team worked together to formulate and agree upon general goals and objectives for hazard mitigation before moving forward with developing specific mitigation strategies.

Step 6. Mitigation Strategies
Next the Team cooperated in formulating countywide mitigation strategies in which the County could serve the lead role and in which each municipality could participate. Next individual mitigation strategies were developed for each community to undertake based on that community's unique position in terms of local capability. This step also included assigning responsibility for implementation of each action.

Step 7. Procedures for Monitoring, Evaluating and Reporting Progress
The HMP Team developed a procedure for an annual review and progress report on the plan. The review process provides for the HMP Team and the general public to have input on plan review.

Step 8. Procedures for Revisions and Updates
The HMP Team developed a procedure for a comprehensive review and update of the Plan on a 5-year schedule with the County taking the lead in assembling and overseeing the review process. The procedure provides for the inclusion of the public.

Step 9. Adoption.
After the approval of the NC Emergency Management, Bertie County held a public hearing (August 16, 2004) and adopted the plan on September 20, 2004. The elected board of each participating municipality will also adopt the Plan.

F. Resolutions of Adoption

The Resolution of Adoption for the Bertie County Multi-Jurisdictional Plan is included on the following pages, and succeeded by the Resolutions for the participating towns of Askewville, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, and Windsor.

RESOLUTION OF ADOPTION

Bertie County
Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214—Senate Bill 300 effective July 1, 2001), states in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, therefore, be it resolved that the Board of Commissioners of Bertie County hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan; and

2. Vests the County Manager with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.

   (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

(c) Adjust the boundaries of County and municipal planning jurisdictions whenever a municipal annexation or extraterritorial jurisdiction revision results in a change whereby a municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

3. Appoints the County Manager to assure that the Hazard Mitigation Plan is reviewed annually and in greater detail at least once every five years to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Bertie County Board of Commissioners for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on September 20, 2004

Norman M. Cherry, Sr., Vice-Chairman
Bertie County Board of Commissioners

Attest:

Misty Edwards, Clerk to the Board

SEAL

RESOLUTION OF ADOPTION

Town of Askewville

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances, and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214-Senate Bill 300 effective July 1, 2001), states in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

WHEREAS, the Board of Commissioners of Bertie County adopted the Bertie County Multi-Jurisdictional Hazard Mitigation Plan on 9/20/04;

WHEREAS, the Town of __Askewville_____ actively participated in the planning process of the Bertie County Multi-Jurisdictional Hazard Mitigation Plan and has fulfilled all their part of the multi-jurisdictional planning elements required by FEMA;

NOW, therefore, be it resolved, that the _____Board_____ Board/Council of the Town of __Askewville_____ hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan.

2. Separately adopts the sections of the plan that are specific to the Town of __Askewville_____.

3. Vests _____Meredith White, Mayor_____ (OFFICIAL, OFFICE OR AGENCY) with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.

   (b) Develop an addendum to the Bertie County Hazard Mitigation Plan if the unique situation of

the municipality warrants such an addendum.

(c) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

(d) Adjust the boundaries of the municipal planning jurisdiction whenever an annexation or extraterritorial jurisdiction revision results in a change whereby the municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

4. Appoints ____Meredith White, Mayor_____ (OFFICIAL, OFFICE OR AGENCY) to assure that, in cooperation with Bertie County, the Multi-Jurisdictional Hazard Mitigation Plan is reviewed at least annually and that any needed adjustment to the town's addendum be developed and presented to the _Board _____ (Council/Board) for consideration.

5. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan and the town's addendum.

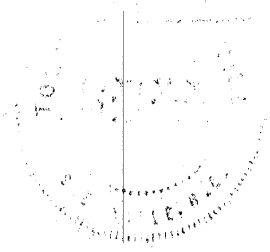
Adopted on October 12, 2004

Meredith White
Mayor

Attest:

Clerk

SEAL



RESOLUTION OF ADOPTION

Town of Colerain

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214—Senate Bill 300 effective July 1, 2001), states in item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

WHEREAS, the Board of Commissioners of Bertie County adopted the Bertie County Multi-Jurisdictional Hazard Mitigation Plan on September 20, 2004;

WHEREAS, the Town of Colerain actively participated in the planning process of the Bertie County Multi-Jurisdictional Hazard Mitigation Plan and has fulfilled all their part of the multi-jurisdictional planning elements required by FEMA;

NOW, therefore, be it resolved, that the Town Council of the Town of Colerain hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan.

2. Separately adopts the sections of the plan that are specific to the Town of Colerain.

3. Vests the Town of Colerain (OFFICIAL, OFFICE OR AGENCY) with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.

   (b) Develop an addendum to the Bertie County Hazard Mitigation Plan if the unique situation of the municipality warrants such an addendum.

   (c) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

   (d) Adjust the boundaries of the municipal planning jurisdiction whenever an annexation or extraterritorial jurisdiction revision results in a change whereby the municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

4. Appoints Town of Colerain (OFFICIAL, OFFICE OR AGENCY) to assure that, in cooperation with Bertie County, the Multi-Jurisdictional Hazard Mitigation Plan is reviewed at least annually and that any needed adjustment to the town's addendum be developed and presented to the Council (Council/Board) for consideration.

5. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan and the town's addendum.

Adopted on October 25, 2004

Mayor, Burney Baker

Attest:

Clerk, Joe Ferguson

SEAL

RESOLUTION OF ADOPTION
Bertie County
Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within the Town of Kelford and Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the Town and County desire to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of the Town of Kelford and Bertie County to fulfill this obligation in order that the Town and County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the Town and County;

NOW, therefore, be it resolved that the Board of Commissioners of The Town of Kelford hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan; and
2. Vests the County Manage with the responsibility, authority, and the means to:
   (a) inform all concerned parties of this action.
   (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.
   (c) Adjust the boundaries of County and municipal planning jurisdictions whenever a municipal annexation or extraterritorial jurisdiction revision results in a change whereby a municipality assumes or relinquishes the authority to adopt and enforce

floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reporduction, clearly delineating municipal corporate limits and extraterritorial jurisdiciton boundaries to all concerned parties.

3. Appoints the County Manager to assure that the Hazard Mitigation Plan is reviewed annually and in greater detail at least once every five years to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Bertie County Board of Commissioners for consideration.
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan

Adopted on September 13, 2007

Tim Emory, Mayor
Town Of Kelford

Attest:

Effie Vick, Clerk to Board

SEAL

RESOLUTION OF ADOPTION

Town of Lewiston Woodville

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214—Senate Bill 300 effective July 1, 2001), states in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

WHEREAS, the Board of Commissioners of Bertie County adopted the Bertie County Multi-Jurisdictional Hazard Mitigation Plan on October 18, 2004;

WHEREAS, the Town of Lewiston Woodville actively participated in the planning process of the Bertie County Multi-Jurisdictional Hazard Mitigation Plan and has fulfilled all their part of the multi-jurisdictional planning elements required by FEMA;

NOW, therefore, be it resolved, that the Board of the Town of Lewiston Woodville hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan.
2. Separately adopts the sections of the plan that are specific to the Town of Lewiston Woodville.

3. Vests the Town Mayor with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.

   (b) Develop an addendum to the Bertie County Hazard Mitigation Plan if the unique situation of the municipality warrants such an addendum.

   (c) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

   (d) Adjust the boundaries of the municipal planning jurisdiction whenever an annexation or extraterritorial jurisdiction revision results in a change whereby the municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

4. Appoints the Town Mayor to assure that, in cooperation with Bertie County, the Multi-Jurisdictional Hazard Mitigation Plan is reviewed at least annually and that any needed adjustment to the town's addendum be developed and presented to the Board for consideration.

5. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan and the town's addendum.

Adopted on October 18, 2004.

Carl a Lee

Mayor

Attest:

Clerk

RESOLUTION OF ADOPTION

Town of Powellsville

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214—Senate Bill 300 effective July 1, 2001), states in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

WHEREAS, the Board of Commissioners of Bertie County adopted the Bertie County Multi-Jurisdictional Hazard Mitigation Plan on Sept. 7, 04;

WHEREAS, the Town of Powellsville actively participated in the planning process of the Bertie County Multi-Jurisdictional Hazard Mitigation Plan and has fulfilled all their part of the multi-jurisdictional planning elements required by FEMA;

NOW, therefore, be it resolved, that the Board Board/Council of the Town of Powellsville hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan.

2. Separately adopts the sections of the plan that are specific to the Town of Powellsville

3. Vests Thomas Ashell (mayor) (OFFICIAL, OFFICE OR AGENCY) with the responsibility, authority, and the means to:

   (d) Inform all concerned parties of this action.

   (e) Develop an addendum to the Bertie County Hazard Mitigation Plan if the unique situation of the municipality warrants such an addendum.

   (f) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

   (g) Adjust the boundaries of the municipal planning jurisdiction whenever an annexation or extraterritorial jurisdiction revision results in a change whereby the municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

4. Appoints Thomas Ashell (Mayor) (OFFICIAL, OFFICE OR AGENCY) to assure that, in cooperation with Bertie County, the Multi-Jurisdictional Hazard Mitigation Plan is reviewed at least annually and that any needed adjustment to the town's addendum be developed and presented to the Board (Council/Board) for consideration.

5. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan and the town's addendum.

Adopted on Sept. 7, 04

Mayor

Attest:

Helen Campbell

Clerk

SEAL

RESOLUTION OF ADOPTION

Town of Roxobel

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214—Senate Bill 300 effective July 1, 2001), states in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

WHEREAS, the Board of Commissioners of Bertie County adopted the Bertie County Multi-Jurisdictional Hazard Mitigation Plan on September 20, 2004;

WHEREAS, the Town of Roxobel actively participated in the planning process of the Bertie County Multi-Jurisdictional Hazard Mitigation Plan and has fulfilled all their part of the multi-jurisdictional planning elements required by FEMA;

NOW, therefore, be it resolved that the Board of Commissioners of the Town of Roxobel hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan.

2. Separately adopts the sections of the plan that are specific to the Town of Roxobel.

3. Vests the Mayor of the Town of Roxobel with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.

   (b) Develop an addendum to the Bertie County Hazard Mitigation Plan if the unique situation of the municipality warrants such an addendum.

   (c) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

   (d) Adjust the boundaries of the municipal planning jurisdiction whenever an annexation or extraterritorial jurisdiction revision results in a change whereby the municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

4. Appoints the Mayor of the Town of Roxobel to assure that, in cooperation with Bertie County, the Multi-Jurisdictional Hazard Mitigation Plan is reviewed at least annually and that any needed adjustment to the town's addendum be developed and presented to the Town Board for consideration.

5. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan and the town's addendum.

Adopted on 9th November 2004

Mayor

Attest:

Town Clerk

RESOLUTION OF ADOPTION

Town of Windsor

Bertie County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Bertie County are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property, and with the knowledge and experience that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the County desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214—Senate Bill 300 effective July 1, 2001), states in item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after November 1, 2004, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local government must develop an All-Hazards Mitigation Plan in order to receive future Hazard Mitigation Grant Program Funds, and

WHEREAS, it is the intent of the Board of Commissioners of Bertie County to fulfill this obligation in order that the County will be eligible for state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

WHEREAS, the Board of Commissioners of Bertie County adopted the Bertie County Multi-Jurisdictional Hazard Mitigation Plan on September 20, 2004;

WHEREAS, the Town of Windsor actively participated in the planning process of the Bertie County Multi-Jurisdictional Hazard Mitigation Plan and has fulfilled all their part of the multi-jurisdictional planning elements required by FEMA;

NOW, therefore, be it resolved, that the Board of Commissioners of the Town of Windsor hereby:

1. Adopts the Bertie County Multi-Jurisdictional Hazard Mitigation Plan.

2. Separately adopts the sections of the plan that are specific to the Town of Windsor.

3. Vests the Windsor Town Administrator with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.

   (b) Develop an addendum to the Bertie County Hazard Mitigation Plan if the unique situation of the municipality warrants such an addendum.

   (c) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.

   (d) Adjust the boundaries of the municipal planning jurisdiction whenever an annexation or extraterritorial jurisdiction revision results in a change whereby the municipality assumes or relinquishes the authority to adopt and enforce floodplain management regulations for a particular area in order that all Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) accurately represent the planning jurisdiction boundaries. Provide notification of boundary revisions along with a map suitable for reproduction, clearly delineating municipal corporate limits and extraterritorial jurisdiction boundaries to all concerned parties.

4. Appoints the Windsor Town Administrator to assure that, in cooperation with Bertie County, the Multi-Jurisdictional Hazard Mitigation Plan is reviewed at least annually and that any needed adjustment to the town's addendum be developed and presented to the Windsor Board of Commissioners for consideration.

5. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan and the town's addendum.

Adopted on October 26, 2004

Mayor

Attest:

Clerk

SEAL

Footnotes

[I-1] Keeping Natural Hazards from Becoming Disasters - A Mitigation Planning guidebook for Local Governments, North Carolina Division of Emergency Management, May 2003, p. 1.

[I-2] Local Hazard Mitigation Planning Manual, North Carolina Division of Emergency Management, November 1998, p.1.

[I-3] Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments, Federal Emergency Management Agency, 1990, p. 4.

[I-4] Local Hazard Mitigation Planning Manual, p. 4.

[I-5] Our Common Future, United Nation's World Commission on Environment and Development, 1987, as quoted in Local Hazard Mitigation Planning Manual, p. 4.

[I-6] Preventing Disasters through Hazard Mitigation, Ana K. Schwab, Popular Government, Spring 2000, p. 12.

II. Mitigation Action Plan

This section of the Plan summarizes study conclusions, outlines community goals and objectives, and describes the action plan to reduce community vulnerability to the effects of natural hazards in Bertie County. Mitigation objectives are designed to support community goals while further defining the parameters for development of mitigation actions. Mitigation actions describe specific steps that are to be undertaken to achieve the stated objectives. Mitigation actions are intended to serve as benchmarks for evaluating progress on plan implementation.

A. Study Conclusions

With limited financial and staff resources to dedicate to hazard mitigation, it is essential that those hazards with the highest likelihood of occurrence and the greatest potential impact receive immediate attention. Through hazard identification and analysis and vulnerability assessment, it has been determined that Bertie County and the participating municipalities of Askewville, Colerain, Lewiston Woodville, Kelford, Powellsville, Roxobel, and Windsor are susceptible to the impact of certain natural hazards as summarized at the conclusion of Appendix A Hazard Identification and Analysis.

Through the hazard mitigation planning process, the cooperating governmental units determined that the Bertie County area is not at risk for tsunamis or volcanoes, that there is "very low" risk of earthquakes and landslides/sinkholes, and "low" risk of riverine erosion, and dam and levee failures. Seven hazards were rated "moderate" risk – coastal erosion, droughts and heat waves, floods, hurricanes and coastal storms, severe storms and tornadoes, wildfires and winter storms and freezes.

Moderate Hazard Threats

Coastal Erosion

Coastal erosion potential is limited to a small area of the County along the Chowan River and the most inland portions of the Albemarle Sound that are susceptible to storm surges associated with hurricanes and coastal storms.

Droughts and Heat Waves

In general, communities can have little influence or impact on mitigating the impact of droughts/heat waves on the local government level except through ensuring adequate water supplies for normal circumstances and through implementation of water conservation measures when drought conditions are imminent. Similarly, heat waves have wide ranging effects that are almost impossible to combat on a level government level. Communities, therefore, depend upon State and Federal agencies for assistance.

Floods

Flooding is often associated with hurricanes and coastal storms (most often general flooding) as well as with severe summer storms (typically flash flooding). Floods are the easiest hazard to quantify and isolate as flooding occurs only in known locations. The severity of a flood is generally dependent upon the amount of rainfall and prior soil conditions (including ground cover). Flood hazard vulnerability can be decreased through adoption and enforcement of local land use regulations and through cooperative, regional efforts to ensure that upstream jurisdictions are not contributing to downstream flooding problems.

High Winds (Severe Storms/Tornadoes and Hurricanes/Coastal Storms)
Severe storms and tornadoes as well as hurricanes and coastal storms present high wind hazards. This hazard is mainly combated through building codes and construction. Enforcement of the current State building code and enhancement of the code in regards to wind resistance will prove the most beneficial in addressing high winds.

Wildfires
Fortunately, wildfires in North Carolina, although frequent, are not normally a serious threat to large areas as is the case in western states where dry weather conditions and large expanses of timber increase the likelihood and extent of the impact of a wildfire. The North Carolina Division of Forest Resources has the responsibility for protecting state and privately owned forest land from wildfires. The program is managed on a cooperative basis with all one hundred counties in the State. The State fire program emphasizes fire prevention efforts; pre-suppression activities (including extensive training of personnel); aggressive suppression efforts on all wildfires; and law enforcement follow-up.

Winter Storms and Freezes
Local governments also look to the State and to private utility companies for leadership in dealing with winter storms/freezes. The typical effects of snow and ice accumulation - loss of electrical power, phone, and cable service and treacherous road conditions - can be only minimally addressed at the local level.

Statement of Commitment to Mitigating Impacts of Natural Hazards
Based on this analysis, the primary responsibility of the participating local governments should be to take action to reduce the level of vulnerability of people and property to future flooding and, as possible at the local level, to the threat of damage from high winds. Thus, the elected and appointed leadership and the citizens of Bertie County and the participating municipalities commit to engage in activities and practices, both as individuals and as members of the larger community of Bertie County, to mitigate the impacts of future natural hazards with particular emphasis on mitigating the effects of flooding and secondarily on mitigating the effects of high winds, as practicable at the local government level.

B. Community Goals

The primary goal of all local governments is to promote the public health, safety, and welfare of the citizens of the community. In keeping with this standard, Bertie County and the participating municipalities have developed four goal statements for local hazard mitigation planning. Each goal, purposefully broad in nature, serves to establish parameters that were used in developing more specific objectives and mitigation actions. Consistent implementation of objectives and actions will over time ensure that community goals are achieved.

- **Goal #1** Protect the public health, safety and welfare by increasing public awareness of hazards and by encouraging collective and individual responsibility for mitigating hazard risks.
- **Goal #2** Improve technical capability to respond to hazards and to improve the effectiveness of hazard mitigation actions.
- **Goal #3** Enhance existing or create new policies and ordinances that will help reduce the damaging effects of natural hazards.
- **Goal #4** Protect the most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation actions.

C. Mitigation Objectives

Mitigation objectives are designed to support community goals while further defining parameters for development of mitigation actions. Objectives are numbered to correspond with the goal that each supports.

Objective 1.1 The County and municipalities will engage in activities and practices that will help mitigate the impacts of natural hazards.

Objective 1.2 The County and municipalities will implement a public awareness campaign to educate citizens of the possible hazards associated with locating in floodplains and of measures that can be taken to lessen impacts of future floods.

Objective 2.1 The County and municipalities will work to ensure that emergency services are adequate to protect public health and safety.

Objective 3.1 The County and municipalities will work together to seek ways to protect wetlands, floodplains, and other natural features that serve to reduce flood hazard susceptibility.

Objective 3.2 The County and municipalities will enforce National Flood Insurance Program (NFIP) development standards and also study additional methods that would help prevent increases in flood velocities and levels that endanger both people and property. (Some of the municipalities will be adopting flood damage prevention regulations for the first time by November 1, 2004 as required by NCEM/FEMA.)

Objective 4.1 The County and municipalities will continue to restrict development in known or predictable pathways of natural hazards such as in identified floodplains. Where hazard locations cannot be predicted, as in the case of hurricane force winds, the County and municipalities will continue to ensure that new structures are built to be as resilient as possible to the impacts of a natural hazard.

D. Mitigation Actions

The Bertie County Mitigation Action Plan is depicted in Table II-1. Mitigation actions that are to be undertaken by the County as the lead agency with the municipalities serving in a supporting role where appropriate. Mitigation actions were developed with an eye toward reducing vulnerability to all natural hazards that can be addressed in a practicable way at the local level. The listed actions do, however, primarily focus on ways Bertie County and the municipalities can act to lessen and, ideally, eventually eliminate repetitive flood losses and prevent future flood losses from inappropriate new development.

Mitigation actions were developed and prioritized by County and town staff responsible for implementation of the specific action (see Tables II-1 and II-2). The planning team reviewed the results of the hazard identification and analysis; vulnerability assessment; and the community capability assessment in determining which mitigation actions should be undertaken. The County and towns also worked together to determine:

1. Cost effectiveness, i.e., do returns or savings produced by implementation of the action outweigh the cost of implementation?
2. Environmental impact, i.e., are actions designed to protect environmentally fragile areas as natural stormwater storage areas? and
3. Technically feasibility, i.e., can the action be undertaken by the County/towns using current staff and local funds, State, or Federal funds, or do other funding sources need to be identified?

The County and towns categorized actions as low, moderate or high priority based on assessment of the need for the specific action, the projected cost of implementation, the potential beneficial effects from implementation of the action, and available funding sources. The implementation years – between 2004 and 2009 – were determined using projected resources (personnel, vehicles, etc.) and operating funds. As discussed under Study Conclusions, the planning team determined that some potential actions were more appropriately addressed at the State level due to long established priorities and responsibilities assumed by the State of North Carolina and local governments.

A process for prioritization of identified hazard mitigation strategies was performed. The hazard mitigation advisory committee used the following criteria for prioritization of hazard mitigation strategies:

1) effectiveness in meeting hazard mitigation goals and comprehensive plan goals

In developing actions, the County and municipalities relied on the following six mitigation policy categories provided by FEMA:

1. Prevention (P) Measures
   Preventive measures are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or where capital improvements have not been substantial. Examples of prevention measures include:
   (a) Comprehensive land use planning
   (b) Zoning regulations
   (c) Subdivision regulations
   (d) Open space preservation
   (e) Building code
   (f) Floodplain development regulations
   (g) Stormwater management

2. Property Protection (PP) Measures
   Property protection measures protect existing structures by modifying the building to withstand hazardous events, or removing structures from hazardous locations. Examples of property protection measures include:
   (a) Building relocation
   (b) Acquisition and clearance
   (c) Building elevation
   (d) Barrier installation
   (e) Building retrofit

3. Natural Resource (NR) Protection
   Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their mitigative functions. Such areas include floodplains, wetlands, and dunes. Parks, recreation or conservation agencies and organizations often implement these measures. Examples include:
   (a) Wetland protection
   (b) Habitat protection
   (c) Erosion and sedimentation control
   (d) Best management practices (BMPs)
   (e) Stream dumping
   (f) Forestry practices

4. Emergency Services (ES) Measures
   Although not typically considered a mitigation technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:
   (a) Hazard warning system
   (b) Emergency response plan
   (c) Critical facilities protection
   (d) Health and safety maintenance
   (e) Post-disaster mitigation

5. Structural Projects (S)
   Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event. The projects are usually designed by engineers and managed or maintained by public works staff. Examples include:
   (a) Reservoirs, retention and detention basins
   (b) Levees and floodwalls
   (c) Channel modifications
   (d) Channel maintenance

6. Public Information Activities (PI) Activities
   Public information and awareness activities are used to advise residents, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques that the public can use to protect themselves and their property. Examples of measures to education and inform the public include:
   (a) Map information
   (b) Outreach projects

(c) Library
(d) Technical Assistance
(e) Real estate disclosure
(f) Environmental education

Mitigation Action Tables - Explanation of Columns and Acronyms

Action #
Action # corresponds to FEMA mitigation policy categories listed above.

Action
Description of action to be undertaken.

Hazard
Hazard which the action addresses.

Objective(s) Addressed
Reference to the numbered objective which the action supports.

Relative Priority
Low, moderate or high priority for funding and implementation.

Funding Sources
State and Federal sources of funds are noted, where applicable.

Responsible Party
Note: The Bertie County Board of Commissioners and the individual Town boards have ultimate authority to approve any policy, program or regulation revisions. Implementing mitigation actions specific to each participating town are the responsibility of the Town Mayor, or a designated Town employee.

Acronyms
BC – Bertie County Board of Commissioners
BI – Bertie County Building Inspections
CM – Bertie County Manager
EMC - Bertie County Emergency Management Coordinator
FEMA - Federal Emergency Management Agency
NCDENR – NC Department of Environment and Natural Resources
NCDOT - North Carolina Department of Transportation
NCEM - North Carolina Division of Emergency Management
NRCS – Natural Resources Conservation Service
USACE – US Army Corps of Engineers

Target Completion Date
Date by which the action should be completed.

Table II-1: Bertie County Mitigation Action Plan

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Preventive Actions							
P-1	Revise/update regulatory floodplain maps.	Flood	1.1	High	FEMA NCDENR NCEM	EMC BI	2006-2007
P-2	Develop a geographic information system (GIS). Use the GIS to map current land uses and to map proposed future land uses (CAMA Land Use Plan Update) as an aid in assessing community vulnerability.	All	1.1 3.1 3.2	High	Local	BC EMC BI	2006-2007
P-3	Consider participating in the Community Rating System (CRS) to reduce flood insurance premiums for citizens.	Flood	3.2	Moderate	Local	BC EMC BI	2007-2008
P-4	At the next CAMA Land Use Plan Update: 1. Establish more specific growth guidelines and policies and specifically delineate sensitive environmental areas for protection; 2. Adopt a more limited policy on the types of uses allowed within flood hazard areas. 3. Adopt a policy to not extend public services and utilities into flood hazard or other environmentally sensitive areas to discourage growth.	All	1.1 4.1	Moderate	Local	BC CM EMC	2007-2008
P-5	Consider adopting a zoning ordinance that: 1. Establishes zoning districts and sets standards for future development. 2. Includes standards for clustering of residential lot development to help preserve flood hazard areas from development. 3. Includes a flood hazard overlay zone to ensure that inappropriate development is adequately controlled.	All	1.1 3.1 4.1	Moderate	Local	BC CM	2007-2008
P-6	Consider adopting subdivision regulations that include minimum standards for property divisions.	All	3.1 4.1	Moderate	Local	BC CM	2007-2008
P-7	Review and update the flood damage prevention ordinance to: 1. Ensure maximum protection from flood hazard events. 2. Raise the minimum finished floor elevation to at least 2' above base flood elevation (BFE) to provide more flood protection for new or substantially improved structures. 3. Consider prohibiting any fill within the 100-year floodplain to discourage development.	Flood	3.2 4.1	High	Local	BC EMC BI	2005-2006

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
	4. Prohibit enclosures to the lower areas of elevated buildings, including breakaway walls. 5. Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain.						
P-8	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development within flood hazard areas.	Flood	1.1	Moderate	Local	BC BI EMC	2007-2008
Property Protection Actions							
PP-1	Prioritize repetitive flood loss properties for acquisition and relocation. Seek Federal and State funding (voluntary program (CRS 420/520).	Flood	1.1	High	FEMA NCEM	BC CM	2006-2007
PP-2	Establish a coordinating committee to ensure that all parties responsible for stormwater management within the County communicate to ensure maximum cooperation in developing and maintaining stormwater drainage systems.	Flood	1.1 3.1	Moderate	Local	BC NRCS EMC BI	2007-2008
PP-3	Establish and maintain a coordinated debris inspection and removal program.	Flood	1.1 3.1	Moderate	Local	BC NRCS EMC BI	2007-2008
Emergency Services							
ES-1	Review rebuilding activities in wake of recent hurricanes and flooding and establish policies/procedures for minimizing repetitive flood losses.	Flood	1.1	High	Local	BC BI EMC	2005-2006
ES-2	Ensure adequate evacuation time in case of a major hazard event.	All	2.1	High	Local	BC EMC NCDOT	2005-2006
ES-3	Evaluate areas with limited evacuation capacity and pursue methods for improving capacity	All	2.1	High	Local	BC EMC NCDOT	2005-2006
Public Information Activities							
PI-1	Establish and maintain information on retrofitting techniques at the public library. Publicize through citizen news bulletins.	All	1.2	High	Local	BC CM BI	Ongoing
PI-2	Advise/assist property owners in retrofitting homes and businesses.	All	1.2	High	Local	BC CM BI	Ongoing

Source: Bertie County.

Table II-2: Mitigation Action Plan
Towns of Askewville, Colerain, Kelford, Lewiston Woodville, Powellsville, and Roxobel

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Preventive Actions							
P-1	Revise/update regulatory floodplain maps.	Flood	1.1	High	FEMA NCDENR NCEM	EMC BI Towns	2006-2007
P-2	Support Bertie County in the development of a geographic information system. Use the GIS to map current land uses and to map proposed future land uses (CAMA Land Use Plan Update) as an aid in assessing community vulnerability.	All	1.1 3.1 3.2	High	Local	BC EMC BI Towns	2006-2007
P-3	Consider participating in the Community Rating System (CRS) to reduce flood insurance premiums for citizens.	Flood	3.2	Moderate	Local	BC EMC BI Towns	2007-2008
P-4	At the next CAMA Land Use Plan Update: 1. Establish more specific growth guidelines and policies and specifically delineate sensitive environmental areas for protection; 2. Adopt a more limited policy on the types of uses allowed within flood hazard areas. 3. Adopt a policy to not extend public services and utilities into flood hazard or other environmentally sensitive areas to discourage growth.	All	1.1 4.1	Moderate	Local	BC CM EMC Towns	2007-2008
P-5	Consider revising zoning ordinances to: 1. Include standards for clustering of residential lot development to help preserve flood hazard areas from development. 2. Include a flood hazard overlay zone to ensure that inappropriate development is adequately controlled.	All	1.1 3.1 4.1	Moderate	Local	BC CM Towns	2007-2008
P-6	Study the feasibility of adopting subdivision regulations.	All	3.1	Moderate	Local	BC CM Towns	2007-2008

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
P-7	Work with Bertie County to review and update the flood damage prevention ordinance to: 1. Ensure maximum protection from flood hazard events. 2. Raise the minimum finished floor elevation to at least 2' above base flood elevation (BFE) to provide more flood protection for new or substantially improved structures. 3. Consider prohibiting any fill within the 100-year floodplain to discourage development. 4. Prohibit enclosures to the lower areas of elevated buildings, including breakaway walls. 5. Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain.	Flood	3.2 4.1	High	Local	BC EMC BI Towns	2005-2006
P-8	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development within flood hazard areas.	Flood	1.1	Moderate	Local	BC BI EMC Towns	2007-2008
Property Protection Actions							
PP-1	Work with Bertie County to establish a coordinating committee to ensure that all parties responsible for stormwater management within the County communicate to ensure maximum cooperation in developing and maintaining stormwater drainage systems.	Flood	1.1 3.1	Moderate	Local	BC NRCS EMC BI Towns	2007-2008
PP-2	Work with Bertie County to establish and maintain a coordinated debris inspection and removal program.	Flood	1.1 3.1	Moderate	Local	BC NRCS EMC BI Towns	2007-2008
Emergency Services							
ES-1	Work with Bertie County Emergency Management to review rebuilding activities in wake of recent hurricanes and flooding and establish policies/procedures for minimizing repetitive flood losses	Flood	1.1	High	Local	BC BI EMC Towns	2005-2006
ES-2	Work with Bertie County Emergency Management to ensure adequate evacuation time in case of a major hazard event.	All	2.1	High	Local	BC EMC NCDOT	2005-2006

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
						Towns	
ES-3	Work with Bertie County to evaluate areas with limited evacuation capacity and pursue methods for improving capacity	All	2.1	High	Local	BC EMC NCDOT Towns	2005-2006
Public Information Activities							
PI-1	Work with Bertie County to establish and maintain information on retrofitting techniques at the public library. Publicize through citizen news bulletins.	All	1.2	High	Local	BC CM BI Towns	Ongoing
PI-2	Work with Bertie County to advise/assist property owners in retrofitting homes and businesses.	All	1.2	High	Local	BC CM BI Towns	Ongoing

Table II-3: Mitigation Action Plan - Town of Windsor

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Windsor P-1	Continue to support Bertie County in instituting the NC State Building Code.	All	1.1	High	County	BI	Ongoing
Windsor P-2	Work with Bertie County provide new home and property buyers with information on wind proofing, including from impacts of trees near the property.	Wind	4.1	High	County	BI	Ongoing
Windsor P-3	Continue to participate in coordination with the Bertie County Emergency Management office to create and disperse information about the plan and evacuation routes.	All	1.1 1.2	high	County	EM	Ongoing
Windsor P-4	Work with Bertie County to develop a Geographical Information System (GIS). Use the GIS to map current land uses and to map proposed future land uses (CAMA Land Use Plan Update) as an aid in assessing community vulnerability.	All	1.1	High	County	BC	Ongoing
Windsor P-5	Consider instituting a preferential tax that encourages development outside of the floodplain, but discourages development within it.	Flood	1.1 4.1	Moderate	Local	WTA	2006-2007
Windsor P-6	Study revising the current Zoning Ordinance to include floodproofing the Central Business District.	Flood	1.1	Low	Local	WTA	2007-2008
Windsor P-7	Consider participating in the Community Rating System.	All	1.1 2.2	Low	Local County	WTA	2007-2008
Windsor P-8	Consider amending the Zoning and Subdivision Ordinances to incorporate shoreline vegetation protection buffers in the Cashie River Floodplain, as well as designation of 404 Wetlands.	All	1.1	Low	Local	WTA	2007-2008
Windsor P-9	Support Bertie County in evaluating the possibility of a hazard warning system to alert citizens of the possibility of a natural hazardous event.	All	1.2	High	County	EM	Ongoing
Windsor PI-1	Work with Bertie County to advise and educate local contractors regarding the development of safe housing through written materials or a community workshop.	All	1.3	High	County	BI	Ongoing
Windsor PI-2	Consider holding a city-sponsored hazard mitigation seminar for the community residents, including information	All	1.1	High	Local	WTA	2005-2006

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
	on preparedness for all hazards significant to Windsor.						
Windsor PP-1	Continue to monitor trees and branches in public area at risk of breaking or falling in windstorms, or any other natural hazardous event.	All	1.1 4.2	High	Local	PW	Ongoing
Windsor NR-1	Study the impacts of developing a Comprehensive Drainage Plan to maximize drainage efficiency.	Flood	1.1 3.1	Low	Local	WTA	2007-2008
Windsor NR-2	Support the US Army Corp of Engineers in analyzing the presence of hydric soils that may indicate the location of wetlands.	All	1.1	High	Federal State	USACE	Ongoing
Windsor S-1	Consider limiting the additional construction of impervious surfaces to reduce the amount of storm water runoff.	All	1.1	Moderate	Local	WTA	2006-2007

Source: Town of Windsor
Abbreviations:, EMC – Bertie County Emergency Management Coordinator, USACE – United States Army Corp of Engineers, WTA – Windsor Town Administrator, PW – Public Works, BI - Bertie County Building Inspections

III. Plan Implementation

A. Process

The Bertie County Multi-Jurisdictional Hazard Mitigation Plan will be implemented through the delegation of assignments as specified in Section II. Mitigation Action Plan. Each Bertie County implementation action includes the assignment of responsibility to specific County departments along with the establishment of a target date for completion for each activity.

It will be the responsibility of the County Manager or his/her designee to ensure that applicable actions are completed by the target completion date unless reasonable circumstances, e.g., lack of funding, prevent timely implementation. In the case where a target date is not met, the reason for such failure to complete the activity in a timely manner will be noted in the annual progress report.

B. Funding Sources

Although in the long term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short term each action will have an associated cost. Bertie County and the participating municipalities will rely heavily on local funding sources to fulfill most of the Plan obligations, however, the County and municipalities will also seek funds from interested State and Federal agencies for both pre- and post-disaster activities. A short description of major disaster assistance programs is included here. More detail on organizations and programs that could provide sources for potential funding for local mitigation actions is included in Appendix D Federal and State Resources.

Federal Programs

Pre-Disaster Mitigation Program – Federal Emergency Management Agency

The Disaster Mitigation Act of 2000 created a national program to provide a funding mechanism that is not dependent on a Presidential disaster declaration. The Pre-Disaster Mitigation (PDM) Program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage of property.

The funding is based on a 75% Federal share plus a 25% non-Federal share of costs. The non-Federal match can be fully in-kind or cash or a combination of the two. Special accommodations are made for small and impoverished communities who are eligible for 90% Federal share plus 10% non-Federal.

Flood Mitigation Assistance Program – Federal Emergency Management Agency

The Flood Mitigation Assistance Program (FMAP) was established by the National Flood Insurance Reform Act of 1994. This program provides grants for cost effective measures to reduce or eliminate the long-term risk of flood damage to existing structures, with an emphasis on sites that historically have been subject to repetitive losses under the National Flood Insurance Program (NFIP). These grants are also available for planning assistance to identify flood risks and actions to reduce that risk, to provide a process for approving flood mitigation plans, and to provide grants to implement measures to decrease flood loses.

Examples of projects that are eligible for grants under this program include elevating or flood proofing pre-FIRM structures, i.e., structures that were brought into the regulatory floodplain by a revision of the Flood Insurance Rate Maps, to acquire land or structures in flood hazard areas, to relocate or demolish existing structures, to construct detention or retention ponds to aid in the control of flood waters, to flood proof sewer systems, to modify drainage culverts and to obtain technical assistance, such as hiring a professional consultant.

Hazard Mitigation Grant Program (HMGP) - Federal Emergency Management Agency

The Hazard Mitigation Grant Program (HMGP) provides funding for mitigation measures following a Presidential disaster declaration. The HMGP is funded in most part by the Federal government and administered by state governments. FEMA can fund up to 75% of project costs and the State or local share can be cash or in-kind services.

HMGP funds can be used for projects such as acquisition or relocation of structures from hazard prone areas, retrofitting of existing structures to protect them from future damages, and development of state or local mitigation standards designed to protect buildings from future damages, comprehensive state and local mitigation plans, structural hazard control, and the purchase of equipment to improve preparedness and response.

Public Assistance (Infrastructure) Program – Federal Emergency Management Agency (Section 406)

The Public Assistance (PA) Program provides funding to local governments following a Presidential disaster declaration. Funds may be used for mitigation activities in conjunction with the repair of damaged public facilities and infrastructure. Mitigation activities must be related to eligible disaster-related damages and must directly reduce the potential of future disaster damages.

Projects are evaluated for cost effectiveness, technical feasibility, and compliance with statutory, regulatory and executive order requirements. The evaluation must ensure that the mitigation measures do not negatively impact facility operation or risk from another hazard.

Small Business Administration Disaster Assistance Program - U.S. Small Business Administration

The Small Business Administration (SBA) Disaster Assistance Program provides low-interest loans to businesses following a Presidential disaster declaration. The loans target businesses with repair and replacement of uninsured property damages including real estate, machinery and equipment, inventory, and supplies. Businesses and non-profit organizations are eligible.

Community Development Block Grants - U.S. Department of Housing and Urban Development

The Community Development Block Grant (CDBG) program assists communities in rehabilitating substandard dwelling structures and in expanding economic opportunities, primarily for low-to-moderate-income families. However, as a result of a Presidential disaster declaration, CDBG funds may be used for long-term needs such as acquisition, reconstruction, and redevelopment of disaster-affected areas.

State Programs

Statewide Floodplain Mapping Initiative

The State of North Carolina, through the Federal Emergency Management Agency's Cooperating Technical Community partnership initiative, has been designated as a Cooperating Technical State (CTS). As a CTS, the State will assume primary ownership and responsibility for Flood Insurance Rate Maps (FIRMs) for all North Carolina communities. The Statewide Floodplain Mapping Initiative project will include conducting flood hazard analysis and producing updated, digital FIRMs (DFIRMs).

The State began acquiring raw elevation data for the Cape Fear, Lumber, Neuse, Pasquotank, Tar-Pamlico, and White Oak river basins in December 2000. This first phase of mapping will address these six river basins, which were the basins most impacted by Hurricane Floyd. These six river basins account for approximately one-half of the area of the State, impact 48 counties and 334 incorporated municipalities, and encompass over 21,000 miles of streams and rivers.

The data being collected will be used to develop Digital Elevation Models (DEMs) and updated flood hazard data and to produce draft DFIRMs for the affected counties and communities. Draft DFIRMS for the Neuse and Tar-Pamlico River basins were provided in March 2003, and are scheduled for adoption in September 2003.

This updated flood hazard data will provide current, accurate information for communities and property owners to make sound locating and design decisions when building new structures and infrastructure and when retrofitting existing structures. If consistently used by communities for floodplain management, this information should help to dramatically reduce future flood losses in North Carolina.

Water and Sewer Grant Programs - NC Rural Economic Development Center, Inc.

The Rural Center administers three programs that assist rural communities with development of public water and sewer systems needed to support local economic growth and to ensure a reliable supply of clean water. The programs are funded by appropriations from the NC General Assembly and through proceeds from Clean Water Bonds approved by voters in November 1998.

1. The Supplemental Grants Program enables local governments and qualified non-profit organizations to improve local public water and sewer systems. Projects may address public health, environmental and/or economic development critical needs. Rural Center funds must be used to match other project funds from local or other sources. The maximum grant amount is $400,000.

2. The Capacity Building Grants Program provides funding for local governments to undertake planning efforts that support strategic investments in public water and sewer facilities. Funds typically are used to prepare preliminary engineering reports, master water and sewer plans, capital improvement plans, water and sewer feasibility studies, rate studies and grant applications. The maximum grant amount is $40,000.

3. The Unsewered Communities Grants Program provides funding for the planning and construction of new publicly owned sewer systems. Qualified communities must be unserved by wastewater collection or treatment systems. Unsewered communities grants are designed to cover 90% of the total project costs, but grants can not exceed $3 million.

Clean Water Management Trust Fund - CWMTF Board of Trustees

The Clean Water Management Trust Fund was created in 1996 for the purpose of making grants to local governments, state agencies, and conservation non-profit organizations to help finance projects that address water pollution. CWMTF will fund projects that 1) enhance or restore degraded waters; 2) protect unpolluted waters; and/or 3) contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits.

The program is funded annually through a portion of unreserved credit balance in the NC General Fund for a minimum of $30 million per year. The CWMTF Board of Trustees, an independent body of 18 members, has responsibility for allocation of fund revenues.

CAMA Local Planning and Management Grants Program - NC Department of Environment and Natural Resources, Division of Coastal Management

The NC Division of Coastal Management assists local governments within the designated 20 coastal counties with local land use planning and management projects through the CAMA Local Planning and Management Grants Program. Eligible projects include new or updated CAMA land use plans, implementation projects, land use ordinances, beach or waterfront access plans, stormwater management plans, hazard mitigation plans, and capital facilities plans.

Water Resources Development Grant Program - NC Department of Environment and Natural Resources, Division of Water Resources

The Water Resources Development Grant Program funds can be used as the non-Federal share of water resources development projects. Eligible projects include 1) general navigation projects; 2) recreational navigation projects: 3) flood control and water drainage projects; 4) stream restoration; 5) protection of privately owned beaches with public access; 6) land acquisition and facility development for water-based recreation; and 7) aquatic weed control projects.

Natural Heritage Trust Fund

The Natural Heritage Trust Fund was established in 1987 and is funded by 25% of the annual state deed excise stamp tax revenues and a portion of personalized license plate sales. The fund is managed by the Board of Trustees and the Natural Heritage Program in the Division of Parks & Recreation (DPR) in the Department of Environment & Natural Resources (DENR). Since 1987, 332 applications have requested $176 million. $80.6 million has been awarded for 1 project to help protect 145,000 acres of land. (http://ils.unc.edu/parkproject/heritage/nhtf.html).

NC Parks and Recreation Trust Fund (NCPARTF)

The NC Parks and Recreation Trust Fund was established in 1993 and is funded by 75% of the annual state deed excise stamp tax revenues. State parks receive 65%; local parks, 30%; beaches & waterfronts, 5%; and administration, 3%. Approximately $22 million is available each year. The program is managed by the Board of the Parks & Recreation Authority and the Division of Parks & Recreation (DPR) in DENR.

Since 1995, local governments have submitted 549 applications requesting over $76 million for capital improvements and land acquisition. The Parks & Recreation Authority has approved 226 projects for a total of $33.7 million. Over 1400 acres have been added to local parks. The Authority has approved 140 state park land acquisition and facility projects for a total of $71.7 million. PARTF has funded the addition of 8,466 acres to the State Park System. (http://ils.unc.edu/parkproject/partfund).

Land and Water Conservation Fund (LWCF)

The Land and Water Conservation Fund was established in 1964 to provide for funding for federal land acquisition and to provide matching grants for state and local governments to acquire parkland. The federal government allocated $2.9 million to North Carolina for this program in fiscal year 2002-03 with 60% being reserved for local governments and the remaining 40% for State government.

National Recreation Trails Program

The National Recreation Trails Program provides funds to federal, state and local governments and for non-profit organizations for the acquisition of land for trails, and for the development and maintenance of a trail system. The State of North Carolina was allocated $1.1 million in fiscal year 2002-03 from this program which is managed by the US Department of Transportation.

Million Acres Initiative

When the Million Acre Initiative began in January 1999, approximately 2.8 million acres — 9% of the state — were permanently protected in North Carolina. At least 112,000 additional acres were permanently protected during the initiative's first two years. Upon reaching the million acre goal in 2009, North Carolina will contain at least 3.8 million acres of land are permanently protected through the federal, state and local governments, and private, nonprofit groups. One of the stated objectives of protecting open space is to “reduce the risk to people and (property) from flooding”.

Conservation Income Tax Credit

Established in 1983, the Conservation Income Tax Credit provides a 25% income tax credit for donations of land or easements for conservation purposes. The donor's tax filing must be accompanied by a Certificate of Conservation Benefit from the Department of Environment & Natural Resources (DENR). As of August 2001, approximately 400 individual and corporate property owners had donated 82,000 acres of land or conservation easements worth an estimated $165 million at a cost to the State of $26 million (http://ncctc.enr.state.nc.us/).

North Carolina Farmland Preservation Program

The NC Farmland Preservation Program was established in 1986 and is funded by appropriates from the NC General Assembly. The program is managed by the NC Department of Agriculture and Consumer Services and contracted to the Conservation Trust for N.C (CTNC). The General Assembly has appropriated $2.45 million to the program since 1998. The 2001 appropriation of $200,000 was expended on nine grants awarded to help local land trusts and counties with farmland protection programs work with farm families to arrange permanent conservation easements on over 4,270 acres and large parts of 30 farms. These grants have leveraged over $20 million from other private and public funding sources and donations of development rights from farm owners. (www.info@ctnc.org or www.ctnc.org).

Conservation Grants Fund

The Conservation Grants Fund program was created in 1997 for the purpose of providing subsidies to non-profit land trusts to aid in transaction costs related to the donation of land, and to provide for staff and volunteer training. This program has never been funded.

Local Sources

Local governments (counties and municipalities) depend upon local property taxes as their primary source of revenue. Property taxes are typically used to finance services that must be available and delivered on a routine basis to the general public, e.g., counties – social services, schools, etc.; municipalities – water, sewer, solid waste management. If local budgets allow, these funds can also be used for other purposes in the general public interest which would include programs to further hazard mitigation planning. Local funds are most effective when used as local match for Federal and State grant programs.

Non-Governmental Sources

Another potential but typically less available source of funds for implementing local hazard mitigation projects are monetary contributions from non-governmental organizations such as private sector companies, churches, charities, community relief funds, the Red Cross, hospitals, land trusts and other non-profit organizations interested in the environment or the plight of persons affected by disasters.

IV. Plan Review and Update

Periodic monitoring and reporting of progress is required to ensure that Plan goals and objectives are kept current and that local mitigation efforts are being accomplished. The Bertie County Multi-Jurisdictional Hazard Mitigation Plan shall be reviewed annually or more often as the local situation may require following a disaster declaration to ensure that progress is being made on achieving stated goals and objectives. The Plan will also undergo periodic evaluation and update as required by FEMA and the State.

A. Annual Review/Progress Report

The Bertie County Manager shall direct the Emergency Management Coordinator to take responsibility for conducting the annual review. The annual review shall include the solicitation of comments and a report on implementation progress from the participating municipalities through re-initiation of the hazard mitigation planning team process utilized during development of the Plan. Other interested parties and the general public will be notified through a variety of media, including but not limited to, local newspapers, and mailed or emailed notices, of the review process and the opportunity to comment on the Plan report.

The annual review shall ensure:

1. That the Bertie County Board of Commissioners and the elected board of each participating municipality receive an annual report and/or presentation on the progress of Plan implementation.
2. The annual report will include an evaluation of the effectiveness and appropriateness of the mitigation actions included in the Plan. Specifically, the report will attend to the following questions:
    a. Do Plan goals and objectives continue to address current and expected conditions?
    b. Has the nature or magnitude of risks changed?
    c. Are current resources sufficient and appropriate for Plan implementation?
    d. Are there any implementation problems, i.e., technical, political, legal or coordination issues with other agencies?
    e. Are implementation outcomes as expected?
    f. Have other agencies and partners participated as proposed?
4. The annual report will recommend, as appropriate, any necessary revisions or amendments to the Plan.
5. The County and each participating municipality will provide the public with an opportunity to review and comment on the annual progress report at a regularly scheduled public meeting.

If the Bertie County Board of Commissioners determines that the recommendations warrant amendment of the Plan, the Board may initiate an amendment through the process described below.

B. Plan Review and Update

Periodic evaluation and revision of the Plan will help ensure that local mitigation efforts include the latest and most effective mitigation techniques. These periodic revisions may also be necessary to keep the Plan in compliance with Federal and State statutes and regulations. The Plan will need to be updated to reflect changes, such as new development in the area, implementation of mitigation efforts, revisions of the mitigation processes, and changes in Federal and State statutes and regulations.

In the context of a Federal disaster declaration, State and local governments are allowed to update or expand an existing plan to reflect circumstances arising out of the disaster. An updated plan in this circumstance might include a re-evaluation of the hazards and the jurisdiction's exposure to them, a re-assessment of existing mitigation capabilities, and new or additional mitigation recommendations.

The Plan shall be reviewed at a minimum every five (5) years to determine if there have been any significant changes that would affect the Plan. Increased development, increased exposure to certain hazards, the development of new mitigation capabilities or techniques, and changes to Federal or State legislation may affect the appropriateness of the Plan.

Review of the Plan

The procedure for reviewing and updating the Plan shall begin with a report summarizing the findings and recommendations of the hazard mitigation planning team. Such report shall be prepared by the County Emergency Management Coordinator and submitted to the County Manager for consideration and recommendation. The report shall include a summary of progress on implementation of hazard mitigation strategies and a recommendation, as appropriate, from the hazard mitigation planning team for any changes or amendments to the Plan.

The review shall include an evaluation of the effectiveness and appropriateness of the Plan. Specifically, the evaluation shall involve a review of the consistency of day-to-day land use decisions to determine if the hazard mitigation policies are being implemented. The review shall recommend if Plan amendments are warranted and if any revisions to local government regulatory tools (zoning, subdivision regulation, etc.) are necessary to assist in implementing the policies of the Plan.

If the Bertie County Board of Commissioners determines that such a report raises issues that warrant modification of the Plan, or if the County Manager recommends that issues have been raised which warrant modification of the Plan, the Board of Commissioners may initiate an amendment as delineated below, or may direct the County Manager to undertake a complete update of the Plan with participation from all municipalities included in the Plan.

Procedure for Amending the Plan

An amendment to the Plan shall be initiated by the Bertie County Board of Commissioners either at its own initiative or upon the recommendation of the County Manager, the elected board of a participating municipality, or any other person or agency who demonstrates that an amendment should be considered.

Upon initiation of a text or map amendment, the County Manager or Emergency Management Coordinator shall re-convene the hazard mitigation planning team which shall include representation from each of the participating municipalities.

Other interested parties as identified through participating local governments and through public announcements via newspapers shall be invited to be a part of the review process. The planning team will consider and reach consensus on the amendment(s) which shall then be forwarded to all affected parties, including, but not limited to, County departments, municipalities, and other interested agencies such as the Natural Resource Conservation Service for a forty-five (45)-day review and comment period.

At the end of the comment period, the proposed amendment shall be forwarded along with all review comments to the County Manager for consideration. If no comments are received from the reviewing department or agency within the specified review period, such shall be noted in the report to the County Manager.

North Carolina Division of Emergency Management (NCEM) Review and Approval

The draft Plan amendment shall be forwarded to NCEM for review and approval prior to further action by the County or participating municipalities.

Board of Commissioners Review and Approval

Upon receiving the recommendation of the County Manager for approval of the NCEM approved draft Plan Amendment, the Bertie County Board of Commissioners shall hold a public hearing. The Board shall review the report and recommendation from the County Manager, any additional comments from the participating municipalities, and any oral or written comments received at the public hearing. Following that review, the Board of Commissioners shall take one of the following actions:

a) Adopt the proposed amendment as presented or with modifications.
b) Deny the proposed amendment.
c) Refer the amendment request back to the County Manager for further work.
d) Defer the amendment request for further consideration and/or hearing.

Participating Municipalities Review and Approval

Once the Bertie County Board of Commissioners has adopted the amendment, the elected board of each participating municipality shall hold a public hearing to receive public input on the amendment prior to local adoption.

Appendix A: Hazard Identification and Analysis

A. Introduction

The development of a hazard mitigation plan consists of five steps – 1) identification and analysis of natural hazards that could impact the community, 2) assessment of the community's vulnerability to natural hazards, 3) assessment of the community's capability to respond to a natural disaster, 4) assessment of the community's current policies and ordinances that affect hazard mitigation, and 5) development of hazard mitigation strategies that can be implemented to reduce future vulnerability. This section of the hazard mitigation plan provides details on the natural hazards that could affect Bertie County. The Federal Emergency Management Agency (FEMA) and the State of North Carolina require that the twelve natural hazards listed below be considered in planning for local hazard mitigation. The threat of each hazard in Bertie County is unique in terms of potential impact, frequency of occurrence, likelihood of occurrence, and combined hazard index for potential harm to persons or property.

(Source of Picture: Natural Hazard Center, Pennsylvania State University.)

This section includes a description and history of natural hazard events that are known to have affected the Bertie County area. The primary data source was the National Climatic Data Center (NCDC - http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms). All historical data searches were conducted for the period 1950 to 2003. Where no information on injuries and deaths or property and crop damages is included, the information was not available.

As required by FEMA, all twelve potential hazards that could affect Bertie County and the towns within the County are profiled. The Bertie County Composite Hazard Index Table (Table A-28) summarizes the composite risk for each hazard. The hazards pose the same risks for Bertie County and for the towns located in the County with the exception that towns located in the western portion of the County are not subject to coastal erosion.

1. Coastal and Riverine Erosion
2. Dam and Levee Failures
3. Droughts and Heat Waves
4. Earthquakes
5. Floods
6. Hurricanes and Coastal Storms
7. Landslides and Sink Holes
8. Severe Storms and Tornadoes
9. Tsunamis
10. Volcanoes
11. Wildfires
12. Winter Storms and Freezes

B. Hazard Analysis - Evaluation Method

Each natural hazard is evaluated for three characteristics:

1. Likelihood of Occurrence, i.e., expected frequency;
2. Likely Range of Impact, i.e., predictable size and location of impact; and
3. Probable Level of Impact, i.e., estimated strength and damage potential.

Likelihood of Occurrence

The likelihood, or frequency, of occurrence of a particular hazard within a specific jurisdiction will be classified in one of four categories. These four categories are explained in Table A-1.

Table A-1: Explanation of Hazard Likelihood of Occurrence

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 within the next ten 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.

Source: "Keeping Natural Hazards from Becoming Disasters", NC Division of Emergency Management, November 2001, p. 11.

Likely Range of Impact

The likely range of impact, or predictable size and location, of a particular hazard within a specific jurisdiction will be classified in one of three categories. These three categories are described in Table A-2.

Table A-2: Description of Likely Range of Impact

Size of Area	Description
Small	10 % or less of the total jurisdictional area
Medium	10 % to 40 % of the total jurisdictional area
Large	40 % to 100 % of the total jurisdictional area

Source: "Keeping Natural Hazards from Becoming Disasters", NC Division of Emergency Management, November 2001, p. 11.

Probable Level of Impact

The probable level of impact, or estimated strength and damage potential, of a particular hazard within a specific jurisdiction is classified in one of four categories as described in Table A-3.

Table A-3: Description of Hazard Probable Level of Impact

Level	Area Affected	Impact[1]
Catastrophic	More than 50%	• Multiple deaths. • Complete shutdown of facilities for 30 days or more. • More than 50% of property is severely damaged.
Critical	25 to 50%	• Multiple severe injuries. • Complete shutdown of critical facilities for at least 2 weeks. • More than 25% of property is severely damaged.
Limited	10 to 25%	• Some injuries. • Complete shutdown of critical facilities for more than 1 week. • More than 10% of property is severely damaged.
Negligible	Less than 10%	• Minor injuries. • Minimal quality of life impact. • Shutdown of critical facilities and services for 24 hours or less. • Less than 10% of property is severely damaged.

Source: "Keeping Natural Hazards from Becoming Disasters", NC Division of Emergency Management, November 2001, p. 12.

[1] The impact of a natural hazard is a combination of the severity of the occurrence, the magnitude of the event, and the density of human activity in the affected area.

C. Composite Hazard Index

These three sets of classification categories - likelihood of occurrence, likely range of impact, and probable level of impact – have been combined to create a composite hazard index for each natural hazard. The combined hazard index describes vulnerability in general terms of "low", "moderate" or "high" hazard susceptibility. An individual hazard index is developed at the end of each of the twelve hazard sections. Table A-28 at the end of Appendix A is a composite of the twelve hazard index scores.

Table A-4: Composite Hazard Index Rating[1]

Size of area	Small (1)	Medium (2)	Large (3)	Small (1)	Medium (2)	Large (3)	Small (1)	Medium (2)	Large (3)	Small (1)	Medium (2)	Large (3)
Likelihood of Occurrence / Impact	Catastrophic (4)			Critical (3)			Limited (2)			Negligible (1)		
Highly Likely (4)	**9 High**	**10 High**	**11 High**	8 Moderate	**9 High**	**10 High**	7 Moderate	8 Moderate	**9 High**	6 Moderate	7 Moderate	8 Moderate
Likely (3)	8 Moderate	**9 High**	**10 High**	7 Moderate	8 Moderate	**9 High**	6 Moderate	7 Moderate	8 Moderate	5 Low	6 Moderate	7 Moderate
Possible (2)	7 Moderate	8 Moderate	**9 High**	6 Moderate	7 Moderate	8 Moderate	5 Low	6 Moderate	7 Moderate	4 Low	5 Low	6 Moderate
Unlikely (1)	6 Moderate	7 Moderate	8 Moderate	5 Low	6 Moderate	7 Moderate	4 Low	5 Low	6 Moderate	3 Low	4 Low	5 Low

[1] Each variable was assigned a number from 1 (lowest) to 3 or 4 (highest) rating. A score from 9 to 11 is a "high hazard risk"; from 6 to 8 "moderate hazard risk"; and from 3 to 5 "low hazard risk".

1. Hazard Coastal and Riverine Erosion

(Source: FEMA)

The U.S. Congress through the National Flood Insurance Reform Act of 1994 required that FEMA conduct a study to evaluate erosion hazards along rivers and coast lines. The study was to assess the economic impact of erosion and erosion mapping on communities and on the National Flood Insurance Program (NFIP). The legislation defined "Erosion Hazard Area" as "an area where erosion or avulsion is likely to result in damage to or loss of buildings and infrastructure within a 60-year period."

The FEMA coastal erosion study was conducted by The Heinz Center for Science, Economics and the Environment and released in 2000. The study estimates that approximately 25 percent of homes and other structures within 500 feet of the U.S. coastline and the shorelines of the Great Lakes will fall victim to the effects of erosion within the next 60 years. Especially hard hit will be areas along the Atlantic and Gulf of Mexico coastlines, which are expected to account for 60 percent of nationwide losses. The report estimates that costs to U.S. homeowners will average more than a half billion dollars per year, and that additional development in high erosion areas will lead to higher losses.

The Atlantic and Gulf coasts account for 45 percent of the U.S. coastline and are home to 63% of the structures within 500 feet of the nation's shoreline. The nation's highest average erosion rates - up to six feet or more per year - occur along the Gulf of Mexico coastline. The average erosion rate on the Atlantic coast is about two to three feet per year; however, actual erosion rates can vary widely from one location to another and from one year to another. A hurricane or other major storm can cause the coast to erode 100 feet or more in a single day.

The Heinz study recommended FEMA be authorized to develop coastal erosion hazard area maps and include the cost of expected erosion losses when setting flood insurance rates for coastal areas. The independent report also presented possible federal policy options, most of them regarding the use of the federal flood insurance program to address the coastal erosion problem.

1.1 Coastal Erosion Hazard

(Information source: FEMA)

Coastal erosion results from beach-ocean interaction coupled with human activity. The beach system is one that is considered to be in dynamic equilibrium. This means that sand is moved from one location to another but it does not leave the system. For example, winter storms may remove significant amounts of sand, creating steep, narrow beaches. In the summer, gentle waves return the sand widening beaches and creating gentle slopes. Because there are so many factors involved in coastal erosion, including human activity, sea level rise, seasonal fluctuations, and climate change, sand movement will not be consistent year after year in the same location. *(Source of Photo: Hurricane Fran erosion along NC coast, September 19, 1996. Source: North Carolina Division of Marine Fisheries. Photographer: Richard K. Davis.)*

Wind, waves, and long shore currents are the driving forces behind coastal erosion. This removal and deposition of sand permanently changes beach shape and structure. Sand may be transported to land-side dunes, deep ocean trenches, other beaches, and deep ocean bottoms. Coastal erosion poses many problems to coastal communities in that valuable property is frequently lost to this dynamic beach-ocean system. Additionally, human activity may intensify the process of coastal erosion through poor land use methods. Thus, issues of beach restoration and erosion control are at the forefront in coastal communities.

Poorly designed or sited development can lead to increased erosion, while measures to control erosion in one place may worsen erosion in others. Accretion (natural increase of sand) may also create problems, as when inlets fill in, interfering with navigation. Many experts predict that continued global warming will be accompanied by rising sea levels, resulting in increased coastal erosion worldwide.

Likelihood of Occurrence of Coastal Erosion

There is no recorded history of significant coastal erosion occurring in Bertie County, however, the close proximity to the Albemarle Sound increases the likelihood of occurrence and therefore rated as “possible”.

Likely Range of Impact for Coastal Erosion

The potential for coastal erosion is confined to limited areas of the County, thus the range of impact can be classified as “medium”.

Probable Level of Impact for Coastal Erosion

With possible occurrence and a medium exposure, the probable level of impact of coastal erosion in Bertie County can be categorized as “limited”.

Bertie County Hazard Index for Coastal Erosion

The hazard index for coastal erosion in Bertie County is categorized as “moderate” based on an “possible” occurrence, “medium” range of impact, and “limited” level of impact. This hazard index of “moderate” indicates that coastal erosion poses a relatively reasonable threat and that local hazard mitigation efforts are more wisely directed to other hazards to which the County and its municipalities are more vulnerable.

1.2 Riverine Erosion Hazard

North Carolina's 37,000 miles of streams and rivers and the floodplains and upland areas adjacent to these waters have great economic, social, cultural, and environmental value. These corridors contain complex ecosystems that encompass the land, plants, animals, and stream networks. Rivers and streams perform a number of important functions, including carrying water and sediment, storing water in wetlands and floodplains, and providing habitat for aquatic and terrestrial plants and animals. For these and other reasons, protecting streams is important. Stable stream channels maintain their shape by slowly eroding the outside of a meander bend while depositing sediment on the inside bend. Unaltered streams located in large, flat floodplains have more meanders than steep streams without floodplains. Whatever the channel form, most unaltered streams have alternating, regularly spaced, deep and shallow areas called pools and riffles. *(Information source: Farm*A*System North Carolina/Photo: FEMA)*

Naturally stable floodplain stream channels are typically sinuous with varying channel depths and stream banks low enough to periodically allow large storm flows to overflow onto the floodplain in response to significant storm events. The natural meandering and varying channel depths dissipate the energy of the water and reduce stream bank erosion. Floodplains also dissipate water energy during high flows, spreading shallow water over a wide area.

Bank height and steepness are the most important indicators of stream bank stability. When stream banks are too high and steep, soil erodes from the bank. Bank height is related to factors such as bank slope, soil types, vegetation cover, and location along the channel. However, once a critical bank height is reached, erosion likely will occur regardless of the other factors.

Management practices that reduce stream bank erosion and sedimentation and protect riparian (on the bank of a river, stream, or other body of water) vegetation can help maintain critical stream channel features. Vegetation slows the flow of water and reduces erosion of the banks. Overall, streams with a mature, diverse riparian buffer are the most stable over time.

Many streams in North Carolina have been straightened and dredged for agriculture, development, and flood control. Straight streams have a steeper gradient than meandering streams which often results in channel incision. Incision is an erosion process that lowers the streambed elevation until it reaches bedrock or other resistant materials. Incision increases stream bank heights and disconnects the stream from the original floodplain. In channels with steeper slopes and higher banks, high volumes of water cause significant stream bank erosion.

Likelihood of Occurrence of Riverine Erosion

There is no recorded history of significant riverine erosion occurring in Bertie County, thus likelihood of occurrence is rated as "possible".

Likely Range of Impact for Riverine Erosion

The potential for riverine erosion is confined to limited areas of the County, thus the range of impact can be classified as "small".

Probable Level of Impact for Riverine Erosion

With limited occurrence and small exposure, the probable level of impact of riverine erosion in Bertie County can be categorized as "negligible".

Bertie County Hazard Index for Riverine Erosion

The hazard index for riverine erosion in Bertie County is categorized as "low" based on a "possible" occurrence, "small" range of impact, and "negligible" level of impact. This hazard index of "low" indicates that riverine erosion poses a relatively low threat and that local hazard mitigation efforts are more wisely directed to other hazards to which the County and its municipalities are more vulnerable.

2. Dam and Levee Failures

Dam and levee failures can be a serious consequence of natural hazards. Dams are structures or appurtenances built to impound or divert water flow in streams or rivers. Levees are embankments built along rivers to contain flood waters.

2.1 Dams (Map A-2 Dam Break Study - Map Pocket)

There are approximately 80,000 dams listed in the National Inventory of Dams. This number includes impoundment structures greater than or equal to 25' in height or impounding 50 acre-feet (an acre-foot equal's water 1 foot deep across one acre of land) or more of water, or structures above 6 ft in height whose failure would potentially cause damage downstream. Nine thousand dams nationwide have been designated as high hazard dams.

The high hazard designation does not indicate the inherent stability or instability of a dam but instead measures the potential threat posed to downstream populations in the event of a dam failure. *(Dam failure following Hurricane Floyd, Fall 1999. Source of Photo: NC Division of Pollution Prevention and Environmental Assistance.)*

Background Information on Dams *(Source: Association of State Dam Safety Officials)*

Dams provide a life-sustaining resource to people in all regions of the United States. Unlike most infrastructures, dam owners are solely responsible for the safety and the liability of the dam and for financing upkeep, upgrade and repair. While most infrastructure facilities (roads, bridges, sewer systems, etc.) are owned by public entities, the majority of dams in the United States are privately owned. Across the nation, about 58% of dams are privately owned, 16% are owned by local governments, 4% by states, and the rest by the federal government and public utilities.

Manmade dams are classified according to the type of construction material used, the methods used in construction, the slope or cross-section of the dam, the way the dam resists the forces of water pressure, the means used for controlling seepage and, occasionally, according to the purpose of the dam.

The materials used for construction of dams include earth, rock, tailings from mining or milling, concrete, masonry, steel, timber, miscellaneous materials (such as plastic or rubber) and any combination of these materials. Embankment dams, the most common type of dam, are usually constructed of natural soil or rock or waste materials obtained from mining or milling operations. An embankment dam is termed an "earth-fill" or "rock-fill" dam depending on whether it is comprised of compacted earth or mostly compacted rock. The ability of an embankment dam to resist water pressure is primarily a result of the mass, weight, type and strength of the materials from which the dam is made.

Overtopping of an embankment dam is very undesirable since embankment materials may be eroded away. Water normally passes through the main spillway or outlet works; it should pass over an auxiliary spillway only during periods of high reservoir levels and high water inflow. All embankment and most concrete dams have some seepage; however, it is important to control the seepage to prevent internal erosion and instability. Proper dam construction, maintenance, and monitoring of seepage provide this control.

Intentional release of water is confined to water releases through outlet works and spillways. A dam typically has a principal or mechanical spillway and a drawdown facility. Additionally, some dams are equipped with auxiliary spillways to manage extreme floods. Spillways ensure that the reservoir does not overtop the dam. Outlet works may be provided so that water can be drawn continuously, or as needed, from the reservoir. Outlets also provide a way to draw down the reservoir for repair or safety concerns. Water withdrawn may be discharged into the river below the dam, run through generators to provide hydroelectric power, or used for irrigation. Dam outlets usually consist of pipes, box culverts or tunnels with intake inverts near minimum reservoir level. Such outlets are provided with gates or valves to regulate the flow rate.

Dam Classifications

Dams are classified in one of three categories:

Table A-5: Dam Hazard Classification

Hazard Classification	Description of Potential Damage	Quantitative Guidelines
Low	Interruption of road service, low volume roads	Less than 25 vehicles/day
	Economic Damage	**< $30,000**
Intermediate	Damage to highways, interruption of service	25 to less than 250 vehicles/day
	Economic Damage	**$30,000 < $200,000**
High	Loss of human life*	Probable loss of 1 or more human lives
	Economic Damage	**>$200,000**
	*Probable loss of human life due to breached roadway or bridge on or below the dam.	250 vehicles/day at 1000 feet visibility 100 vehicles/day at 500 feet visibility 25 vehicles/day at 200 feet visibility

Source: Dam Safety Program, NC Division of Land Resources.

Note: Cost of dam repair and loss of services should be included in economic loss estimate if the dam is a publicly owned utility, such as a municipal water supply dam.

National Dam Safety Program

The National Dam Safety Program Act, enacted in 1996, was established to improve dam safety by:

1. providing assistance grants to state dam safety agencies to improve regulatory programs;
2. funding research to enhance technical expertise as dams are built and rehabilitated;
3. establishing training programs for dam safety inspectors; and
4. creating a National Inventory of Dams.

The Act also requires FEMA to provide education to the public, to dam owners and to others about the need for strong dam safety programs, nationally and locally, and to coordinate partnerships among all players within the dam safety community to enhance dam safety.

North Carolina Dam Safety Program

The NC Dam Safety Program conducts the following:

1. Inspect high hazard dams at least every two years and intermediate and low hazards at least every five years.
2. Notify dam owners of deficiencies found in the dams and needed maintenance or engineering and repairs.
3. Enforcement action if needed.
4. Review plans for construction of new dams, and repairs, modifications and decommissioning of existing dams.
5. Inspect during construction activities as resources permit.
6. Inspect prior to impoundment once construction is completed.
7. Inspect during and after extreme events such as floods.
8. Maintain databases and records of dams under state jurisdiction.

The U.S. Army Corps of Engineers is responsible for dams under federal jurisdiction, (e.g., Falls Lake Reservoir and Jordan Lake Reservoir) and for hydroelectric dams or cooling water dams for power plants.

Potential of Dam Failure

Early in the 20th century, it was recognized that some form of regulation was needed after a number of dams failed due to lack of proper engineering and maintenance. Federal agencies, such as the Corps of Engineers and the Department of Interior, Bureau of Reclamation built many dams during the early part of the twentieth century and established safety standards during this time. It was not until a string of significant dam failures in the 1970s that awareness was raised to a new level among the states and the federal government.

Driving every other issue and all activities within the dam safety community is the risk of dam failure. Although the majority of dams in the U.S. have responsible owners and are properly maintained, still many dams fail every year. In the past several years, there have been hundreds of documented failures across the nation (this includes 250 after the Georgia Flood of 1994). Dam and downstream repair costs resulting from failures in 23 states reporting in one recent year totaled $54.3 million.

Dam failures are most likely to happen for one of the following reasons:

- Structural failure of materials used in dam construction
- Cracking caused by movements like the natural settling of a dam
- Piping—when seepage through a dam is not properly filtered and soil particles continue to progress and form sink holes in the dam.

Property owners downstream often know nothing about the potential that an upstream dam has to cause devastation should it fail. Even if citizens understand and are aware of dams, they still can be overly confident in the infallibility of these manmade structures. Living in dam-break flood-prone areas is a risk. Many dam owners do not realize their responsibility and liability toward the downstream public and environment. Adequate understanding of proper dam maintenance and upgrade techniques is a typical problem among many owners across the United States.

History of Dam and Levee Failures in North Carolina

The North Carolina Dam Safety Program has made use of National Dam Safety Program funds to create and implement the North Carolina Emergency Action Plan. The Plan was activated in 1999 during and after Hurricane Floyd and was instrumental in reducing response time in closing roads and evacuating persons from high-risk areas. Following Hurricane Floyd, no injuries were reported despite the failure of 36 dams (14 high hazard, 5 intermediate, and 12 low or unclassified dams). In the days and months following Hurricane Floyd, North Carolina dam safety personnel worked to ensure the safety of over fifty dams damaged by the hurricane. Dam owners, safety inspectors and local emergency management personnel monitored these dams asking owners to lower water levels and/or complete emergency repairs.

Dams in or affecting Bertie County (Map A-2 Dam Break Study)

Bertie County has only one dam - the Taylor-Brown Pond Dam – on the list of dams provided by the State of NC. This dam is located along Salmon Creek and is privately owned. The dam is monitored by the North Carolina Department of Environment and Natural Resources Land Quality Section.

There are two dams located outside Bertie County that would have an impact on western portions of the County if either dam were to fail. Both dams - Gaston Lake Dam and Reservoir and the Roanoke Rapids Dam and Reservoir – are located in the Roanoke River Basin. Gaston Lake Dam is located in southern Virginia eight miles upstream of the Roanoke Rapids Dam which is located northwest of the City of Roanoke Rapids in Halifax County, NC. Dominion Generation owns and operates both dams for the purpose of producing hydro-electric power. Map A-2 Dam Break Study (map pocket) produced by Fossil & Hydro Engineering for Virginia Power, indicates the area of Bertie County that could be impacted by failure of these two dams.

History of Dam Failures in Bertie County

No dam failures have been reported in Bertie County although the State did report a number of dam failures in eastern NC following Hurricanes Fran and Floyd. No injuries or property damages were reported with these failures and no specific failures were reported in Bertie County.

Likelihood of Occurrence of Dam Failure

There is no recorded history of significant dam failure occurring in Bertie County; however, failure of a high hazard dam due to high rain precipitation or other hazard events could result in significant damage to downstream properties and the possible loss of human life. The likelihood of a significant high hazard dam failure can be classified as "possible".

Likely Range of Impact for Dam Failure

Failure of either the Roanoke Rapids Reservoir or Gaston Lake Reservoir dam would impact significant sections of the western portion of the County, thus the range of impact can be classified as "large".

Probable Level of Impact for Dam Failure

A major dam break could have a "critical" impact on western Bertie County.

Bertie County Hazard Index for Dam Failure

The hazard index for dam failure in Bertie County is categorized as "moderate" based on a rating of "possible" occurrence, "large" range of impact, and "critical" level of impact. This hazard index of "large" indicates that the potential of a significant dam failure should be a concern for the County; however, regulation of dam safety is beyond the authority of the County. Bertie County Emergency Management will continue to work with dam safety officials and Dominion Generation to stay informed and ready to respond in the case of a dam failure.

2.2 Levees

Many communities around the globe are nestled in the lush green valleys and fertile floodplains that surround the rushing waters of streams and rivers. These water systems are vital in moving rainwater from land to sea and also serve to transport and deposit sediments. It is estimated that streams and rivers move about 1.5 billion tons of sediment from land to oceans each year. By shifting such great masses of earth, streams become sculptors of the land. *(Flint River and Georgia Power Company levee failure, Albany, Georgia, September 14, Georgia Institute of Technology.)1994.*

Farming communities often settle along rivers on floodplains because the land is flat, the soil is deep and fertile, and there is abundant rainfall. People have long known the risk of settling in these areas but to them, the economic benefits of agricultural production there usually outweigh the flood risk.

People living in valleys or on flood plains next to earthen dams or levees are susceptible to sudden flooding. Dams and levees can both fail in the event of an earthquake, internal erosion, poor engineering and construction or avalanches. The most common cause of failure, however, is too much rainfall.

When a region experiences heavy rainfall, the water inside a levee builds up and flows over the top. Water flow washes away the upper portion of the barrier and carves out deep grooves. The levee will eventually weaken as the water destroys the structure, resulting in sudden release of tons of water.

Levees are broadly classified as either urban or agricultural. Urban levees provide protection from flooding in communities where industrial, commercial, and residential properties are at risk of flood damage. Agricultural levees protect agricultural lands. There are five main types of levees:

1. Main/Tributary Levees - parallel the main channel and/or its tributaries.
2. Ring Levees - encircle or "ring" an area from all directions.
3. Setback Levees - generally built as a backup to an existing levee that has become endangered due to such actions as river migration.
4. Sub-Levees - constructed for the purpose of under seepage control. Sub-levees encircle areas landward of the main levee, and capture seepage water during high-water stages.
5. Spur Levees - project from the main levee and provide protection to the main levee by directing erosive river currents riverward.

Constructed levees cause water levels to rise upriver by forcing flood waters to pass through a narrow funnel-like opening between the levees. Waters impounded downstream by levees cause rapidly rising, higher than normal flood elevations such that properties upstream that have never been flooded are affected. The result is a chain reaction where people upstream build levees to protect their property – usually with taxpayer assistance. Overtime, the majority of the river will become contained within levees that isolate virtually the entire floodplain from the river.

Levee Failures

When high levees break, a tremendous amount of energy is released as a "dam break flood wave" which creates huge scour holes adjacent to the channel. Sands from these holes are then scattered across the floodplain at varying depths creating natural levees and floodplains. During a flood, as sediment-laden water flows out of the completely submerged channel, the depth, velocity and turbulence of the water decrease abruptly at the channel margins, where the coarsest part of the suspended load is deposited to form a natural levee. Farther away, finer silt and clay settle out across the stream's floodplain, a relatively flat region of valley floor that is periodically inundated by floodwater. The Midwest floods of 1993 caused $14 - $16 billion in property damages and recovery costs.

Since 1993, USGS scientists have decided that the best way to provide for flood control is to enclose the river's entire meander belt within a system of setback levees. The meander belt is the area most susceptible to flooding, the area where old active river channels occur, and where most of the major levee breaks occurred during the 1993 flood. The meander belt is thus that portion of the floodplain least desirable for farming or other developmental uses.

Hazard Index for Levee Failures

There are no known levees in Bertie County, thus levee failure is not included in the natural hazard index analysis.

3. Droughts and Heat Waves

3.1 Droughts

(Source of Photo: National Drought Mitigation Center, University of Nebraska)

Droughts are not rare or random events but normal, recurrent features of climate. Droughts occur in virtually all climatic zones, but drought characteristics vary significantly from one region to another.

Drought is a temporary aberration and differs from aridity which is restricted to low rainfall regions and is a permanent feature of climate. Drought originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector.

Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events) of rain events. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with drought and can significantly aggravate drought severity.

The more recent understanding that a deficit of precipitation has different impacts on groundwater, reservoir storage, soil moisture, snowpack, and streamflow led to the development of the Standardized Precipitation Index (SPI) in 1993. The SPI was designed to quantify the precipitation deficit for multiple time scales. These time scales reflect the impact of drought on the availability of the different water resources. Soil moisture conditions respond to precipitation irregularities on a relatively short scale. Groundwater, streamflow, and reservoir storage reflect longer-term precipitation inconsistencies.

Sequence of Drought Impacts

When drought begins, the agricultural sector is usually the first to be affected because of heavy dependence on stored soil water. Soil water can be rapidly depleted during extended dry periods. If precipitation deficiencies continue, then people dependent on other sources of water will begin to feel the effects of the shortage. Those who rely on surface water (reservoirs and lakes) and subsurface water (ground water), for example, are usually the last to be affected. A short-term drought that persists for 3 to 6 months may have little impact on these sectors, depending on the characteristics of the hydrologic system and water use requirements.

When precipitation returns to normal and meteorological drought conditions have abated, the sequence is repeated for the recovery of surface and subsurface water supplies. Soil water reserves are replenished first, followed by streamflow, reservoirs and lakes, and ground water. Drought impacts may diminish rapidly in the agricultural sector because of its reliance on soil water, but linger for months or even years in other sectors dependent on stored surface or subsurface supplies. Ground water users, often the last to be affected by drought during its onset, may be the last to experience a return to normal water levels. The length of the recovery period is a function of the intensity of the drought, its duration, and the quantity of precipitation received as the episode terminates.

Severe Droughts in the United States

The period of drought that has been the most well documented in both text and photographs occurred in the 1930s when drought covered virtually the entire Plains area of the U.S. for almost a decade. The direct effect of the drought is most often remembered as agricultural. Crops were damaged by deficient rainfall, high temperatures, and high winds, as well as insect infestations and dust storms that accompanied these conditions. The resulting agricultural depression contributed to the Great Depression with bank closures, business losses, increased unemployment, and other physical and emotional hardships. Although records focus on other problems, the lack of precipitation would also have affected wildlife and plant life, and would have created water shortages for domestic needs.

Effects of the Plains drought sent economic and social ripples throughout the country. Millions of people migrated from the drought areas, often heading west, in search of work. These newcomers were often in direct competition for jobs with longer-established residents, which created conflict between the groups. In addition, because of poverty and high unemployment, migrants added to local relief efforts, sometimes overburdening relief and health agencies.

To reduce the impact of future droughts, proactive measures were developed and implemented including an increase in conservation practices and irrigation, average farm size, and crop diversity. Federal crop insurance was established and the regional economy was diversified. Many other proactive measures taken after the 1930s drought also reduced rural and urban vulnerability to drought, including new or enlarged reservoirs, improved domestic water systems, changes in farm policies, new insurance and aid programs, and removal of some of the most sensitive agricultural lands from production.

Table A-6: History of Drought in North Carolina and the U.S.

Year	Description
1980	The drought/heat wave summer of 1980 caused over $20 billion in damages to agriculture and related industries and an estimated 10,000 heat stress-related deaths in the United States.
1986	$1 - $1.5 billion in damages and an estimated 100 deaths.
1988	Over $40 billion in damages and 5,000 to 10,000 deaths across central and eastern United States.
1993	During June-July 1993 most of the Southeast received less than 50% of normal rainfall along with temperatures 3 – 6 degrees above normal. Eighty-nine of the one hundred counties in NC were declared disaster areas. Crop losses for NC were estimated at $165 million. During this period, North Carolina also recorded the second driest summer (June-August) on record (since 1895) with a statewide average precipitation of only 9.43 inches. The Raleigh-Durham area recorded the driest June on record with 0.33 inches of rain. Estimated damages for the United States exceeded $1 billion in damages to agriculture and at least 16 deaths.
1998	Severe drought/heat wave from Texas/Oklahoma eastward to the Carolinas resulted in $6 - $9 billion in damages to agriculture and at least 200 deaths.
1999	Summer drought/heat wave of 1999 resulted in extensive agricultural losses estimated at over $1.0 billion in damages and an estimated 502 deaths in the United States. The east coast was hardest hit by the drought, with record and near-record short-term precipitation deficits occurring on a local and regional scale resulting in agricultural losses and drought emergencies being declared in several states. Drought was especially severe in the mid-Atlantic states, where local water restrictions were in effect and drought emergencies were declared by several governors. February-August 1999 ranked as the fifth driest such period in the 105-year record.
2000	Severe drought and persistent heat over south-central and southeastern states caused significant losses to agriculture and related industries estimated at over $4.0 billion in damages and 140 deaths.
2002	According to the National Climatic Data Center, moderate to extreme drought affected more than 45% of the United States June through August of 2002. Nationwide, the summer of 2002 was the third hottest on record after the summers of 1934 and 1936. The 12 months that ended with August 2002 were the driest on record for North Carolina. Local water restrictions were in effect throughout central and western North Carolina.

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html .

3.2 Heat Waves

Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. Among large natural hazards, only the cold of winter -- not lightning, hurricanes, tornadoes, floods, or earthquakes – takes a greater toll. In the 40-year from 1936 through 1975, nearly 20,000 people in the United States were killed by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died as a direct result of the heat wave. People at higher risk, e.g., with aging or diseased hearts, are especially susceptible to excessive heat. In recent years, the National Weather Service (NWS) has stepped up efforts to more effectively alert the general public and appropriate authorities to the hazards of heat waves and prolonged excessive heat/humidity episodes. *(Source of Photo: National Oceanic and Atmospheric Administration (NOAA))*

How Heat Affects the Body

Human bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and - as the last extremity is reached - by panting, when blood is heated above 98.6 degrees. As heat rises, the heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the bundles of tiny capillaries threading through the upper layers of skin are put into operation. Blood is circulated closer to the skin's surface, and excess heat drains off into the cooler atmosphere. At the same time, water diffuses through the skin as perspiration. The skin handles about 90 percent of the body's heat dissipating function. Sweating, by itself, does nothing to cool the body, unless the water is removed by evaporation -- and high relative humidity retards evaporation.

Heat disorders generally have to do with a reduction or collapse of the ability of the body to shed heat by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop.

Ranging in severity, heat disorders share one common feature: the individual has overexposed or over exercised for his/her age and physical condition in the existing thermal environment. Sunburn, with its ultraviolet radiation burns, can significantly retard the skin's ability to shed excess heat. Studies indicate that, other things being equal, the severity of heat disorders tend to increase with age -- heat cramps in a 17-year-old may be heat exhaustion in someone 40 and heat stroke in a person over 60.

Heat Index

The heat index, given in degrees Fahrenheit, is an accurate measure of how hot it really feels when the relative humidity is added to the actual air temperature (see Table A-7 Heat Index Chart). If the air temperature is 95°F (found on the left side of Table A-6), and the relative humidity is 50% (found at the top of Table A-7), the heat index - or how hot it really feels - is 106.7°F. This is at the intersection of the 95° row and the 50% column. Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous. In Table A-7, the shaded zone above 105°F corresponds to a heat index level that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

Table A-7: Heat Index Chart

Temperature (F) versus Relative Humidity (%)									
°F	**90%**	**80%**	**70%**	**60%**	**50%**	**40%**	**30%**	**20%**	**10%**
65	65.6	64.7	63.8	62.8	61.9	60.9	60.0	59.1	58.1
70	71.6	70.7	69.8	68.8	67.9	66.9	66.0	65.1	64.1
75	79.7	76.7	75.8	74.8	73.9	72.9	72.0	71.1	70.1
80	88.2	85.9	84.2	82.8	81.6	80.4	79.0	77.4	76.1
85	101.4	97.0	93.3	90.3	87.7	85.5	83.5	81.6	79.6
90	119.3	112.0	105.8	100.5	96.1	92.3	89.2	86.5	84.2
95	**141.8**	131.1	121.7	113.6	106.7	100.9	96.1	92.2	89.2
100	**168.7**	**154.0**	**140.9**	129.5	119.6	111.2	104.2	98.7	94.4
105	**200.0**	**180.7**	**163.4**	**148.1**	**134.7**	123.2	113.6	105.8	100.0
110	**235.**	**211.2**	**189.1**	**169.4**	**151.9**	**136.8**	124.1	113.7	105.8
115	**275.3**	**245.4**	**218.0**	**193.3**	**171.3**	**152.1**	**135.8**	122.3	111.9
120	**319.1**	**283.1**	**250.0**	**219.9**	**192.9**	**169.1**	**148.7**	**131.6**	118.2

Source: National Weather Service Heat Index Program, NOAA.

Heat Index/Heat Disorders

The Heat Index/Heat Disorders (Table A-8) relates ranges of heat index with specific disorders, particularly for people in higher risk groups. Heat disorder symptoms are described in Table A-9.

Table A-8 Heat Index/Heat Disorders

Prolonged Exposure or Physical Activity	HI	Possible Heat Disorder
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and physical activity.
Extreme Caution	90°F - 105°F	Sunstroke, heat cramps and heat exhaustion possible.
Danger	105°F – 130°F	Sunstroke, heat cramps, and heat exhaustion likely, and heat stroke possible.
Extreme Danger	**130°F or greater**	**Heat stroke highly likely with continued exposure.**

Source: National Weather Service Heat Index Program, NOAA.

Table A-9: Heat Disorder Symptoms

Heat Disorder	Symptoms	First Aid
Sunburn	Redness and pain. In severe cases, swelling of skin, blisters, fever, headaches.	Ointment for mild cases if blisters appear. If breaking occurs, apply dry sterile dressing. Serious cases should be seen by a physician.
Heat Cramps	Painful spasms usually in muscles of legs and abdomen possible. Heavy sweating.	Firm pressure on cramping muscles, or gentle massage to relieve spasm. Give sips of water. If nausea occurs, discontinue use.
Heat Exhaustion	Heavy sweating, weakness, skin cold, pale and clammy. Pulse thready. Normal temperature possible. Fainting and vomiting.	Get victim out of sun. Lie down and loosen clothing. Apply cool wet cloths. Fan or move victim to air conditioned room. Sips of water. If nausea occurs, discontinue use. If vomiting continues, seek immediate medical attention.
Heat Stroke/ Sunstroke	High body temperature (106°F, or higher). Hot dry skin. Rapid and strong pulse. Possible unconsciousness.	Heat stroke is a severe medical emergency. Summon medical assistance or get the victim to a hospital immediately. Delay can be fatal. Move the victim to a cooler environment. Reduce body temperature with cold bath or sponging. Use extreme caution. Remove clothing, use fans and air conditioners. If temperature rises again, repeat process. Do not give fluids.

Source: National Weather Service Heat Index Program, NOAA.

Cities Pose Special Hazards

The stagnant atmospheric conditions a heat wave trap pollutants in urban areas and add the stresses of severe pollution to the already dangerous stresses of hot weather, creating a health problem of greater dimensions. A map of heat-related deaths in St. Louis during 1966, for example, showed a heavier concentration in the crowded alleys and towers of the inner city, where air quality would also be poor during a heat wave.

The high inner-city death rates also can be read as poor access to air-conditioned rooms. While air-conditioning may be a luxury in normal times, it can be a lifesaver during heat wave conditions. The cost of cool air moves steadily higher, adding what appears to be a cruel economic side to heat wave fatalities. Indications from the 1978 Texas heat wave suggest that some elderly people on fixed incomes, many of them in buildings that could not be ventilated without air conditioning, found the cost too high, turned off their units, and ultimately succumbed to the stresses of heat.

History of Droughts and Heat Waves in Bertie County

There is no recorded information available on past droughts and heat waves specific to Bertie County.

Likelihood of Occurrence of Droughts and Heat Waves

Since 1980 there have been several periods of significant drought affecting the southeastern portion of the United States. Although there is no recorded information from the National Climatic Data Center on heat waves in North Carolina, these hazard events can be considered "likely" in Bertie County.

Likely Range of Impact for Droughts and Heat Waves

When droughts and heat waves do occur, they impact several states or an entire region of the United States, therefore, the range of impact can be classified as "large".

Probable Level of Impact for Droughts and Heat Waves

Extended droughts can have a significant impact on local resources and local economies as evidenced by data on drought impacts since 1980. Heat waves have a much more limited impact, but considered together these two related natural hazards can have a huge impact on a community; therefore, the probable level of impact can be classified as "limited to critical".

Bertie County Hazard Index for Droughts and Heat Waves

The hazard index for droughts and heat waves in Bertie County is categorized as "moderate" based on a "likely" occurrence, "large" range of impact, and "limited to critical" level of impact. This hazard index of "moderate" indicates that droughts and heat waves pose a relatively large threat in Bertie County and that major hazard mitigation efforts are advised. However, mitigating the impact of a drought or heat wave is generally considered a State or regional issue and planned for at those levels. Local initiatives could include public education and limits on water usage.

4. Earthquakes

The Federal Emergency Management Agency (FEMA) defines an earthquake as "a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface". Earthquakes result when stress forces build up along fractures or fault lines in the earth's crust over extended periods of time. At the point where these stresses exceed the strength of the rocks on either side of the fault there is a sudden rupture or snapping that releases energy in the form of seismic waves. *(Source of Photo: FEMA)*

The 1931 Modified Mercalli Scale (Table A-10) is used in the United States to measure the intensity of an earthquake. The scale assigns a Roman numeral from Category I to Category XII to describe the qualitative effects of an earthquake. The methodology used involves:

1. Assigning an intensity numeral at each location to describe the earthquake effect.
2. Creating a contour map of the zones of similar effect.
3. The earthquake assumed to occur near the region of maximum intensity.
4. The earthquake is characterized by the largest Roman numeral assigned.

The scale is a qualitative assessment that measures different phenomena. The lower intensity values measure human response to ground motions, the intermediate values characterize the response of simple structures, and the upper values describe ground failure processes. A problem with the scale is that incomplete spatial coverage may lead to missing the location of the earthquake or an underassessment of its size. This can be a problem when measuring offshore earthquakes or where sparsely populated, less developed areas result in inadequate measurements.

History of Earthquakes Impacting North Carolina

North Carolina's vulnerability to earthquakes decreases from west to east. Epicenters that affect North Carolina are generally concentrated in the Eastern Tennessee Seismic Zone (ETSZ), which is second in activity in the eastern United States only to the New York Madrid Fault. The eastern portion of the State faces minimal effects from seismic activity (North Carolina Natural Hazards Mitigation (Section 409) Plan, North Carolina Department of Environment and Natural Resources, 1998, p. 14.).

The ETSZ is part of a crescent of moderate seismic activity risk extending from Charleston, South Carolina northwestward into eastern Tennessee and then curving northeastward into central Virginia. There have not been any earthquakes in the ETSZ with MMI intensity greater than IV since 1928, but the potential to produce an earthquake of significant intensity still exists.

Table A-10: Modified Mercalli Scale of Earthquake Intensity

Scale	Intensity	Description of Effects	Maximum Acceleration (mm/sec)	Richter Scale
I	Instrumental	Detected only on seismographs.	<10	
II	Feeble	Some people feel it.	<25	<4.2
III	Slight	Felt by people resting.	<50	
IV	Moderate	Felt by people walking.	<100	
V	Slightly Strong	Sleepers awake; church bells ring.	<250	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	<500	<5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	<1000	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	<2500	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	<5000	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	<7500	<7.3
XI	Very Disastrous	Most buildings/bridges collapse; roads/railways/pipes/cables destroyed; other hazards triggered.	<9800	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	>9800	>8.1

Source: Local Hazard Mitigation Planning Manual, NC Division of Emergency Management, 1998.

Earthquakes are relatively infrequent but not uncommon in North Carolina. From 1568 to 1992, 157 earthquakes occurred in North Carolina (Local Hazard Mitigation Planning Manual, NC Division of Emergency Management, 1998, p. 77.). The strongest earthquake on record in the State occurred March 8, 1735 near Bath. During the great earthquake of 1811 (MMI VI), centered in the Mississippi Valley, tremors were felt throughout North Carolina.

The most earthquake property damages recorded in North Carolina are attributed to an earthquake that occurred August 31, 1886 in Charleston, SC. This quake left 65 people dead in Charleston and caused chimney collapses, fallen plaster and cracked walls as far away as Charlotte, Elizabethtown, Henderson, Hillsborough, Raleigh, Waynesville, and Whiteville, North Carolina. On February 21, 1916, the Asheville area was the center for a large MMI VI earthquake that was felt in several states. Subsequent minor earthquakes have caused damages in North Carolina in 1926, 1928, 1957, 1959, 1971, 1973, and 1976.

History of Earthquake damage in Bertie County
There is no history of earthquake damage in Bertie County.

Likelihood of Occurrence of an Earthquake
The probability of a notable earthquake occurring in Bertie County can be classified as "unlikely".

Likely Range of Impact of an Earthquake
Earthquakes are not localized events within a small land area and therefore are not easily mapped. Any diminishment of the destructive force of an earthquake from one side of Bertie County to the other would probably be negligible. The impact of an earthquake within the area would be fairly uniform among structures which were built using comparable construction methods and materials. If an earthquake were to occur, the range of impact would be classified as "large".

Probable Level of Impact of an Earthquake
Earthquakes can cause buildings and bridges to collapse, damage utility service lines, trigger landslides and avalanches, and cause flash floods and fires. Regarding earthquakes, FEMA reports that "buildings with foundations resting on unconsolidated landfill, old waterways, or other unstable soil are most at risk. Buildings or trailers and manufactured homes not tied to a reinforced foundation anchored to the ground are also at risk since they can be shaken off their mountings during an earthquake".

There are no records of the Bertie County area experiencing an earthquake. Past history indicates that only minor property damage is likely from an earthquake that affects this area. The probable level of impact of an earthquake in the greater Bertie County area can be classified as "negligible".

Bertie County Hazard Index for Earthquakes
Earthquakes have been assigned a hazard index of "low" for the Bertie County area based on the likelihood of occurrence ("possible"), a "small" likely range of impact, and a "negligible" probability of damage. The combined hazard index of "low" for earthquakes indicates that this particular hazard poses a relatively low threat and that hazard mitigation efforts would be more wisely directed to other hazards to which the area is more vulnerable.

5. Floods (see map pocket)
Areas susceptible to flood damage caused by heavy rainfall have been determined through the Federal Emergency Management Agency (FEMA) floodplain mapping program. The economic and human impact a hurricane or other heavy rainfall event has on a community depends greatly on how development has occurred within that community. Development in areas of high risk or vulnerability greatly increases the potential for property damage and loss of life.

Flooding is normally the result of a larger event such as a hurricane, nor'easter or thunderstorm, but flooding can be as frequent as the occurrence of a spring rain or a summer thunderstorm. Flooding is caused by excessive precipitation and can be generally considered in two categories: flash floods and general floods.

Flash floods are the product of localized, high-intensity precipitation over a small drainage basin in a short time period. Flash floods, which typically occur more frequently than general floods, occur along small streams and creeks. The undermining or washing out of roads is typically associated with flash floods. General floods are caused by precipitation over a longer time period and over a given river basin. These larger storm events occur along the East Coast of the United States most often in the late summer and fall. *Flooding caused by Hurricane Floyd (Source of Photos: Nash Co. Planning Department)*

A combination of river basin physiography, local thunderstorm movements, past soil moisture conditions, the degree of vegetative clearing and the amount of impervious surface coverage (building, pavements, etc..) determine the severity of a flooding event. Flooding is typically most severe in areas of the floodplain immediately adjacent to major streams and rivers.

History of Floods in Bertie County
Since 1999, eight flood events have been reported in Bertie County. The National Climatic Data Center also reported two other heavy rain events in Bertie County occurring on 1/27/98 and 2/4/98. No flooding was reported with these rain events.

Table A-11: Flood Event Data for Bertie County – 1999 – 2001

Location	Date	Time	Type	Deaths
Countywide	9/07/1999	1:00 AM	Flash Flood	0
Countywide	9/15/1999	8:15 PM	Flood	1
Countywide	10/17/1999	5:30 PM	Flash Flood	0
Askewville	6/15/2001	6:30 PM	Flash Flood	0
Askewville	6/15/2001	8:55 PM	Flash Flood	0
Aulander	6/15/2001	10:30 PM	Flash Flood	0
Aulander	6/16/2001	9:20 AM	Flash Flood	0
Powellsville	6/16/2001	12:45 AM	Flash Flood	0
Totals				**1**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
Note: No property or crop damages reported by NCDC – see hurricane section for additional data on floods associated with hurricanes.

The total economic and loss of life impact in a community depends greatly on the amount of development within flood prone areas. In September 1999, Tropical Storm/Hurricane Dennis I and II and Hurricane Floyd together dealt eastern North Carolina a severe two-punch blow. Rains from Dennis saturated the ground and overfilled creeks, rivers, and reservoirs before Floyd made landfall three weeks later. Once Floyd passed through the State, severe flash flooding and general flooding occurred with floodwaters overflowing stream and riverbanks for up to two weeks following the storm.

Both flash flooding and longer-term general flooding from Hurricane Floyd caused property damage to structures located in floodplains. A number of individuals and families in Bertie County were left homeless and a number of businesses were either closed for several weeks or destroyed by the flooding.

Hurricane Floyd's unprecedented flooding levels resulted in private property and public infrastructure damage totaling $3 billion throughout eastern North Carolina. Crop damage was estimated at $500 million. Damages within Bertie County, as reported by the Bertie County Emergency Management Assessment Team, are outlined in Table A-12.

Table A-12: Hurricane Floyd Damage Assessment for Bertie County*

Category	Damages
Immediate area around the Town of Windsor	$9,479,676
Town of Windsor	$28,439,028
Other Municipalities and Rural Areas	$920,000
Agricultural (crops and livestock)	$9,554,286
Total	**$48,392,990**

Source: Bertie County Emergency Management Assessment Team.

Likelihood of Occurrence of Floods

Localized flooding can occur several times a year in Bertie County. In recent years there have also been a number of more widespread flooding events caused by hurricanes and tropical storms. The likelihood of localized flooding can be categorized as "highly likely" and area wide flooding as "likely".

Likely Range of Impact for Floods

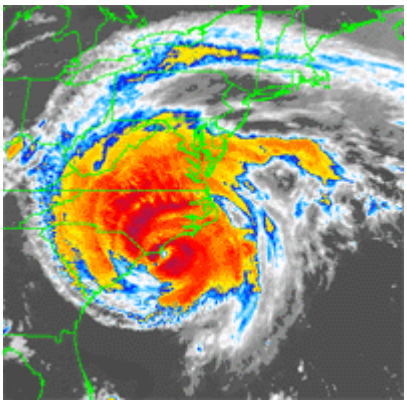
Flooding is normally confined to specific, known flood hazard areas where development can be controlled or limited. The likely range of flood impact can be classified as "small".

Probable Level of Impact for Floods

Localized flooding typically has a "negligible" level of impact, whereas area wide flooding can have a "limited" to "critical" level of impact in Bertie County.

Bertie County Hazard Index for Floods

The hazard index for floods in Bertie County is categorized as "moderate" based on a "likely to highly likely" level of occurrence, "small" range of impact, and "limited to critical" level of impact. This hazard index indicates that floods should be a major focus of local hazard mitigation efforts.



6. Hurricanes and Coastal Storms

Hurricanes are cyclonic low-pressure system storms originating in tropical ocean waters and fueled by latent heat from the condensation of warm water. Hurricanes and tropical storms that affect North Carolina normally form in the Atlantic Ocean off the coast of western Africa between the months of June and November with the peak season occurring in early September. (State Climate Office of North Carolina)

Hurricanes are born over tropical oceans when the water is warmer than about 80 degrees. These storms start as areas of disturbed weather where a combination of clouds and falling pressure combined with the rotation of the earth result in increasing winds. Once these winds mature into hurricanes, they can remain constant for days or they may peak and quickly die. Hurricanes lose power when taken away from a warm water source - which is what happens when a storm moves over land. *(Hurricane Fran, Source of Photo: NC Office of Archives and History)*

Hurricanes and other cyclones that form in the tropics during summer months are different from the extratropical storms (nor'easters) that form during winter months. Both types of storms produce strong winds and may cause flooding. The main differences between hurricanes and nor'easters are:

- Hurricanes and tropical systems have no fronts.
- Hurricane winds weaken with height.
- The centers of hurricanes are warmer than the surroundings.
- Hurricanes and tropical systems form under weak high-altitude winds.
- Air sinks at the center of a hurricane.
- Latent heat of condensation is the major energy source for hurricanes.
- Hurricanes weaken rapidly when over land.

Tropical Storm Categories

Tropical systems/hurricanes are classified into four categories according to degree of organization and maximum sustained wind speed:

1. Tropical Disturbance/Tropical Wave - unorganized mass of thunderstorms, very little, if any, organized wind circulation.
2. Tropical Depression - evidence of closed wind circulation around a center with sustained winds from 20-34 knots (23-39 mph).
3. Tropical Storm - maximum sustained winds are from 35-64 knots (40-74 mph). A storm is named once it reaches tropical storm strength.
4. Hurricane - maximum sustained winds exceed 64 knots (74 mph).

With favorable atmospheric and oceanic conditions, a storm will intensify from a tropical depression to a tropical storm and then to a hurricane. Heavy precipitation, high winds and tornadoes are all typically associated with hurricanes. Hurricanes have long threatened the North Carolina coast and, as evidenced in recent years, can strongly affect inland areas as well.

The Saffir-Simpson Scale measures hurricane intensity ranging from one (minimal) to five (catastrophic). The scale ratings are based on wind speeds, surface pressure and height of storm surge (Table A-13).

To improve storm-rating accuracy, scientists are currently considering revising the Saffir-Simpson Scale to include rainfall potential as a fourth rating variable.

Hurricane Categories

Major hurricanes are categorized as 3, 4 or 5 on the Saffir-Simpson Scale. While hurricanes within this range comprise only 20% of total tropical cyclone landfalls, they account for over 70% of the damage in the United States. Maximum sustained winds of category 3, 4 and 5 hurricanes range from 112 mph to over 156 mph. The higher wind intensities topple trees and cause severe damage to structures.

Table A-13: Saffir-Simpson Hurricane Scale

Category	Barometric Pressure (mb)	Wind Speed (in miles per hr)	Height of Storm Surge (in feet)	Damage Potential
1 Weak	>980.2	75 – 95	4 – 5	Minimal damage to vegetation
2 Moderate	979.68 – 965.12	96 – 110	6 – 8	Moderate damage to houses
3 Strong	945.14 – 964.78	111 – 130	8 – 12	Extensive damage to small buildings
4 Very Strong	920.08 – 944.80	131 – 155	13 – 18	Extreme structural damage
5 Devastating	<920.08	> 155	> 18	Catastrophic building failures possible

Source: State Climate Office of North Carolina, NC State University.

The National Hurricane Center, describes damages associated with hurricanes categories as:

Category 1

Damage primarily to unanchored mobile homes, shrubbery and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage.

Category 2

Some building roofing material, door and window damage. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings.

Category 3

Some structural damage to small residences and utility buildings with a minor amount of curtain wall failures. (Curtain walls are typically associated with non-residential buildings where non-structural window and/or wall panels are attached to the structural framework to form the exterior skin of the building.) Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the hurricane center. Flooding near the coast destroys smaller structures with larger structures damaged by battering of floating debris. Terrain continuously lower than 5 feet above mean sea level may be flooded inland 8 miles or more. Evacuation of low-lying residences within several blocks of the shoreline may be required.

Category 4
More extensive curtain wall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the hurricane center. Major damage to lower floors of structures near the shore. Terrain lower than 10 feet above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles.

Category 5
Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the hurricane center. Major damage to lower floors of all structures located less than 15 feet above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles of the shoreline may be required.

Historic Impact of Hurricanes and Coastal Storms in Bertie County

During the time period from 1993 - 1999, five hurricanes or tropical storms impacted Bertie County - Hurricanes Bertha (July 1996), Bonnie (August 1998), and Fran (September 1996), Tropical Storm/Hurricane Dennis I and II (August 1999), and Floyd (September 1999). These storms caused significant damage within the State. (Table A-14). (Note: For more detail on hurricane damages, also see section on Floods.) *(Source of Photo: FEMA)*

Table A-14: Hurricanes and Tropical Storms Affecting Bertie County

Date	Storm Name	Deaths and Injuries in NC		Damages in NC	
		Deaths	Injuries	Property	Crop
7/12/1996	Bertha	0	0	200K	30K
9/05/1996	Fran	0	0	1.0M	0
10/07/1996	Tropical Storm	0	0	100k	0
7/30/1996	Waterspout	0	0	0	0
8/26/1998	Bonnie	1	0	13.4M	0
9/01/1999	Dennis	0	0	35K	0
9/15/1999	Floyd	0	0	12M	63.4M
10/17/1999	Gert	0	0	31K	0
9/23/2003	Isabel	N/A	N/A	N/A	N/A
Totals		**1**	**0**	**$26.77 M**	**$63.43M**

Source: National Climatic Data Center.

Likelihood of Occurrence of Hurricanes and Coastal Storms in NC

According to the Local Hazard Mitigation Planning Manual, "by virtue of its position along the Atlantic Ocean adjacent to and protruding to the edge of the Gulf Stream, North Carolina is frequently impacted by hurricanes (and tropical storms). In fact, North Carolina has experienced the fourth greatest number of hurricane landfalls of any state in the twentieth century (after Florida, Texas and Louisiana)." Many of these storms track inland and pass over Bertie County, although they usually have weakened below hurricane force by the time that they reach the area. There are other storms that do not even make landfall and instead just skirt the North Carolina coastline, but they can still cause high winds and torrential rains in the area, because of the tremendous size of these storms.

There have been a number of hurricanes (and tropical storms) whose impacts have been felt in Bertie County. Hurricanes that have struck North Carolina in the last 50 years include Hazel in 1954, Connie, Diane and Ione all in 1955, Donna in 1960, Hugo in 1989, Emily in 1993, Opal in 1995, Bertha and Fran in 1996, Bonnie in 1998, and Dennis Floyd in 1999 and Isabel in 2003. Because of the size of these storms (up to 400 miles wide), the Bertie County area felt some impact (including torrential rains and high winds) from these storms. In addition to the above named hurricanes there have been smaller tropical storms that may have also impacted Bertie County. The probability of the Bertie County area experiencing the affects of a hurricane, or tropical storm, can be classified as "likely".

Likely Range of Impact of Hurricanes and Coastal Storms in NC

Hurricanes and tropical storms are not localized events. The diminishment of the destructive force of a hurricane or tropical storm from one side of Bertie County to the other would probably be limited. The impact of the wind element of a hurricane or a tropical storm within the County would be fairly uniform among structures which were built using comparable construction methods and materials. The impact of the associated rainfall from a hurricane or tropical storm would primarily affect structures and infrastructure in proximity to regulatory floodplains and secondary tributaries and creeks. The accumulation of wind blown debris in public or private storm drainage inlets and drainage swales has the potential to cause minor flooding problems throughout the area. If a hurricane or tropical storm were to occur, the entire Bertie County area would be subject to the effects of the storm, therefore the range of impact can be classified as "large".

Probable Level of Impact of Hurricanes and Coastal Storms in NC

The Local Hazard Mitigation Planning Manual indicates that "hurricanes have the greatest potential to inflict damage as they cross the coastline from the ocean, which is called landfall. 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 makes the right front quadrant of the hurricane the location of the most potentially damaging winds."

Property damage can result when the high winds of a hurricane or a tropical storm combine with saturated soils from extended heavy rains which may cause trees to be uprooted and fall onto nearby structures, or when wind blown debris damages structures. Additionally, hurricanes and tropical storms generally include bands of severe thunderstorms, which may produce hail and spawn tornadoes.

The probable level of impact of a hurricane or tropical storm in Bertie County can be classified as “limited”. Although most hurricanes cause only limited damage within the area, past hurricane experience indicates the likelihood of occurrence.

Bertie County Hazard Index for Hurricanes and Coastal Storms

The hazard index for hurricane impacts in Bertie County is “moderate” based on the probability of occurrence being “likely”, the “large” area that would be impacted, and the probable “limited” damage impact. This hazard index of “moderate” for hurricanes indicates that this particular hazard poses a relatively large, but infrequent threat. Since hurricanes and coastal storms are also significant contributors to flooding, there are opportunities for local hazard mitigation efforts to have a significant impact on exposure to future events.

(Road failure caused by a landslide. Source of Photo: NOAA.)

7. Landslides and Sinkholes

7.1 Landslides

According to the United States Geological Survey (USGS), landslides are a major geologic hazard that occur in all 50 states and cause on average $1-2 billion in damages and more than 25 fatalities each year. (USGS, 1997) Landslides often occur in conjunction with other natural hazards such as earthquakes and floods.[1-6]

Clay-rich soil landslides are common throughout the mountainous Appalachian region of the United States. The USGS classifies landslide incidence/susceptibility for the eastern United States as low, medium, or high based on geographic features and geologic formations.

USGS further defines susceptibility to landslides as the probable degree of response of geologic formations to natural or artificial cutting, loading of slopes, or unusually high precipitation. Generally, unusually high precipitation or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced landslides in the past.

Historic records suggest that destructive landslides and debris flows in the Appalachian Mountains occur when unusually heavy rain from hurricanes and intense rain storms soaks the ground, reducing the ability of steep slopes to resist the downward pull of gravity. Scientists have documented fifty-one debris-flow events in North Carolina between 1844 and 1985. All of these occurred in the Appalachian Mountains and most were in the Blue Ridge area. (Gori and Burton, 1996)

Table A –15: USGS Landslide Susceptibility/Incidence

Category	Incidence	Susceptibility
1	Low	Low
2	Low	Moderate
3	Low	High
4	Moderate	Moderate
5	Moderate	High
6	High	High

Source: Local Hazard Mitigation Planning Manual, North Carolina Division of Emergency Management, 1998.

An area with a “low” incidence ranking means that less than 1.5% of the area has experienced a landslide in the past. An area with a “medium” incidence ranking means that between 1.5% and 15% of the area has experienced a landslide in the past. An area with a “high” incidence ranking means that greater than 15% of the area has experienced a landslide in the past. The susceptibility rankings of “low”, “medium” and “high” follow the same percentage classifications for landslide susceptibility for a specific area. The overall likelihood of occurrence of a landslide in Bertie County can be classified as “unlikely”, due to the relative flat topography of the inner coastal plain. Limited steep slopes associated with the banks of major watercourses in the County could collapse under heavy rainfall to produce a localized landslide. The potential of damage to lives or property in Bertie County from the type of natural hazard is low.

7.2 Sinkholes *(Source: Virginia Department of Conservation and Recreation publication “Living with Sinkholes”)*

Sinkholes are basin-like, funnel-shaped, or vertical sided depressions in the land surface. In general, sinkholes form by the subsidence of unconsolidated materials or soils into voids created by the dissolution of the underlying soluble bedrock. *(Source of Photo: Sinkhole in Georgia. Source: USGS.)*

There are three general types of sinkholes – collapse, subsidence, and solution. These different types of sinkholes generally correspond to the thickness of the sediments overlying limestone. The sediments and water contained in the unsaturated zone, surficial aquifer system, and the confining layer are collectively referred to as overburden. Collapse sinkholes are most common in areas where the overburden is thick, but the confining layer is breached or absent. Subsidence sinkholes form where the overburden is thin and only a veneer of sediments is present overlying the limestone. Solution sinkholes form where the overburden is absent and the limestone is exposed at land surface.

The rock exposed in a collapsed sinkhole is usually weathered and rounded, but some sinkholes contain freshly broken rock along steep sides of the hole. Freshly broken rock may indicate that the sinkhole has formed by the collapse of a cave (naturally occurring) or a mine (manmade). Where sinkholes and caves have formed by the dissolution of soluble rock, such as limestone, dolomite, and gypsum, surface water is uncommon and streams may sink into the ground. This type of topography formed by dissolution is referred to as karst terrain. In karst terrain, sinkholes are input points where surface water enters the groundwater system. The most important current and future environmental issue with respect to karst is the sensitivity of karst aquifers to groundwater contamination.

Karstic groundwater problems are accelerated with the advent of (1) expanding urbanization, (2) misuse and improper disposal of environmentally hazardous chemicals, (3) shortage of suitable repositories for toxic waste (both household and industrial), and (4) ineffective public education on waste disposal and the sensitivity of the karstic groundwater system.

Because sinkholes are natural holes in the ground surface, they have been inviting sites for dumping of trash. The number of active and inactive sinkhole dumps in karst regions is staggering. It is conceivable that each county with karst has hundreds of sinkhole dumps. The profusion of these dumps is the result of (1) the absence of a refuse-removal service in rural areas and the expense and inconvenience of trash haulage, (2) the convenient proximity of sinkholes, and (3) a lack of appreciation of the role of sinkholes in the karstic groundwater system.

Sinkholes are natural funnels that conveyed toxic substances directly into the karstic plumbing system. In many cases, chemicals may be transmitted directly to domestic wells in a matter of the few hours. Thoughtless disposal of game or farm animal carcasses into sinkholes (a common practice) can contaminate the well water of the landowner and even his neighbors.

Sinkhole dumping is only one way of contaminating a karstic groundwater supply. Fertilizers, herbicides, and pesticides applied to fields overlying carbonate rock can enter the aquifer through diffuse infiltration and contaminate springs and wells. Improper siding of municipal landfills on or near karst allows leakage or runoff from these landfills to easily contaminate karst waters. Chemicals introduced in this fashion may include many of the most hazardous, including hydrocarbons, heavy metals, PCBs, and others. Additionally, leaky septic systems or sewage lines and effluent from feed lots or faulty sewage treatment facilities introduced coliform bacteria and other disease causing organisms into the karst system.

A good conservation practice would be to establish natural buffer zones around sinkholes in order to maintain the quantity and quality of recharge entering the aquifer. Conditions, such as fractures in the bedrock, size of drainage area, and proximity to sources of contamination, should be considered when establishing the level protection that is needed.

Likelihood of Occurrence of Landslides and Sinkholes

The Local Hazard Mitigation Planning Manual indicates that landslides are common throughout the mountainous Appalachian region of the eastern United States and New England and that these events primarily involve the sliding of clay-rich soils. This source also states that "the USGS identifies landslide incidence/susceptibility for the eastern United States by (1) classifying geographic areas by high, medium, or low landslide incidence and (2) evaluating geologic formations in these areas by high, medium, or low susceptibility to sliding. Susceptibility to landslides is defined by the USGS as the probable degree of response of geologic formations to natural or artificial cutting, loading of slopes, or to unusually high precipitation."

Bertie County is categorized as having a landslide vulnerability of "1" on a scale of "1" to "6" where "1" is the lowest level of risk. This categorization generally corresponds to the likelihood of earthquake activity and is based upon a combination of landslide susceptibility and incidence. This information is derived from the USGS National Landslide Overview Map. The potential of sinkholes in Bertie County has not been analyzed by the State. The likelihood of occurrence for landslides and sinkholes can be categorized as "unlikely".

Likely Range of Impact of Landslides and Sinkholes

Any landslide or sinkhole events that may occur within Bertie County will probably be in the form of very isolated and small-scale slumps of steep slope areas that are heavily saturated and/or under a load condition from a nearby structure such as a house or road. The range of impact from landslide and sinkhole events in Bertie County can be classified as "small".

Probable Level of Impact of Landslides and Sinkholes

Landslides in other portions of the country, even in other portions of North Carolina (i.e.—the Blue Ridge Mountains) have the potential of being large-scale, fast moving events that may pose a serious risk to life and property that may be in their path. However, the mostly gently sloping terrain in Bertie County can be coupled with no record of notable landslide events and a low risk of earthquake activity to yield an impact classification of "negligible" for a landslide event. Likewise, the sinkholes, if they were to occur, could be expected to have only "negligible" impact in Bertie County.

Bertie County Hazard Index for Landslides and Sinkholes

The Hazard Index for landslides and sinkholes in Bertie County can be categorized as "low" based on the "unlikely" probability of occurrence, the "small" area that would be impacted by a landslide event, and the probable "negligible" damages that could be expected from such events. The hazard index of "low" for landslides and sinkholes in Bertie County indicates that these natural hazards pose a low threat, and that hazard mitigation efforts would be more wisely directed to other hazards to which Bertie County is vulnerable.


of Photo: NOAA)

8. Severe Storms and Tornadoes

8.1. Thunderstorms (Hail and Lightning)

Severe thunderstorms can occur alone or in clusters, but affect relatively small areas compared to those affected by hurricanes or nor'easters. In eastern North Carolina, thunderstorms most frequently occur in the late afternoon or during the evening or night hours during the summer months. Summer thunderstorms involve lightning, strong winds, heavy rains and hail that can result in wildfires, localized wind damage and flash flooding. *(Source*

According to the North Carolina State Climate Office, thunderstorms typically are 15 miles or less in diameter and last an average of 20 to 30 minutes. Downbursts and straight-line winds associated with thunderstorms can produce winds of 100-150 miles per hour – enough to flip large trucks and endanger airplane landings and takeoffs. The potential impact of thunderstorms, however, can be rated low due to the localized nature of the storms.

The National Weather Service considers a thunderstorm severe if it produces hail at least three-quarters of an inch in diameter, has winds of 58 miles per hour or greater or produces a tornado. Of the estimated 100,000 thunderstorms in the United States each year, only about 10% are classified as severe.

Lightning, a major threat during a thunderstorm, is responsible for more deaths each year in the United States than are tornadoes. Since lightning strikes are very unpredictable, the risk to individuals and property can be significant.

History of Thunderstorms in Bertie County

A number of thunderstorm/high wind storm events and thunderstorm related events (hail and lightning) have been reported in Bertie County (Tables A-16 – A-18). Thunderstorms and high wind events recorded prior to 1959 do not contain information on magnitude or damages.

Table A-16: Thunderstorm and High Wind Data 1959 – 2002

Location	Date	Time	Magnitude (in knots)	Damages in NC	
				Injuries	Property
Bertie	6/22/1959	3:00 PM	N/A	0	0
Bertie	5/2/1962	4:00 PM	N/A	0	0
Bertie	1/24/1965	7:00 PM	N/A	0	0
Bertie	6/21/1970	12:15 PM	N/A	0	0
Bertie	3/19/1971	5:20 PM	N/A	0	0
Bertie	7/16/1971	2:00 PM	N/A	0	0
Bertie	3/24/1975	2:50 PM	N/A	0	0
Bertie	5/23/1975	4:45 PM	N/A	0	0
Bertie	8/9/1983	4:25 PM	N/A	0	0
Bertie	5/29/1984	4:15 PM	N/A	0	0
Bertie	7/12/1985	1:31 PM	N/A	0	0
Bertie	7/12/1985	1:35 PM	N/A	0	0
Bertie	11/4/1985	8:46 AM	N/A	0	0
Bertie	6/28/1986	2:22 PM	N/A	0	0
Bertie	6/3/1987	4:50 PM	N/A	0	0
Bertie	11/5/1988	10:45 AM	N/A	0	0
Bertie	2/21/1989	12:30 AM	N/A	0	0
Bertie	7/16/1989	4:05 PM	N/A	0	0
Bertie	8/7/1989	4:02 PM	N/A	0	0
Bertie	5/13/1990	3:35 PM	N/A	0	0
Bertie	7/6/1990	9:20 PM	N/A	0	0
Bertie	8/29/1990	4:25 PM	N/A	0	0
Bertie	9/7/1990	10:55 PM	N/A	0	0
Bertie	6/24/1992	5:00 PM	N/A	0	0
Powellsville	7/17/1994	6:55 PM	N/A	0	0
Askewville	5/11/1995	5:55 PM	N/A	0	0
Midway	6/12/1995	11:50 AM	N/A	0	0
Windsor	10/28/1995	1:50 AM	N/A	0	0
Kelford	11/11/1995	8:50 PM	N/A	2	125 K
Windsor	5/11/1996	5:45 PM	N/A	0	3 K
Merry Hill	5/11/1996	6:05 PM	N/A	0	2 K
Kelford	3/5/1997	9:10 PM	N/A	0	2 K
Aulander	5/3/1997	9:52 AM	N/A	0	2 K
Colerain	5/3/1997	10:30 AM	N/A	0	2 K
Lewiston	7/5/1997	12:00 AM	N/A	0	1 K
Eastern NC	7/24/1997	10:30 AM	50	0	33 K
Windsor	1/8/1998	10:15 AM	N/A	0	2 K
Windsor	6/13/1998	4:30 PM	N/A	0	3 K
Merry Hill	6/13/1998	5:45 PM	N/A	0	2 K
Colerain	8/16/2000	8:40 PM	50	0	5 K
Merry Hill	8/18/2000	5:50 PM	N/A	0	3 K
Windsor	5/13/2002	8:35 PM	0	0	2 K
Lewiston	7/10/2002	6:50 PM	0	0	2 K
Windsor	11/11/2002	12:30 PM	0	0	2 K
Colerain	5/9/2003	5:10 PM	50	0	15 K
Aulander	6/7/2003	5:36 PM	50	0	2 K
Total				**2**	**$208 K**

Source: National Climatic Data Center, http://lwf.ncdc.noaa.gov/oa/ncdc.html .

Table A-17: Hail Storm Data for Bertie County 1959 – 2002

Location	Date	Time	Magnitude (in inches)
Bertie	5/2/1962	4:00 PM	1.75
Bertie	8/91983	4:20 PM	1.75
Bertie	6/4/1985	5:15 PM	1.75
Bertie	7/12/1985	1:04 PM	1.75
Bertie	4/4/1988	11:36 PM	1.75
Bertie	5/20/1988	4:09 PM	1.75
Bertie	6/17/1988	2:53 PM	1.75
Windsor	5/19/1993	1:20 PM	0.75
Woodville	7/5/1997	8:15 PM	0.75
Windsor	7/28/1997	4:00 PM	0.75
Kelford	6/3/1998	7:53 PM	1.75
Windsor[1]	6/13/1998	4:30 PM	1.75
Kelford	6/15/1998	4:12 PM	2.00
Windsor	6/15/1998	4:56 PM	1.25
Trap	8/11/1999	5:15 PM	1.75
Merry Hill	4/21/2000	6:45 PM	0.88
Powellsville[2]	6/15/2000	5:30 PM	1.00
Colerain	8/16/2000	8:40 PM	1.25
Windsor	4/03/2002	7:21 PM	0.88
Colerain	5/09/2003	4:45 PM	4.25
Colerain	5/09/2003	5:10 PM	1.75

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
[1] Hail broke windows and caused significant crop damage near intersection of Highway 17 and State Rd 1001
[2] Hail caused damage to tobacco fields.

Table A-18: Lightning Data for Bertie County 1993 – 2001

Location	Date	Time	Deaths	Injuries	Damages in NC Property
Powellsville[1]	7/30/95	3:00 PM	0	0	17 K
Aulander[2]	9/24/01	5:00 PM	0	0	50 K
Total			**0**	**0**	**$67 K**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html .
[1] Lightning ignited a fire which did heavy damage to a garage.
[2] House totally burned after being struck by lightning

Likelihood of Occurrence of Thunderstorms

There is an extensive history of thunderstorms, hail and lightning storms in Bertie County. Thus, the likelihood of occurrence can be rated as "likely".

Likely Range of Impact for Thunderstorms

Thunderstorms typically have a more localized effect but over a fairly large area of land, thus the range of impact can be classified as "medium".

Probable Level of Impact for Thunderstorms

Although occurring frequently, severe thunderstorms typically have only a minor impact on the areas affected. The probable level of impact of severe thunderstorms, hail and lightning in Bertie County can be categorized as "negligible".

Bertie County Hazard Index for Thunderstorms

The hazard index for severe thunderstorms in Bertie County is categorized as "moderate" based on a "likely" occurrence, "medium" range of impact, but "negligible" level of impact. This hazard index of "moderate" indicates that although thunderstorms definitely pose a regular threat in Bertie County, the impacts are not at the level that requires a concentration of local hazard mitigation efforts.

8.2 Tornadoes (see map pocket)
Many times severe storms, such as thunderstorms and hurricanes, can produce concentrated windstorms called tornadoes. Tornadoes are violently rotating columns of air created where warm, moist air intersects with cold, dry air. Tornadoes have a much more localized impact than a hurricane or nor'easter and have been known to destroy one building while leaving a nearby building virtually unharmed. Tornadoes can produce a path of destruction from 0.01 mile wide to greater than 1 mile wide but generally tornadoes are less than 0.6 mile in width. In terms of length, paths of destruction vary from a few hundred feet to several miles in length. The duration of a tornado is typically less than 30 minutes. The destruction caused by tornadoes may range from light to severe depending on the intensity of the storm and the travel path. Typically, tornadoes cause the greatest damages to structures of light construction, such as residential homes. The Fujita-Pearson Scale for tornado strength is shown in Table A-19. (Photo: NOAA)

Table A-19: Fujita-Pearson Tornado Scale

F-Scale	Damage	Winds (mph)	Path Length (miles)	Mean Width (miles)
F0	Light	40-72	<1.0	<0.01
F1	Moderate	73-112	1.0-3.1	0.01-0.03
F2	Considerable	113-157	3.2-9.9	0.04-0.09
F3	Severe	158-206	10-31	0.1-0.3
F4	Devastating	207-260	32-99	0.32-0.99
F5	Incredible	261-318	100+	1.0+

Source: Local Hazard Mitigation Planning Manual, North Carolina Division of Emergency Management, 1998.

High Wind Damage
It is impossible to predict where damage from high winds and tornadoes will occur. Manufactured homes, however, are more vulnerable to the damaging effects of high winds than are site-built structures. The age of manufactured homes located within the Bertie County's planning jurisdiction is not known. However, manufactured homes built before 1993 when more stringent Department of Housing and Urban Development (HUD) wind resistance standards became effective are especially susceptible to wind damage (Table A-20).

Table A-20: HUD Wind Resistance Standards for Manufactured Homes

Year	Wind Resistance[1]	Weight	Anchor Requirements[2]
Pre-1993	75 mph	16,000	5-6 anchors/side
Post 1993	80 mph	40,000	11-14 anchors/side

Source: Manufactured Housing Institute, www.mfghome.org
[1] Wind resistance standards for coastal placement are more rigorous.
[2] An anchor is a weighted disc buried in the ground and attached to the manufactured unit with steel cable.

Tornadoes are most likely to occur during the spring and early summer months of March through June. Tornadoes during these months tend to be the strongest, resulting in the greatest amount of physical harm and property damage. Tornadoes can occur at any time of day but are mostly likely to form between the hours of 3 p.m. and 9 p.m.

History of Tornadoes in Bertie County

North Carolina ranks 22nd out of the 50 states for frequency of tornadoes, 18th for number of tornado related deaths, 17th for injuries, and 21st for cost of damages. Although tornadoes in North Carolina are typically less severe than in other parts of the country, the North Carolina Division of Emergency Management has rated Bertie County as a "moderate" risk for tornadoes.

Historic records indicate that eighteen tornados hit Bertie County between 1952 and 2001 (Table A-21). Of these, the 1984 tornado (with two touchdowns rated F3 and F2) was the most severe with 6 deaths, 21 injuries and $27.5 million in damages.

Table A-21: Tornado Data for Bertie County – 1952-2001

Location	Date	Time	Magnitude	Damages in North Carolina		
				Deaths	Injuries	Property Damages
Bertie	5/10/1952	11:00AM	F2	0	6	0
Bertie	11/08/1957	6:30 PM	F3	0	1	250 K
Bertie	3/15/1964	8:51 AM	F1	0	0	250 K
Bertie	10/02/1969	4:00 PM	F1	0	0	250 K
Bertie	5/29/1973	2:00 AM	F0	0	0	25 K
Bertie	6/03/1978	1:30 PM	F2	0	0	250 K
Bertie	4/03/1979	2:30 PM	F1	0	0	25 K
Bertie	8/09/1983	4:20 PM	F1	0	0	250 K
Bertie	3/28/1984	7:55 PM	F3	6	19	2.5 M
Bertie	3/28/1984	8:10 PM	F2	0	2	25 M
Bertie	8/20/1986	12:45 AM	F0	0	0	0
Bertie	3/29/1991	5:10 PM	F1	0	1	25 K
Bertie	11/23/1992	5:05 AM	F3	0	0	250 K
Bertie	11/23/1992	5:43 AM	F3	0	0	0
Windsor[1]	9/01/1993	6:00PM	F1	0	0	50 K
Askewville[2]	5/11/1995	5:57 PM	F1	0	0	125 K
Windsor[3]	9/15/1999	6:40 PM	F0	0	0	2 K
Aulander[4]	9/24/2001	5:00PM	F0	0	0	20 K
Totals				**6**	**29**	**$ 29.27 M**

Source: National Climatic Data Center,

[1] A narrow path of twisted trees and downed power lines, minor structural damage to a house roof just south of Buena Vista on US Route 13 to just south of Askewville

[2] Brief tornado touchdown caused damage (some major) to several sheds/buildings. Numerous trees down, a couple of which were on automobiles. Tornado path was east-west and about three-eights miles long from approximately one-quarter mile northeast to one-half mile east-northwest of Askewville. Path was approximately 100 yards wide.

[3] Small, brief tornado blew a large tree down onto a road. A citizen witnessed the tornado.

[4] Minor damage to 2 homes and 8-10 trees down. Tops of trees ripped off along Route 11.

Likelihood of Occurrence of Tornadoes
Since 1952, tornadoes have impacted Bertie County almost once every three years on average. This translates to a "likely" level of occurrence.

Likely Range of Impact for Tornadoes
Tornadoes in Bertie County typically have a very localized effect over a "medium" area.

Probable Level of Impact for Tornadoes
Although tornadoes occur on a fairly regular basis in Bertie County, there has been only three level F3 tornado in the last fifty years. 38 percent of tornadoes have been at the F0 level, 25% F1, 19% F2, and 19% F3. The probable level of impact of tornadoes in Bertie County can be categorized as "negligible" due to the relatively small extent of the areas affected. Nevertheless, tornadoes have been the cause of a number of deaths, injuries and cost, an estimated 30 million dollars a year, over the course of the past 50 years.

Bertie County Hazard Index for Tornadoes
The hazard index for tornadoes in Bertie County is categorized as "low" based on a "likely" occurrence, "small" range of impact, and "negligible" level of impact. This hazard index of "low" indicates that although tornadoes pose a threat, tornado impacts can be expected to be minor on the population and property as a whole. Thus, local hazard mitigation efforts should not concentrate on this natural hazard.

9. Tsunamis *(Information Source: University of Washington Geophysics Program)*
Tsunami (pronounced tsoo-nah-mee) is a wave train, or series of waves, generated in a body of water by a disturbance that vertically displaces the water column. Earthquakes, landslides, volcanic eruptions, explosions, and even the impact of cosmic bodies, such as meteorites, can generate tsunamis. Tsunamis can savagely attack coastlines, causing devastating property damage and loss of life. *(Source of Photo: NOAA)*

Tsunamis are unlike hurricane or wind generated waves in that they are characterized as shallow-water waves, with long periods and wave lengths. A wind-generated swell that rhythmically rolls in, one wave after another, might have a period of about 10 seconds and a wave length of 150 meters. A tsunami, on the other hand, can have a wavelength in excess of 100 kilometers and last on the order of one hour.

The character of a tsunami transforms as it leaves the deep water of the open ocean and travels into the shallower water near the coast. A tsunami travels at a speed that is related to the water depth - hence, as the water depth decreases, the tsunami slows. But the energy flux of a tsunami, which is dependent on both wave speed and wave height, remains nearly constant. Consequently, as the speed of the tsunami diminishes as it travels into shallower water, the height of the tsunami grows. A tsunami may be imperceptible at sea but grow to be several meters or more in height near the coast. When the tsunami finally reaches the coast it may appear as a rapidly rising or falling tide or a series of breaking waves.

Just like other water waves, tsunamis begin to lose energy as they rush onshore - part of the wave energy is reflected offshore, while the shoreward-propagating wave energy is dissipated through bottom friction and turbulence. Despite these losses, tsunamis still reach the coast with tremendous amounts of energy that strips beaches of sand and undermines trees and other coastal vegetation. Capable of inundating or flooding hundreds of meters inland past the typical high-water level, a tsunami can crush homes and other coastal structures. Tsunamis may reach a maximum vertical “runup” height onshore above sea level of 10, 20, and even 30 meters.

History of Tsunamis in Bertie County
Since there is no recorded history of tsunamis impacting North Carolina, this natural hazard was not analyzed for potential impact on Bertie County.

10. Volcanoes *(Source: USGS Volcano Hazards Program, Photo: Mount St. Helens, USGS)*

Volcanic eruptions are one of the most dramatic and violent agents of environmental change. Not only can powerful explosive eruptions drastically alter land and water for tens of kilometers around a volcano, but tiny liquid droplets of sulfuric acid erupted into the stratosphere can temporarily change the climate of the planet. Eruptions often force people living near volcanoes to abandon land and homes, sometimes forever. Those living farther away are likely to avoid complete destruction, but cities and towns, crops, industrial plants, transportation systems, and electrical grids can still be damaged by tephra, lahars, and flooding caused by volcanic eruptions.

Worldwide volcanic activity since 1700 A.D. has killed more than 260,000 people, destroyed entire cities and forests, and severely disrupted local economies for months or years. Even with the improved ability to identify hazardous areas and warn of impending eruptions, increasing numbers of people face certain danger. Scientists have estimated that the total population at risk from volcanoes in 2000 is at least 500 million, which is comparable to the entire population of the world at the beginning of the seventeenth century.

Volcano Hazard Areas Around the Globe

Active volcanoes are not randomly distributed over the earth surface. Instead, they tend to be located in linear volcanic mountain chains thousands of kilometers long on the edges of continents, in the middle of oceans, or as island chains. The locations of these volcanic chains are closely related to the way in which the earth crust is divided into more than a dozen enormous sections or "plates" and how the plates move relative to one another.

According to the theory of plate tectonics, rigid plates averaging 80 kilometers in thickness, move in slow motion on top of the hot, pliable interior of the earth. Most active volcanoes are located along the boundaries where these massive plates spread apart or collide. But some of the most active volcanoes, like Kilauea Volcano on the Island of Hawaii, are found in the middle of these massive plates above hot spots in the interior of the earth. More than fifty volcanoes in the United States have erupted one or more times in the past few hundred years.

The United States Geological Survey (USGS) is charged with the responsibility to issue warnings of hazardous volcanic activity in the United States. The USGS has identified volcano-hazard zones around active and potentially active volcanoes. Volcano-hazard assessments are based on the assumption that the same general area around a volcano is likely to be affected by future volcanic activity of the same type and at about the same average frequency as in the past. Through detailed geologic mapping of the type and size of past eruptions, the USGS has estimated the area most likely to be affected by similar events in the future.

Volcanoes generate a wide range of activity that can affect the surrounding land, river valleys, and communities in different ways. Depending on the type, size, and duration of the eruptive activity, hazardous areas might exist within a few kilometers of a volcano or extend to areas hundreds of kilometers from an active vent. By studying the natural history of a volcano, it is possible to identify those hazard areas most likely to be affected in the future by volcano hazards.

Historic Volcanic Eruptions in the United States

Records of volcanic eruptions within the United States are centered in the states of Alaska, Washington, Oregon, California, and Hawaii. Since there are no recorded instances of volcanic eruptions in North Carolina, this natural hazard was not analyzed for potential impact. (Additional information about volcanic eruptions can be found at http://volcanoes.usgs.gov/Volcanoes/Historical.html.)

History of Volcanic Eruptions in Bertie County

There is no recorded information about the occurrence of volcanic eruptions in Bertie County, thus, volcanoes are not included in the hazard index for Bertie County.

Bertie County Hazard Index for Volcanic Eruptions

There are no known instances of volcanic eruptions in Bertie County, thus volcanoes are not included in the natural hazard index analysis.

11. Wildfires

Wildfires occur in North Carolina during the dry spring and summer months. The potential for wildfires depends upon recent climate conditions, surface fuel characteristics, and fire behavior. Wildfires can destroy precious natural resources and forestry essential to the survival of wildlife. There are four types of wildfires as described in Table A-22.

(Trees damaged by Hurricane Fran at Lake Benson Park Trail, 1996, Source of Photo: Town of Benson)

Table A-22: Types of Wildfires

Type	Description	Control
Ground	Burns in natural litter, duff (decayed organic matter), roots, or high organic soils.	Once started, difficult to control. Fire may rekindle.
Surface	Burns in grasses, low shrubs, and lower branches of trees.	May move rapidly. Ease of control depends upon fuel involved.
Crown	Burns in tops of trees.	Difficult to control; wind plays important role.
Spotting	Produced by crown fires; wind/topography conditions. Large burning embers thrown ahead of main fire.	Makes fire very difficult to control.

Source: National Weather Service, www.seawfo.noaa.gov/fire/olm/firetype.htm

In recent years, increased residential development has been occurring along the urban/rural interface where homes built in or near forests become susceptible to wildfire damage. These buildings are at great risk since wildfires often begin unnoticed and spread rapidly igniting brush, trees and buildings.

State forestry personnel have estimated that Hurricanes Fran and Floyd together multiplied the amount of forest fire fuel (pine needles, cones, twigs and damaged trees on the ground) by more than three times – increasing potential wildfire fuel from five tons to sixteen tons per acre in central and eastern North Carolina. In areas where downed or damaged trees were not removed, excess wildfire fuel has greatly increased the likelihood of uncontrollable wildfires due to increased fire intensity and blocked fire roads.

History of Wildfires in Bertie County

As new structures are built near vulnerable woodlands become the structures themselves become more vulnerable to wildfires. Because wind fuels wildfires, structures in close proximity to potential wildfire fuels are at risk of damage as wind direction and velocity change. According to data provided by the State Forest Service, the frequency of wildfires in Bertie County is relatively moderate (Table A-23).

Table A-23: Bertie County Wildfires 1970-2003

Year	# of Fires	Acres Burned		Year	# of Fires	Acres Burned
1970	35	897		1987	31	112
1971	21	160		1988	28	104
1972	14	38		1989	27	82
1973	58	534		1990	36	244
1974	53	502		1991	50	131
1975	28	96		1992	33	82
1976	75	227		1993	19	99
1977	66	441		1994	48	163
1978	46	152		1995	28	109
1979	26	96		1996	22	37
1980	86	486		1997	28	269
1981	94	375		1998	16	38
1982	50	103		1999	32	85
1983	34	117		2000	35	62
1984	49	64		2001	55	188
1985	92	283		2002	30	232
1986	55	201		2003*	7	8
Total Acres Burned						**6,817**

Source: Bertie County Forest Ranger

* 2003 record low occurrence of wildfires contributed to the excessive amount of rainfall received.

Likelihood of Occurrence of Wildfires in Bertie County

There are 1,407 recorded wildfire events for Bertie County, thus they are considered "likely."

Likely Range of Impact for Wildfires in Bertie County

When wildfires do occur they typically impact a relatively small area of land. The range of impact can be classified as "small".

Probable Level of Impact for Wildfires in Bertie County

Wildfires have historically had a very limited impact on the community so the level of impact can be classified as "limited".

Bertie County Hazard Index for Wildfires

The hazard index for wildfires in Bertie County is categorized as "moderate" based on a "likely" occurrence, "small" range of impact, and "limited" level of impact. This hazard index of "moderate" indicates that the threat of wildfires is real, but these types of hazards are most commonly addressed with activities at the State level.

12. Winter Storms and Freezes

12.1 Nor'easters

Nor'easters are similar to hurricanes in respect to their effects. However, nor'easters, unlike hurricanes, are extra-tropical storms that derive their strength from horizontal gradients in temperature - they form as a result of a drop in temperature. Nor'easters affect the coast in a similar fashion to hurricanes as they produce high winds and heavy surf. *(Source of Photo: US Army Corp of Engineers)*

Nor'easters are usually more diffuse and less intense than hurricanes resulting in less significant damage. Nor'easters occur more frequently, cover larger land areas and those storms occurring during winter months may also produce ice hazards and effects similar to those of a severe winter storm.

The frequency of major nor'easters (Class 4 or 5) has increased in recent years. From 1987 to 1993, at least one class 4 or 5 storm occurred each year along the Atlantic seaboard of the United States. This high frequency is a situation duplicated only once in the last 50 years (State Climate Office of North Carolina, North Carolina State University.) Nor'easters are rated by the Dolan-Davis Intensity Scale shown in Table A-24.

Table A-24: Dolan-Davis Nor'easter Intensity Scale (1993)

Storm Class	Beach Erosion	Dune Erosion	Overwash	Property Damage
1 (Weak)	Minor changes	None	No	No
2 (Moderate)	Modest; mostly to lower beach	Minor	No	Modest
3 (Significant)	Erosion extends across beach	Can be significant	No	Loss of many structures at local level
4 (Severe)	Severe beach erosion and recession	Severe dune erosion or destruction	On low beaches	Loss of structures at community-scale
5 (Extreme)	Extreme beach erosion	Dunes destroyed over extensive areas	Massive in sheets and channels	Extensive losses on a regional-scale

Source: Local Hazard Mitigation Planning Manual, NC Division of Emergency Management, 1998.

Historic Impact of Nor'easters in Bertie

The NCDC has not recorded any incidences of nor'easter storm events affecting Bertie County. The North Carolina Division of Emergency Management has rated Bertie County as a "low" risk for nor'easters (Local Hazard Mitigation Planning Manual, p. 86).

12.2 Severe Winter Storms

Severe winter weather is typically associated with much colder climates; however, in some instances winter storms do occur in the warmer climate of North Carolina. On occasion, Bertie County has had moderate winter weather as a result of a nor'easter originating in the Gulf Stream and producing frozen precipitation.

Winter storms can paralyze a community by shutting down normal day-to-day operations. Winter storms produce an accumulation of snow and ice on trees and utility lines resulting in loss of electricity and blocked transportation routes. Frequently, especially in rural areas, loss of electric power means loss of heat for residential customers, which poses an immediate threat to human life. One occurrence of an extreme cold event happened on February 6, 1996 when temperatures reached -5 below zero.

Because of the rare occurrence of these events, central and eastern North Carolina communities are often not prepared because they can not afford to purchase expensive road and debris clearing equipment for these relatively rare events.

History of Severe Winter Storms in Bertie County

The North Carolina Division of Emergency Management has rated Bertie County as a "moderate" risk for severe winter storms (Local Hazard Mitigation Planning Manual, p. 86).

Table A-25: Snow and Ice Storm Data for Bertie County 1994 - 2003

Location	Date	Time	Type	Property Damage
Northern & Central NC	1/3/1994	6:00 PM	Heavy Snow	0
Northern Interior NC	2/10/1994	8:00 PM	Ice Storm	0
Eastern NC	1/6/1996	1:00 PM	Winter Storm	0
Eastern NC	2/2/1996	2:00 AM	Winter Storm	0
Eastern NC	2/3/1996	5:00 PM	Winter Storm	0
Eastern NC	2/16/1996	3:00 AM	Winter Storm	0
Eastern NC	12/23/1998	2:00 PM	Ice Storm	500 K
Eastern NC	1/24/2000	11:00 PM	Winter Storm	0
Eastern NC	12/3/2000	10:00 AM	Winter Storm	25 K
Eastern NC	1/02/2002	9:00 PM	Winter Storm	0
Eastern NC	1/16/2003	9:00 PM	Winter Storm	0
Eastern NC	1/23/2003	1:00 AM	Winter Storm	0
Total				**525 K**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
Note: No deaths, injuries, or damages reported. In addition to these events, the NCDC also reported an extreme cold event for Bertie County on 2/5/96.

Likelihood of Occurrence of Severe Winter Storms in Bertie County

Bertie County is located in the coastal plain of North Carolina as the likelihood of occurrence of severe winter storms can be ranted as "possible".

Likely Range of Impact for Severe Winter Storms in Bertie County

When severe winter storms do occur they typically impact a relatively large area or region of the State, thus the range of impact can be classified as "large".

Probable Level of Impact for Severe Winter Storms in Bertie County

Severe winter storms can have a tremendous impact on communities within the State, but they do not typically result in more than "limited" impact.

Bertie County Hazard Index for Severe Winter Storms

The hazard index for severe winter storms in Bertie County is categorized as "moderate" based on a "possible" occurrence, but "large" range of impact, and "limited" level of impact. This hazard index of "moderate" indicates that the severe winter storms are a serious threat that should be addressed with local hazard mitigation initiatives where possible. Because of the regional impact of severe winter storms, however, many initiatives are more appropriately addressed and coordinated at the State level.

D. NC Emergency Management Hazard Analysis for Bertie County

The North Carolina Local Hazard Mitigation Planning Manual, published by the NC Division of Emergency Management, was used as another reference source for assessing natural hazards. Table A-28 shows the State's summary assessment for Bertie County for the nine natural hazards identified in the Local Hazard Mitigation Planning Manual.

Table A-26: Natural Hazard Summary Assessment for Bertie County[a]

Natural Hazard[a]	Vulnerability of Bertie County[b]	
	State Assessment	Local Assessment
Hurricane	High	High
Flood	High	High
Tornado	High	High
Nor'easter	Moderate	Low
Thunderstorm[c]	Moderate	High
Severe Winter Storm	Low	Moderate
Wildfire	Low	Moderate - Low
Earthquake	Low	Low
Landslide	Low	Low

Source: Local Hazard Mitigation Planning Manual, NCDEM, 1998, p. 84-5.

[a] The "Local Hazard Mitigation Planning Manual" does not rate the following hazards for Bertie County - coastal erosion, levee failures, coastal storms, tsunamis, and volcanoes.

[b] The North Carolina Division of Emergency Management Methodology: Each of the one hundred counties in North Carolina was categorized into one of three levels of natural hazard likelihood – "Low", "Moderate", or "High" for eight natural hazards. Some assignments were made, in part, using the Climate Division (formulated by the National Climatic Data Center - Guttman and Quayle, 1995) to which each county was assigned. The Climate Division number for Bertie County is 8. For additional information on how ratings were developed, see Local Hazard Mitigation Planning Manual, North Carolina Division of Emergency Management, November 1998.

[c] Thunderstorms were not rated in the Local Hazard Mitigation Planning Manual. For the purposes of this report, thunderstorms were rated moderate.

The manual also estimated the potential impact of various natural hazards for Bertie County as shown in Table A-27. This information from the Local Hazard Mitigation Planning Manual was considered as part of the analysis process.

Table A-27: Natural Hazards–Potential Impact Data for Bertie County

Natural Hazard	Range	Bertie County
Earthquake Vulnerability	Low =1 to High = 6	1
Landslide Vulnerability	Low =1 to High = 6	1
Frequency of All Hurricanes, 1900-96	Saffir-Simpson Class 1-5	1
Frequency of Minor Hurricanes, 1900-96	Saffir-Simpson Class 1-2	1
Frequency of Major Hurricanes, 1900-96	Saffir-Simpson Class 3-5	0
Nor'easter Vulnerability	1 = some direct vulnerability	0
Frequency of Tornadoes, 1953-1995	Number of tornadoes	16
Extreme 1-day snowfall	In inches	N/A
Cold Air Damming Vulnerability	1 = some vulnerability	0
Wildfires, 1950-1993	Low = 1, Mod. =2, High = 3	1
Number of Acres Burned	Low = 1, Mod. =2, High = 3	1

Source: Local Hazard Mitigation Planning Manual, NCDEM, 1998, pp. 88-91.

E. Bertie County Composite Hazard Index

Certain parts of the County, such as floodplains and steep slopes, are more prone to hazards. In addition, certain types of hazards are likely to produce only localized effects while others have wide spread effects. Some natural hazards have extraordinary impacts but occur infrequently. Other hazards occur annually or several times a decade, but cause little damage.

The total potential impact of each type of hazard can be projected using a combination of likely strength of the event, the size of the area(s) affected, and the density of human activity within the likely path of the hazard. Table A-28 gives each natural hazard a "hazard index" rating based on the combination of three factors – likelihood of occurrence, size of potential area affected, and the potential impact of the event. An explanation of the terms for likelihood of occurrence and level of potential impact can be found in Tables A-1 through A-3.

Table A- 28: Composite Hazard Index for Bertie County

Hazard Type	Likelihood of Occurrence	Potential Area Affected	Potential Impacts	Hazard Index (combined ranking)
Coastal Erosion	(2) Possible	(2) Medium	(2) Limited	**(6) Moderate**
Dam Failures	(2) Possible	(3) Large	(3) Critical	**(8) Moderate**
Droughts/Heat Waves	(3) Likely	(3) Large	(2) Limited	**(8) Moderate**
Floods	(3) Likely	(1) Small	(2) Limited	**(6) Moderate**
Hurricanes/Coastal Storms	(3) Likely	(3) Large	(2) Limited	**(8) Moderate**
Severe Storms/Tornadoes	(3) Likely	(2) Medium	(1) Negligible	**(6) Moderate**
Wildfires	(3) Likely	(1) Small	(2) Limited	**(6) Moderate**
Winter Storms and Freezes	(2) Possible	(3) Large	(2) Limited	**(7) Moderate**

Eight hazards received a "moderate" or "high" rating as these hazards pose the greatest potential risk to persons and property. These eight hazards pose the same risks for Bertie County and for the towns located in the County with the exception that towns located in the western portion of the County are not subject to coastal erosion but are subject to major dam failure.

Three of these hazards – droughts/heat waves, hurricanes/coastal storms, and winter storms/freezes – typically have a regional impact. Droughts and heat waves generally most strongly impact the agricultural economy although in extreme cases this type of hazard can also cause injuries and deaths. Based on hazard event history, it is estimated that the Bertie County area has a maximum 100% exposure to hurricanes/coastal storms and winter storms/freezes. A 100% exposure means that all structures both public and private within the County could potentially be impacted by these two hazard events. (See Appendix B Vulnerability Assessment for more detailed information.)

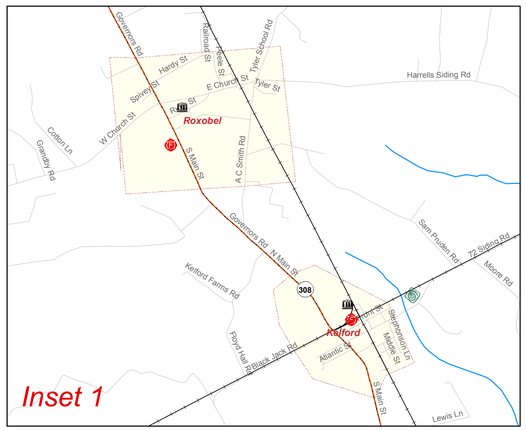
The other five hazards – coastal erosion, dam failures, floods, severe storms/tornadoes, and wildfires – typically have a more limited area of impact. Exposure to coastal erosion and floods is estimated to be no greater than 5%, i.e., 5% or less of all structures within the County could potentially be impacted by coastal erosion or flooding. For severe storms/tornadoes and for wildfires, it is estimated that the Bertie County area has a maximum 10% exposure, i.e., 10% or less of all structures within the County could potentially be impacted by a single hazard event. A major dam failure of either the Roanoke Rapids Reservoir Dam or the Gaston Lake Dam could impact 25% of the County. (See Appendix B Vulnerability Assessment for more detailed information.)

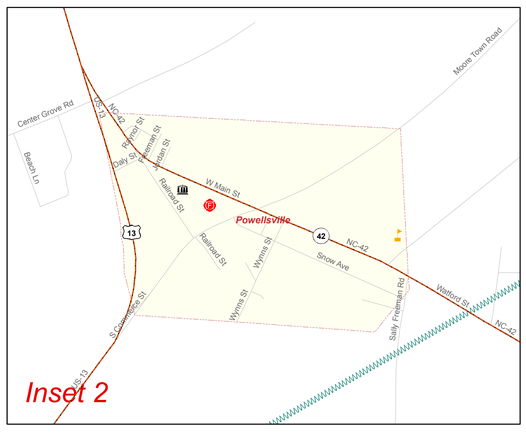
BERTIE COUNTY, NC

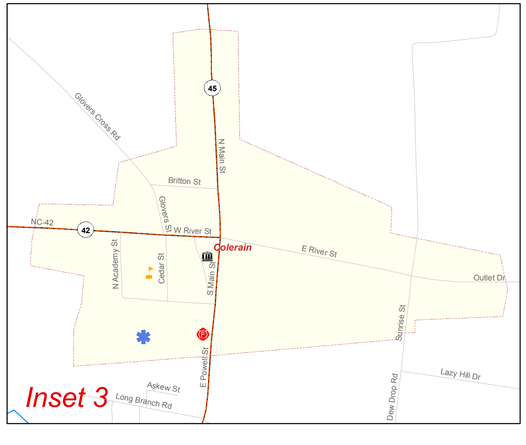
CRITICAL FACILITIES & MULTI-HAZARDS

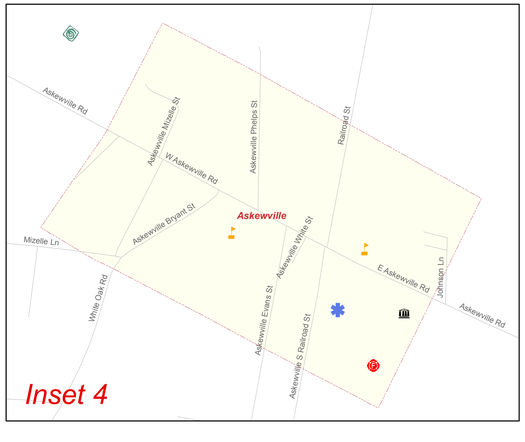
Multi-Jurisdictional Hazard Mitigation Plan

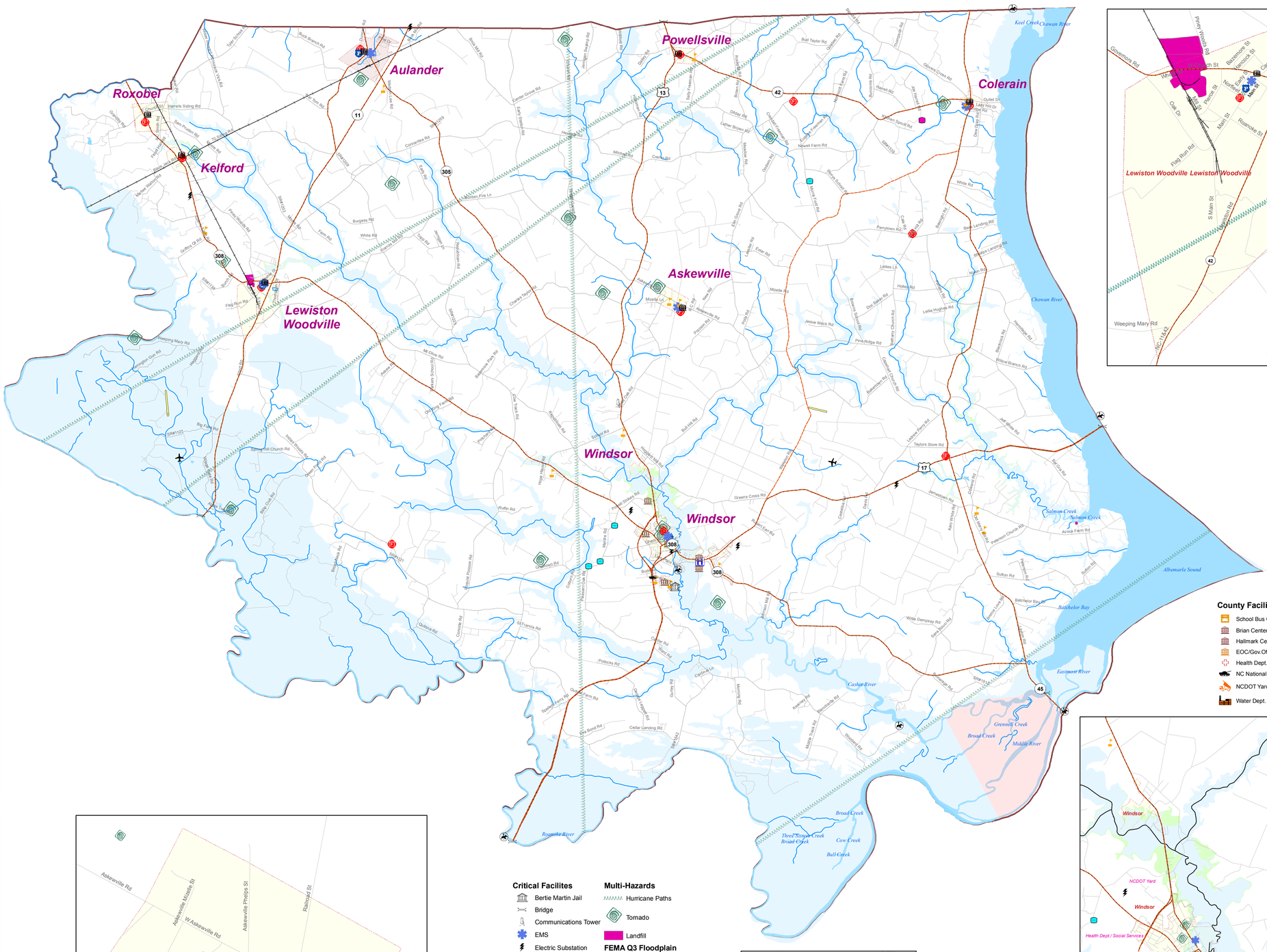
Including: Askewville, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel & Windsor

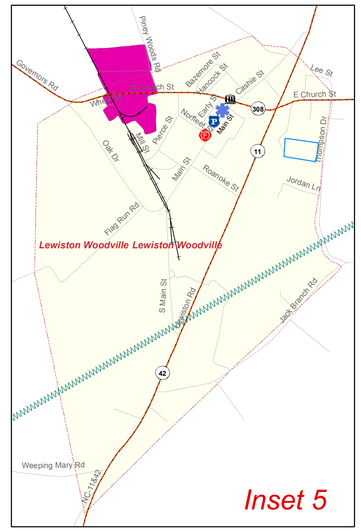












Critical Facilites

- Bertie Martin Jail
- Bridge
- Communications Tower
- EMS
- Electric Substation
- Fire Dept
- Hospital
- Police Dept
- School
- Town Hall
- WTP
- WWTP
- Wildlife Landing
- Government Buildings
- National Guard Armory

Multi-Hazards

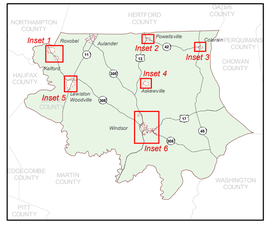
- Hurricane Paths
- Tornado
- Landfill

FEMA Q3 Floodplain

- Floodway
- 100 Year Floodplain
- 500 Year Floodplain

Features & Boundaries

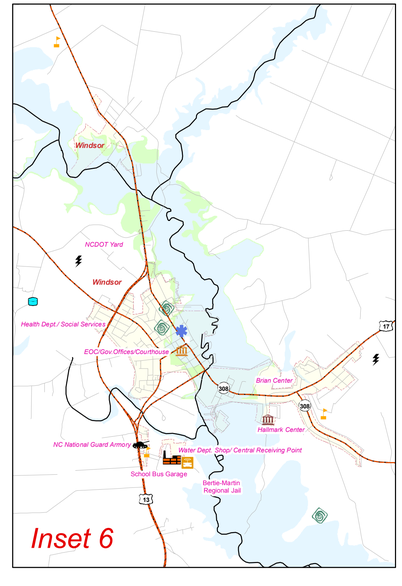
- Rivers & Streams
- Railroads
- Evacuation Routes
- Airports
- Major Water Bodies
- Towns Included in Plan
- Towns Excluded from Plan
- County Boundary

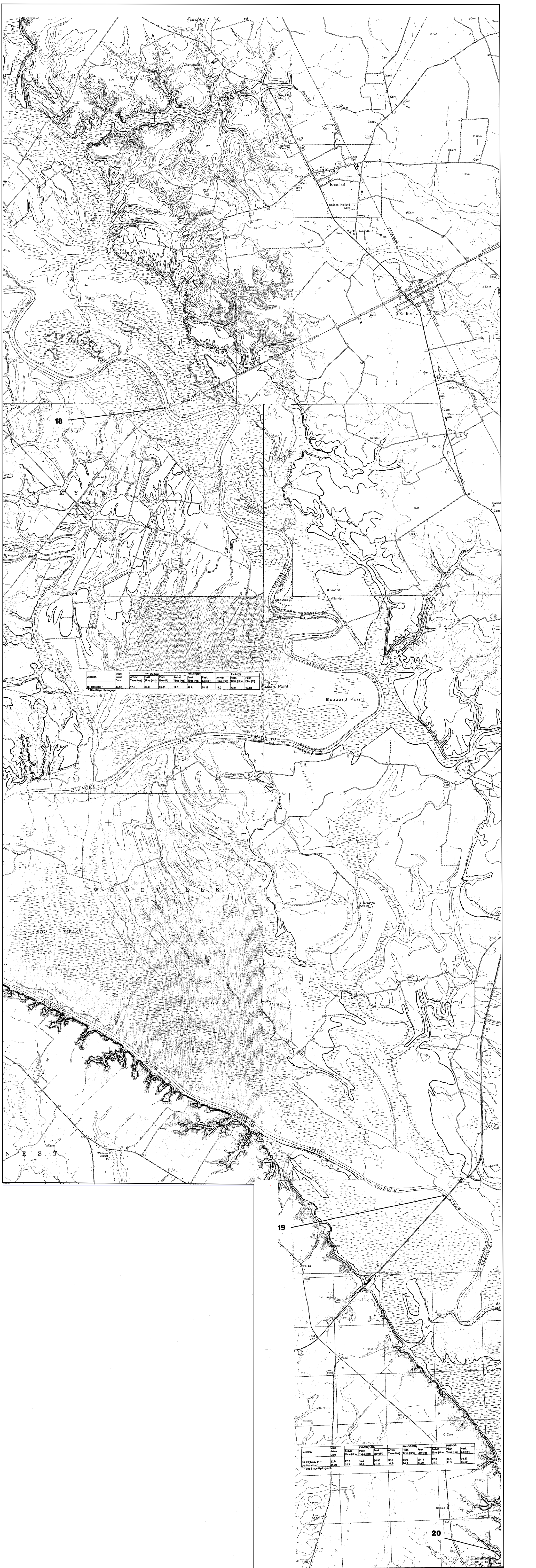


THE WOOTEN COMPANY

County Facilities near Windsor

- School Bus Garage
- Brian Center
- Hallmark Center
- EOC/Gov.Offices/Courthouse
- Health Dept./ Social Services
- NC National Guard Armory
- NCDOT Yard
- Water Dept. Shop/ Central Receiving Point





Location	Miles Below Dam	FW-DB(GAS)			FW-DB(RR)			PMF-DB		
		Arrival Time (Hrs)	Peak Time (Hrs)	Peak Elev (Ft)	Arrival Time (Hrs)	Peak Time (Hrs)	Peak Elev (Ft)	Arrival Time (Hrs)	Peak Time (Hrs)	Peak Elev (Ft)
18: Railroad *	43.52	17.5	34.8	35.85	17.0	49.8	28.16	14.0	72.9	49.68

* See Stage Hydrograph

Location	Miles Below Dam	FW-DB(GAS)			FW-DB(RR)			PMF-DB		
		Arrival Time (Hrs)	Peak Time (Hrs)	Peak Elev (Ft)	Arrival Time (Hrs)	Peak Time (Hrs)	Peak Elev (Ft)	Arrival Time (Hrs)	Peak Time (Hrs)	Peak Elev (Ft)
19: Highway 11 *	52.5	22.7	42.3	26.95	30.0	63.0	20.15	22.0	86.4	38.37
20: Hamilton *	56.29	25.7	54.0	21.11	31.0	84.9	14.27	24.0	91.5	35.09

* See Stage Hydrograph

Match Plate 34

LEGEND
- FW-DB (GAS)
- FW-DB (RR)
- PMF-DB

N

Map A-2

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

GASTON DAM AND RESERVOIR
ROANOKE RAPIDS DAM AND RESERVOIR
ROANOKE RIVER BASIN, VA. NC.
DAM BREAK STUDY

INUNDATION MAP

FOSSIL & HYDRO ENGINEERING - CIVIL
VIRGINIA POWER, GLEN ALLEN, VA

PLATE

Appendix B: Assessment of Vulnerability

A. Introduction

The Bertie County Composite Hazard Index (Table A-28 in Appendix A) outlines the eight hazards rated "moderate" or "high" for potential threat to persons and property. Three of these hazards – droughts/heat waves, hurricanes/coastal storms, and winter storms/freezes – typically have a regional impact; however, the impact of droughts and heat waves is primarily limited to agricultural losses. Based on hazard event history, it is estimated that Bertie County has a maximum 100% exposure to hurricanes/coastal storms and winter storms/freezes. A 100% exposure means that all structures both public and private within the County could possibly be impacted by these two types of hazards.

The other five hazards – coastal erosion, dam failures, floods, severe storms/tornadoes, and wildfires – typically have a more limited area of impact. Exposure to coastal erosion and floods is estimated to be no greater than 5%, i.e., 5% or less of all structures within the County could potentially be impacted by coastal erosion or flooding. For severe storms/tornadoes and for wildfires, it is estimated that the Bertie County area has a maximum 10% exposure, i.e., 10% or less of all structures within the County could potentially be impacted by a single hazard event. A major dam failure of either the Roanoke Rapids Reservoir Dam or the Gaston Lake Dam could impact 25% of the County.

B. Community Description (see map in pocket)

Bertie County is located in northeastern coastal plain of North Carolina. Bertie County is located approximately 75 miles from the Outer Banks of NC and 100 miles east of Raleigh, NC. Major waterways within Bertie County include the Albemarle Sound and the Roanoke and Chowan Rivers, as well as the Cashie which originates within Bertie County. Bertie County encompasses over 721 square miles and over 310,000 acres of commercial forest. The total population of Bertie County is approximately 20,700.

Bertie County is served by a network of roadways including US-11, US-13, US-17, US-64 NC-42, NC-45, NC-305 and NC-308. Bus transportation is provided by Carolina Trailways that services a terminal in Windsor. Commercial air transportation is provided by Pitt-Greenville Airport located approximately 40 miles away, as well as Norfolk International Airport located 85 miles away and Raleigh-Durham International Airport located 110 miles away.

Within Bertie County is an extensive wildlife refuge along the Roanoke River. This refuge encompasses over 17,500 acres and has over 70 miles of river frontage. Concentrations of wintering waterfowl, nesting ducks, raptors, osprey and neo-tropical migrants are common throughout. The largest inland heron rookery in North Carolina finds habitat within this refuge. The endangered short-nose sturgeon is found in refuge habitat along the lower river reach. Also, Bald eagles nest on adjacent lands, where river corridors serve as winter nesting sites. Bottomland hardwood forest covers much of the refuge totaling over 9,500 acres, along with cypress/tupelo swamps covering 8,000 acres.

Demographics and Employment

The largest manufactures within Bertie County include Perdue Farms Inc. (2,200), Golden Peanut Co. Inc. (100), Evans Lumber Co. (85), RJ Reynolds Tobacco Co. (65), and Coulbourn Lumber Co. Inc. (40). In addition to manufacturing, jobs held within government include 1,185 employees.

The economy of Bertie County depends largely on lower skilled jobs such as production, transportation and material moving which in the 2000 Census (Table B-1) accounted for 29.7% of the total work force. Only 22.7% of the population was engaged in management or professional jobs. More than 36% of Bertie County residents have less than a high school education and 23.5% of the population lives below the poverty line. The median age of residents in 2000 was 38.6 years of age with 70.3% of the population above the age of 21.

Table B-1: Bertie County Demographics

Economic		
Median Household Income		$30,186
Average Household Size		2.53
Percent of Individuals Below Poverty Level		23.5 %
Occupation	**People**	**Percent**
Management, professional, etc.	1,709	22.7 %
Service related	1,332	17.7 %
Sales and office	1,229	16.3 %
Farming, fishing, and forestry	213	2.8 %
Construction, extraction, and maintenance	820	10.9 %
Production, transportation, material moving	2,236	29.7 %
Employment	**People**	**Percent**
Employed	7,539	49.5 %
Unemployed	573	3.8 %
Not in labor force	7,092	46.6 %
Social		
Level of Educational Attainment	**People**	**Percent**
Less than 9^{th} grade	1,782	13.6 %
9^{th} – 12^{th} (no diploma)	2,974	22.6 %
High School Diploma (includes GED)	4,819	36.7 %
Some college, no degree	1,755	13.4 %
Associate degree	646	4.9 %
Bachelor's degree	820	6.2 %
Graduate or professional degree	339	2.6 %
Housing		
Selected Characteristics	**People**	**Percent**
Lacking complete plumbing facilities	192	2.5 %
Lacking complete kitchen facilities	101	1.3 %
No phone service	508	6.6 %

Source: US Census, 2000

Developed and Undeveloped Areas (see map in pocket)

Developed land within the unincorporated area is composed primarily of larger parcels designated for agricultural activities. There are some smaller lot residential districts scattered throughout the eight communities. The Town of Windsor incorporates most of the more highly developed residential, commercial and industrial zones within Bertie County.

The County real estate tax base currently exceeds $720 million (Table B-2). However, the State Data Center projects a significant population decline (8.7%) in Bertie County between 2000 and 2020. Such a population decrease will lead to a decrease in overall community vulnerability as existing houses and businesses are abandoned and fewer new residents move to Bertie County.

Table B-2: Real Property Values

Category	Number of Parcels	Land Value (in 000's)	Building Value (in 000's)	Out Bldg. Value (in 000's)	Total Value (in 000's)
Vacant Lots	2,636	$12,224	$0	$0	$12,224
Vacant Acreage Tracts	4,296	$118,955	$0	$0	$118,955
Residences	7,764	$127,884	$240,576	$17,820	$386,279
Agricultural Out Buildings	91	$1,699	$0	$3,413	$5,111
Outbuildings Only	1,254	$42,096	$0	$12,787	$54,883
Industrial	8	$272	$2,363	$133	$2,768
Commercial	643	$22,739	$24,769	$17,808	$65,316
Hotel/Motel	3	$42	$180	$12	$234
Apartments	12	$110	$1,170	$5	$1,284
Other Buildings	0	$0	$0	$0	$0
Exempt Parcels – Vacant	261	$3,971	$0	$0	$3,971
Exempt Parcels - Improved	300	$9,319	$58,022	$2,122	$69,464
Totals	**17,268**	**$339,311**	**$327,080**	**$54,100**	**$720,489**

Source: Bertie County Tax Office, May 2002.

The 2000 Census found 9,050 housing units located in Bertie County. Most of the houses in the County (66%) were built prior to 1980.

Table B-3: 2000 Census of Housing Units/Year Built – Bertie County

Types of Housing Units		
Type of Unit	**Number of Units**	**Percent of Total Units**
Single Family	6,204	66.6 %
Multi-family	158	1.7 %
Mobile homes	2,865	31.7 %
Boat, RV, Van	3	-
Total Units	**9,050**	**100 %**

Housing Units by Year Built		
Year Built	**Number of Units**	**Percent of Total Units**
1959 or earlier	2,632	29.1 %
1960 - 1979	3,345	36.9 %
1980 - 1989	1,492	16.5 %
1990-March 2000	1,581	17.5 %
Total	**9,050**	**100.0 %**

Source: 2000 U.S. Census, Mini-Profiles, Table DP-4 Profile of Selected Housing Characteristics

C. Critical Public Facilities (see map in pocket)

Critical public facilities are those facilities that are essential to the health, safety, and viability of the community. Critical facilities include buildings, public infrastructure (roads, highways, bridges, water and sewer facilities*) and private utility services, e.g., electric, phone and cable, without which residents and businesses could not survive for long. Certain facilities are absolutely critical to response and recovery efforts in the wake of a disaster resulting from a natural or technological hazard. These include fire and rescue facilities, hospitals, major transportation facilities, communication facilities, and public water and sewer infrastructure.

The inventory of County-owned critical public facilities is shown in Table B-4 and the locations are shown on the map located in the map pocket at the back of the Plan. The ability to protect these facilities from damage from a future natural hazard event is critical to the welfare of the citizens of Bertie County. Other publicly or privately owned facilities that are either critical, essential or supportive of community functions are listed following Table B-4.

Rationale for Designating a Facility as Critical

Facilities within Bertie County have been divided into three categories of importance for hazard mitigation:

1. Critical (Table B-4) – Publicly-owned facilities that are absolutely necessary for response and recovery efforts during and after a disaster. This category includes all county-owned and/or city-owned facilities that must either remain in operation without interruption or should be operational within 24 hours of an emergency.
2. Essential – facilities that are essential for normal community functions. Should be back in service within 72 hours following a disaster.
3. Supportive – facilities/services that are typically available to the public but which can be closed for a week or more following a disaster without undue harm to public health and safety.

*(Note: Underground public water and/or sewer lines are generally not considered vulnerable to the types of hazards that could impact Bertie County with the exception that underground distribution and collection lines could be impacted by erosion associated with flooding events. Due to the very limited nature of this potential impact, underground lines are not included in the list of critical public facilities. Major roads, highways and bridges within Bertie County are owned and operated by the State of North Carolina and the Federal Highway System. Since neither the County nor the towns are responsible for the operation and maintenance of these facilities, they are not included in vulnerability calculations.)

Table B-4: Critical Public Facilities/Infrastructure within Bertie County

Type of Facility	Location/Site	Function	Estimated Replacement Value[1]
Fire Departments			
Askewville Fire Department	Windsor	Fire Protection	$250,000
Aulander Fire Department	Aulander	Fire Protection	$250,000
Blue Jay Fire Department	Windsor	Fire Protection	$250,000
Colerain Fire Department	Colerain	Fire Protection	$250,000
Kelford Volunteer Fire Department and Rescue	Kelford	Fire Protection / Emergency Medical	$250,000
Lewiston Woodville Volunteer Fire Department and EMS	Lewiston Woodville	Fire Protection / Emergency Medical	$250,000
Merry-Hill-Midway Fire Department Inc.	Merry Hill	Fire Protection	$250,000
Perrytown Fire Department	Merry Hill	Fire Protection	$250,000
Powellsville Fire Department	Powellsville	Fire Protection	$250,000
Roxobel Fire Department	Roxobel	Fire Protection	$250,000
Trap Fire Department	Colerain	Fire Protection	$250,000
Windsor Fire Department (Alternate EOC)	Windsor	Fire Protection	$250,000
Emergency Medical Services			
Bertie County Rescue Unit 1	Windsor	Emergency Medical	$200,000
Bertie County Rescue Unit 2	Windsor	Emergency Medical	$200,000
Colerain Rescue Unit	Colerain	Emergency Medical	$200,000
Aulander Volunteer Rescue Squad Inc.	Aulander	Emergency Medical	$200,000
Sheriff/Police			
Bertie County Sheriffs Department	Windsor	Law Enforcement	$500,000
Aulander Police Department	Aulander	Law Enforcement	$150,000
Windsor Police Department	Windsor	Law Enforcement	$150,000
County Facilities			
Bertie County EOC	Windsor	Government Operations	$300,000
Bertie County Communications Tower	Windsor	Government Operations	$150,000

Source: Bertie County and NCDOI.

[1] *Values are estimates.*

State/Federally-Owned Critical Facilities

Transportation Facilities

- US-11
- US-13
- US-64
- NC-11
- NC-45

US Post Office

Privately-Owned Critical Facilities

Utilities

- Town of Windsor
- Dominion NC Power
- VEPCO
- Edgecombe-Martin EMC
- Roanoke Electric Membership
- Halifax EMC
- NC Natural Gas
- Sprint/Carolina

Health Services

- Bertie County Memorial Hospital

Other Facilities

Essential

- Bertie County Courthouse
- Bertie County Health Department
- Bertie County Social Services
- Bertie County Water Department Shop
- Bertie-Martin Regional Jail
- Askewville Town Hall
- Aulander Town Hall
- Colerain Town Hall
- Kelford Town Hall
- Lewiston Woodville Town Hall
- Powellsville Town Hall
- Roxobel Town Hall
- Windsor Town Hall

Landfill

- East Carolina Regional Landfill

Other Facilities

Supportive

Specific Care Providers

- Brian Center
- Hallmark Center

Pubic Schools

- Askewville Elementary
- Aulander Elementary
- C.G White Elementary
- Lewiston Town Hall
- West Bertie Elementary
- Windsor Elementary
- Southwestern Middle
- Bertie High
- Bertie Serendipity

Private Schools

- Bethel Christian Academy
- Lawrence Academy

D. Description of All-Hazards Exposure (see map in pocket)
As detailed in Appendix A - Hazard Identification and Analysis, the entire area within Bertie County is exposed to general hazards such as hurricanes/coastal storms, droughts/heat waves, winter storms/freezes, etc. Severe storms/tornadoes are another common threat but the exact location of a future event can not be predicted. Only coastal erosion and flood hazards have known hazard locations.

Flood Hazard Areas (see map in pocket)
The flood hazard areas within Bertie County are scattered throughout the county with concentrations of 100 year flood plains located along US-11 south of Lewiston-Woodville, along US-13 and US-17 south of the Town of Windsor, also concentrations of 100 year floodplains run parallel to NC-305 and NC-308 near Aulander and in the northern quadrant of the county near NC-13 in Powellsville.

National Flood Insurance Program
Bertie County is an active participant in the National Flood Insurance Program (NFIP). Although the position of the Federal government is to discourage development within flood hazard areas, the NFIP was created to ensure that owners of flood susceptible properties could purchase flood insurance coverage. Data on current NFIP insurance policies and recent claims within Bertie County are shown in Table B-5.

Table B-5: National Flood Insurance Program Statistics (NFIP) – Bertie County

Category	Number or Value
Total Insured Value	**$8,556,600**
Number of Policies	93
Total Premiums	**$30,082**
Average Premium	$323.46
NFIP Claims Since 1978	14
NFIP Claim Amounts Paid Since 1978	$118,106.36

Source: NFIP, FEMA Policy Statistics as of December 2002

Repetitive Loss Claims
One of the main objectives of the hazard mitigation planning process is to determine how best to reduce repetitive loss claims. Through FEMA, the Federal government annually makes available grants to local governments for the purchase and/or elevation of flood prone properties in order to reduce the re-occurrence of flood damages. NFIP statistics on repetitive loss claims indicate that Bertie County has two repetitive loss claims.

High Wind Hazard Vulnerability
Predicting where damage from high winds and tornadoes will occur is impossible. Mobile/manufactured homes, however, are more vulnerable to the damaging effects of high winds than are site-built structures.

Mobile/manufactured homes built prior to 1993 when more rigorous Department of Housing and Urban Development (HUD) wind resistance standards became effective are especially susceptible to wind damage (Table B-6). County tax and building permit records do not specify the age of individual mobile/manufactured home units, nonetheless, in the 2000 Census, 2,865 (31.7%), of all residential units within in Bertie County are for mobile/manufactured home units. All of these units regardless of age are frequently more susceptible to wind damage than are site-built dwelling units.

Table B-6: HUD Wind Resistance Standards - Mobile/Manufactured Homes

Year	Wind Resistance[1]	Weight (lbs)	Anchor Requirements[2]
Pre-1993	75 mph	16,000	5-6 anchors/side
Post 1993	100 mph	40,000	11-14 anchors/side

Source: Manufactured Housing Institute, www.mfghome.org
[1] Wind resistance standards for coastal placement are more rigorous.
[2]An anchor is a weighted disc buried in the ground and attached to the manufactured unit with steel cable

E. Future Hazard Vulnerability

Future vulnerability can be defined as the extent to which people are expected to experience harm and the likelihood of property damage by a hazard event if projected development were to occur. If development is allowed to occur within identified floodplains, then vulnerability will increase accordingly.

According to the 2000 Census (Table B-7), the population of Bertie County decreased from 20,338 persons in 1990 to 19,773 persons in 2000 – a decrease of 565 people. The Office of State Planning population projections for Bertie County are also shown in Table B-8.

Table B-7: Projected Population Figures for Bertie County

Year	Bertie County	
	Population Estimate	Ten-Year Growth Rate
1990	20,338	-3.3%
2000	19,773	-2.8%
2010	18,946	-4.2%
2020	18,047	-4.7%

Source: NC Office of State Planning; local population estimates.

Using the 2000 Census, average household population size of 2.53 persons/household for Bertie County, the County is expected to lose approximately 327 dwelling units by 2010 and another 355 units between 2010 and 2020 for a total loss of 682 housing units. Thus, if State population projects hold true, community vulnerability to hazards will actually decrease as people choose to leave the County within the coming years.

F. Summary Conclusions

Current Vulnerability

Bertie County, as determined in Appendix A, is most vulnerable to coastal erosion; droughts/heat waves; hurricanes/coastal storms; winter storms/freezes; floods; severe storms/tornadoes; and wildfires. Since droughts/heat waves typically impact primarily crops and not structures, this hazard was not included in vulnerability assessment tables at the end of this section.

Based on hazard event history, it is estimated that the Bertie County area has a maximum 100% exposure to hurricanes/coastal storms and winter storms/freezes. A 100% exposure means that all structures both public and private within the County could potentially be impacted by these two types of hazard events.

Coastal erosion impacts a very limited area of the County and floods only impact flood hazard areas. Thus exposure to these two hazards is estimated to be 5%, i.e., 5% or less of all structures could by impacted by coastal erosion or flooding. For severe storms/tornadoes and wildfires, it is estimated that Bertie County has a maximum 10% exposure, i.e., 10% or less of all structures within the County could potentially be impacted by these types of hazard events.

Table B-8: Potential Hazard Exposure

Hazard	Hazard Ranking	Estimated Level of Exposure
Coastal Erosion	Moderate	5% Exposure
Droughts/Heat Waves	Moderate	Minimal
Hurricanes/Coastal Storms	Moderate	100% Exposure
Winter Storms/Freezes	Moderate	100% Exposure
Dam Failure	Moderate	25% Exposure
Floods	Moderate	5% Exposure
Severe Storms/Tornadoes	Moderate	10% Exposure
Wildfires	Moderate	10% Exposure

Source: Appendix A Table A-32.

Methodology for Calculating Current Hazard Exposure

Current (Year 2000) hazard exposure was estimated using the 2000 Census housing and population count and local property tax values. The left side of Tables B-9, B-10, B-11, and B-12 summarize the vulnerability of persons and property values in the Year 2000. This information is presented in two categories - Private Development and Public Critical Facilities. (Municipalities that have a current land use maps are provided, however; currently the majority of municipalities do not have such maps to aid in assessing vulnerability. The County/towns have set development of a GIS as a mitigation action - see Section II. Mitigation Action Plan.)

Current Vulnerability to Hurricanes/Coastal Storms and Winter Storms/Freezes

It is estimated that the Bertie County area has a maximum 100% exposure to hurricanes/coastal storms and winter storms/freezes. A 100% exposure means that all existing development - both public and private - within the County could possibly be impacted by this type of hazard event. A dollar estimate of current exposure to these hazards is detailed on the left side of Table B-9 Current Conditions (Year 2000).

Current Vulnerability to Coastal Erosion and Flooding

Bertie County has limited exposure to coastal erosions and flood hazards. The County estimates that a maximum of 5% of developed property is exposed to these two hazards. A dollar estimate of current exposure to these two hazards is detailed on the left side of Table B-10 Current Conditions (Year 2000). (Note: Major roads, highways, and bridges within Bertie County are owned and operated by the State of North Carolina and the Federal Highway System. Since the County and the towns are not responsible for the operation and maintenance of these facilities, they are not included in vulnerability calculations.)

Current Vulnerability to Severe Storms/Tornadoes and Wildfires

For severe storms/tornadoes and wildfires, it is estimated that the Bertie County area has a maximum 10% exposure, i.e., 10% or less of all structures within the County could be potentially impacted by these two types of hazard events. A dollar estimate of current exposure to these hazards is detailed on the left side of Table B-11 Current Conditions (Year 2000).

Current Vulnerability to Dam Failures

For dam failures, it is estimated that the Bertie County area has a maximum 25% exposure, i.e., 25% or less of all structures within the County could be potentially impacted by this type of hazard event. A dollar estimate of current exposure to these hazards is detailed on the left side of Table B-12 Current Conditions (Year 2000).

Methodology for Calculating Potential Future Vulnerability

Bertie County population is projected to decrease by 8.7% over the next twenty years (Table B-7). Thus future vulnerability will actually be less than current vulnerability (assuming constant Year 2000 dollars – no factor used for inflation). To estimate future vulnerability, the number of housing units and commercial/industrial structures in the County in 2020 was estimated at 8.7% less than in 2000. (At this time, the County/towns do not have a future land use map. At the next CAMA Land Use Plan Update, the County/towns intend to develop a future land use map to aid in assessing future vulnerability. The County/towns have set development of a GIS as a mitigation action - see Section II. Mitigation Action Plan.)

(Note: It could be argued that even with a population decrease, there might still be limited future development. However, it is most likely that any new construction will be offset by the abandonment of housing/buildings associated with population decline. In addition, with a projected population decrease it is very unlikely that the State will be building new roads/highways to serve the area since other areas of the State that are experiencing growth will be requiring more dollars for road construction.)

Future Vulnerability to Hurricanes/Coastal Storms and Winter Storms/Freezes

Future exposure to hurricanes/coastal storms and winter storms/freezes (right side of Table B-9 – Potential Future Conditions (Year 2020)) was estimated using the methodology described above. A 100% exposure of all development - both public and private - was assumed for these two types of hazards.

Future Vulnerability to Coastal Erosion and Flooding

Although the County overall is expected to lose population between 2000 and 2020 it is possible that new vacation residents will be attracted to areas subject to coastal erosion and flooding. However, the County will continue to enforce the flood damage prevention ordinance which will serve to limit new development that is vulnerable to flooding. A 5% exposure was assumed for these two hazards (Table B-10 – Potential Future Conditions).

Future Vulnerability to Severe Storms/Tornadoes and Wildfires

Future exposure to severe storms/tornadoes and wildfires (right side of Table B-11 – Potential Future Conditions (Year 2020)) was estimated using the methodology described above. A 10% exposure of all development – both public and private – was assumed for these two hazards.

Future Vulnerability to Dam Failures

Future exposure to dam failures (right side of Table B-12 – Potential Future Conditions (Year 2020)) was estimated using the methodology described above. A 25% exposure of all development – both public and private – was assumed for this hazard.

Table B-9: Bertie County Vulnerability Assessment for Hurricanes/Coastal Storms and Winter Storms/Freezes – 100%

Private Development						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020)[1]		
Type of Development	Number of Existing Private Buildings	Current Value (in 000s) (Year 2000 $)	Current Number of People	Projected Number of Private Buildings	Projected Value (in 000s) (Year 2000 $)	Projected Number of People
Single-Family Residential	6,204	$240,576	13,291	5,664	$219,600	12,132
Multi-Family Residential	158	$1,170	338	144	$1,100	308
Mobile Homes (Boat RV, Van)	2,868	$43,020	6,144	2,618	$39,300	5,607
Subtotal Residential	**9,230**	**$284,766**	**19,773**	**8,426**	**$260,000**	**18,047**
Commercial/Industrial	160	$27,312	0	146	$24,900	0
Other (exempt)	300	$58,022	0	274	$53,000	0
Subtotal Non-Residential	**460**	**$85,334**	**0**	**420**	**$77,900**	**0**
Subtotal Private	**9,690**	**$370,100**	**19,773**	**8,846**	**$337,900**	**18,047**

Public Buildings and Critical Facilities						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020) [1]		
Type of Development	Number of Existing Buildings and Critical Facilities	Current Replacement Value (in 000s) (Year 2000 $)	Current Number of People	Projected Number of Public Buildings and Critical Facilities	Projected Replacement Value (in 000s) (Year 2000 $)	Projected Number of People
Fire Departments	12	$3,000	0	12	$3,000	0
Emergency Medical Services	4	$800	0	4	$800	0
Sheriff/Police	4	$850	0	4	$850	0
EOC/Communications Tower	2	$450	0	2	$450	0
Subtotal Public	**22**	**$5,100**	**0**	**22**	**$5,100**	**0**
Total Community Vulnerability	**9,712**	**$375,200**	**19,773**	**8,868**	**$343,000**	**18,047**

[1] *2000 Data based on 2000 Census data and local tax revenue data.*
[2] *2020 Projections based on population projections with comparable decrease (8.7%) in commercial/industrial properties; no reduction in number of public buildings/critical facilities.*

Table B-10: Bertie County Vulnerability Assessment for Coastal Erosion and Flooding (5%)

Private Development						
Current Conditions (Year 2000)				**Potential Future Conditions (Year 2020)[1]**		
Type of Development	**Number of Existing Private Buildings**	**Current Value (in 000s) (Year 2000 $)**	**Current Number of People**	**Projected Number of Private Buildings**	**Projected Value (in 000s) (Year 2000 $)**	**Projected Number of People**
Single-Family Residential	310	$12,029	665	283	$10.980	607
Multi-Family Residential	8	$59	17	7	$55	16
Mobile Homes (Boat RV, Van)	144	$2,151	307	131	$1,965	281
Subtotal Residential	**462**	**$14,239**	**989**	**421**	**$13,000**	**904**
Commercial/Industrial	8	$1,366	0	8	$1,245	0
Other (exempt)	15	$2,901	0	14	$2,650	0
Subtotal Non-Residential	**23**	**$4,267**	**0**	**22**	**$3,895**	**0**
Subtotal Private	**485**	**$18,506**	**989**	**443**	**$16,895**	**904**

Public Buildings and Critical Facilities						
Current Conditions (Year 2000)				**Potential Future Conditions (Year 2020) [1]**		
Type of Development	**Number of Existing Buildings and Critical Facilities**	**Current Replacement Value (in 000s) (Year 2000 $)**	**Current Number of People**	**Projected Number of Public Buildings and Critical Facilities**	**Projected Replacement Value (in 000s) (Year 2000 $)**	**Projected Number of People**
Fire Departments	0.6	$150	0	0.6	$150	0
Emergency Medical Services	0.2	$40	0	0.2	$40	0
Sheriff/Police	0.2	$43	0	0.2	$43	0
EOC/Communications Tower	0.1	$23	0	0.1	$23	0
Subtotal Public	**1.1**	**$255**	**0**	**1.1**	**$255**	**0**
Total Community Vulnerability	**486**	**$18,760**	**989**	**443**	**$17,150**	**902**

[1] *2000 Data based on 2000 Census data and local tax revenue data.*

[2] *2020 Projections based on population projections with comparable decrease (8.7%) in commercial/industrial properties; no reduction in number of public buildings/critical facilities.*

Table B-11: Bertie County Vulnerability Assessment for Severe Storms/Tornadoes and Wildfires (10%)

Private Development						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020)[1]		
Type of Development	Number of Existing Private Buildings	Current Value (in 000s) (Year 2000 $)	Current Number of People	Projected Number of Private Buildings	Projected Value (in 000s) (Year 2000 $)	Projected Number of People
Single-Family Residential	620	$24,058	1,329	566	$21,960	1,213
Multi-Family Residential	16	$117	34	14	$110	31
Mobile Homes (Boat RV, Van)	287	$4,302	614	262	$3,930	561
Subtotal Residential	**923**	**$28,477**	**1,977**	**842**	**$26,000**	**1,805**
Commercial/Industrial	16	$2,731	0	15	$2,490	0
Other (exempt)	30	$5,802	0	27	$5,300	0
Subtotal Non-Residential	**46**	**$8,533**	**0**	**42**	**$7,790**	**0**
Subtotal Private	**969**	**$37,010**	**1,977**	**884**	**$33,790**	**1,805**

Public Buildings and Critical Facilities						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020)[1]		
Type of Development	Number of Existing Buildings and Critical Facilities	Current Replacement Value (in 000s) (Year 2000 $)	Current Number of People	Projected Number of Public Buildings and Critical Facilities	Projected Replacement Value (in 000s) (Year 2000 $)	Projected Number of People
Fire Departments	1.2	$300	0	1.2	$300	0
Emergency Medical Services	0.4	$80	0	0.4	$80	0
Sheriff/Police	0.4	$85	0	0.4	$85	0
EOC/Communications Tower	0.2	$45	0	0.2	$45	0
Subtotal Public	**2.2**	**$510**	**0**	**2.2**	**$510**	**0**
Total Community Vulnerability	**971**	**$37,520**	**1,977**	**887**	**$34,300**	**1,805**

[1] *2000 Data based on 2000 Census data and local tax revenue data.*

[2] *2020 Projections based on population projections with comparable decrease (8.7%) in commercial/industrial properties; no reduction in number of public buildings/critical facilities.*

Table B-12: Bertie County Vulnerability Assessment for Dam Failures – 25%

Private Development						
Current Conditions (Year 2000)				**Potential Future Conditions (Year 2020)[1]**		
Type of Development	**Number of Existing Private Buildings**	**Current Value (in 000s) (Year 2000 $)**	**Current Number of People**	**Projected Number of Private Buildings**	**Projected Value (in 000s) (Year 2000 $)**	**Projected Number of People**
Single-Family Residential	1,551	$60,144	3,323	1,416	$54,900	3,033
Multi-Family Residential	40	$293	85	36	$275	77
Mobile Homes (Boat RV, Van)	717	$10,755	1,536	655	$9,825	1,402
Subtotal Residential	**2,308**	**$71,192**	**4,943**	**2,107**	**$65,000**	**4,512**
Commercial/Industrial	40	$6,828	0	37	$6,225	0
Other (exempt)	75	$14,506	0	69	$13,250	0
Subtotal Non-Residential	**115**	**$21,334**	**0**	**105**	**$19,475**	**0**
Subtotal Private	**2,423**	**$92,525**	**4,943**	**2,212**	**$84,475**	**4,512**

Public Buildings and Critical Facilities						
Current Conditions (Year 2000)				**Potential Future Conditions (Year 2020) [1]**		
Type of Development	**Number of Existing Buildings and Critical Facilities**	**Current Replacement Value (in 000s) (Year 2000 $)**	**Current Number of People**	**Projected Number of Public Buildings and Critical Facilities**	**Projected Replacement Value (in 000s) (Year 2000 $)**	**Projected Number of People**
Fire Departments	3	$750	0	3	$750	0
Emergency Medical Services	1	$200	0	1	$200	0
Sheriff/Police	1	$213	0	1	$213	0
EOC/Communications Tower	0.5	$113	0	0.5	$113	0
Subtotal Public	**5.5**	**$1,275**	**0**	**5.5**	**$1,275**	**0**
Total Community Vulnerability	**2,428**	**$93,800**	**4,943**	**2,217**	**$85,750**	**4,512**

[1] *2000 Data based on 2000 Census data and local tax revenue data.*
[2] *2020 Projections based on population projections with comparable decrease (8.7%) in commercial/industrial properties; no reduction in number of public buildings/critical facilities.*

Appendix C: Community Capability Assessment

A. Introduction

The effectiveness of a hazard mitigation plan is in large part determined by the successful garnering and integration of a community's existing and potential institutional, legal, fiscal and political resources. Thus Appendix C is organized into subsections addressing the specifics of the following five factors:

Departments and Agencies
- a. Local government departments or agencies that have direct responsibility for hazard mitigation activities, e.g., public works department's responsibility for storm water system maintenance;
- b. Other local departments or agencies that may, by virtue of their work, either increase or decrease local vulnerability, e.g., school system selection of new school construction sites;
- c. Non-County departments or agencies impacting hazard mitigation.

Existing Policies, Programs and Ordinances;
- a. Local policies, programs and ordinances that affect hazard mitigation;
- b. State programs, e.g., NCDOT maintenance of state-owned roads and highways;

Legal Capability (State authorization for local government programs);
Fiscal Capability (Operating budget, capital improvement program);
Political Climate (local political will for implementation of hazard mitigation activities).

B. Departments and Agencies Impacting Hazard Mitigation

Bertie County is a local government body with a board-manager form of government. The elected Board of Commissioners is the decision making body for the County. The County has a number of professional staff departments to serve the citizens of the County and to carry out day-to-day administrative activities. (More information about each department is can be found under Technical Capabilities – Staff Resources need the end of this section.)

Table C-1*:* County Departments & Agencies Directly/Indirectly Impacting Hazard Mitigation

Department / Agency	Direct/Indirect Impact	Function
County Manager	Direct	Responsible for all the day-to-day operations of the County; carrying out the policies of the elected Board of Commissioners.
Economic Development	Indirect	Responsible for promoting economic investment in the County.
Emergency Management	Direct	Responsible for preparation, response and recovery activities following an emergency or disaster.
Environmental Health	Direct	Responsible for maintaining a healthy environment.
Forest Ranger	Direct	Responsible for detecting, controlling and distinguishing forest fires.
Health Department	Direct	Responsible for promoting citizen health.
Human Resources	Indirect	Responsible for employee recruitment and retention.
Animal/Litter Control Department	Indirect	Responsible for care, custody and control of animals which have been abandoned
Inspections Department	Direct	Responsible for administering and enforcing the building code.
Recreation Department	Indirect	Responsible for recreational programs and use of recreational facilities.
Social Services	Indirect	Responsible for providing assistance to citizens in need during an emergency.
Tax Department	Indirect	Responsible for maintaining records and collecting property taxes.
Water Department	Direct	Responsible for providing safe drinking water and maintaining water resources.

Source: Bertie County

Other Agencies/ Departments

Bertie County Public School System

The Bertie County Public School System provides public educational programming and is responsible for constructing and maintaining school facilities. When selecting new school sites, the school system considers environmental factors that would impact the development potential of each site under consideration.

NC Department of Transportation

The NC Department of Transportation is responsible for construction and maintenance of state-owned roads and highways, including the construction and maintenance of stormwater drainage systems. Sizing and maintenance of stormwater drainage systems can have an impact on hazard mitigation. If inadequately sized structural elements (e.g., piping, channels, etc.) cannot handle stormwater runoff, than upstream flooding will occur.

C. Existing Polices, Programs and Ordinances

Bertie County has used its legislated regulatory power to adopt and implement a limited number of policies, programs, and ordinances to regulate land use and development. These policies and regulations can be used to help mitigate potential harmful effects of natural hazards.

Under the Coastal Area Management Act (CAMA) and as one of the state's twenty coastal counties, Bertie County is charged with developing and keeping current a land use plan that establishes County policies on growth and development. The Bertie County CAMA Land Use plan was last updated in 1998. The County also has in effect a flood damage prevention ordinance, a minimum housing code, and building code regulations to help control and minimize vulnerability to natural hazards.

Each County policy, ordinance or regulation has a unique and varying impact on hazard mitigation. Although policies and ordinances may have not been created specifically for hazard mitigation purposes, they have been and can be utilized to implement hazard mitigation initiatives. Existing County policies and ordinances include:

- 1998 CAMA Land Use Plan
- Flood Damage Prevention Ordinance
- Building Code Enforcement
- Minimum Housing Code
- Soil Erosion and Sedimentation Control
- Emergency Plan

Coastal Area Management Act (CAMA)

One of the basic purposes of the CAMA was to establish a state management plan that was capable of rational and coordinated management of North Carolina's coastal resources. The CAMA established two principal mechanisms to accomplish this purpose – the formulation of local land use plans articulating the objectives of local citizens and translating these objectives into future desired land use patterns; and second, the designation of areas of environmental concern (AEC's) for the protection of areas of statewide concern within the coastal area.

> In passing CAMA, the 1974 NC General Assembly found that "the coastal area, and in particular the estuaries, are among the most biologically productive regions of this state and of the nation" . . . but in recent years the area "has been subjected to increasing pressures which are the result of the often conflicting needs of society expanding in industrial development, in population, and in the recreational aspirations of its citizens. Unless these pressures are controlled by coordinated management, the very features of the coast which make it economically, aesthetically, and ecologically rich will be destroyed." (NC Administrative Code T15A: 07H.0100 (c)(d))

To prevent this destruction, the NC Coastal Resources Commission was charged with responsibility for identifying types of areas – water as well as land – in which uncontrolled or incompatible development might result in irreversible damage. The Commission also determined which types of development activities were appropriate within such areas and called upon local governments to give special attention to these environmentally fragile areas in developing land use plans. The intent of the act was not to stop development, but rather to ensure the compatibility of development with the continued productivity and value of certain critical land and water areas. (NC Administrative Code T15A: 07H.0102 (e))

CAMA Guidelines for Areas of Environmental Concern (AEC's)

There are four broad categories of AEC's:

1. Estuarine System – Estuarine Waters, Coastal Wetlands, Public Trust Areas, and Estuarine Shorelines
2. Ocean Hazard Areas – Ocean Erodible Area, High Hazard Flood Area, Inlet Hazard Area, and Unvegetated Beach Area
3. Public Water Supply – Small Surface Water Supply Watersheds, and Public Water Supply Well Fields
4. Fragile Coastal Natural and Cultural Resource Areas – Coastal Areas that Sustain Remnant Species, Coastal Complex Natural Areas, Unique Coastal Geologic Formations, Significant Coastal Archaeological Resources, and Significant Coastal Historic Architectural Resources

All development occurring in AEC's must conform to state guidelines, which serve to discourage inappropriate development forms in areas identified as being environmentally sensitive.

CAMA's permit program involves two main categories of permits: one for "major" development and one for "minor" development. Major development permits are administered directly by the NC Division of Coastal Management and the NC Coastal Resources Commission. Generally speaking, major permits are required for development projects that meet one or more of the following conditions:

- Involve alteration of more than 20 acres of land and/or water within an AEC.
- Involve a structure or structures covering a ground area greater than 60,000 square feet on a single parcel of land.
- Propose drilling or excavation for natural resources on land in an AEC or under water; or
- Require another state or federal permit, license, or authorization (such as for dredging and filling, sedimentation control, wastewater discharge, or mining).

Projects that meet none of the conditions listed for a major permit are required to get a minor development permit except for a few exceptions. The local government under authority granted by the Coastal Area Management Act and using standards adopted by the Coastal Resources Commission administers minor permits. More detailed information about minor and major development permits can be obtained from Bertie County Building Inspections or the NC Division of Coastal Management.

1998 Bertie County CAMA Land Use Plan

The executive summary for the 1998 Plan states that the Bertie County Board of County Commissioners is committed to the promotion of economic development that will be in harmony with the natural environment. Bertie County's overall policy and management objective for the Estuarine System is to give the highest priority to their protection and perpetuate their biological, social, economic and aesthetic values, and to ensure that development occurring within these areas of environmental concern is compatible with natural resources.

The County supports the Federal and State wetlands programs by discouraging land uses that will alter the natural drainage patterns and vegetation. (Wetlands compose a significant amount of land in Bertie County.) The County does not require but does encourage landowners to establish and maintain vegetative buffers around sensitive wetlands and water bodies.

The executive summary states that Bertie County is fortunate in that very few natural disasters have impacted the County. Major hazard areas are identified as the Chowan River shoreline and wetlands and the Roanoke River floodplain and wetlands. The Plan identifies few structures within the Sea, Lake and Overland Surges from Hurricanes (SLOSH) level along the Chowan River, which has had limited property damages and personal injuries.

The Plan states that the water flow of the Roanoke River is controlled by upstream dams, which have kept inundation low and that the ground level at which most structures have been built warrant no major concerns.

1998 Plan Introduction

Land use planning is based on the evaluation of and coordination of growth based on factors such as topography, drainage, soils, existing uses of land, availability of community services, highways, population projections, trends in economic, and future land use needs. Planning is essential to setting the groundwork to ensure that land development proceeds in a sustainable fashion. Implementation of the Plan is the key to receiving the benefits from the planning effort.

Local governments can utilize regulations and policies to ensure that the Plan is actually implemented. These include zoning and subdivision regulations, the provision (or not) of public services such as water, sewer and roads, and the acquisition of property for public purposes. Zoning is the tool most often used by local governments to ensure that growth occurs appropriately, but the adoption of zoning requires considerable effort to educate local leaders and the public to the ramifications. So far, Bertie County leaders have indicated a strong desire to not inhibit activity with restrictive land use classifications and zoning.

Plan Goals and Objectives

In accordance with N.C.G.S. 113A-102(b), four goals were established for the Coastal Area Management Act (CAMA) region of North Carolina. In general, these goals relate to:

1. preserving and managing the natural ecological conditions of the estuarine system, the barrier dune system, and the beaches;
2. insuring that the development or preservation of land and water resources of the coastal area proceeds in a manner consistent with the capability of the land and water for development, use, or preservation;
3. insuring an orderly and balanced use and preservation of coastal resources; and

4. establishing policies, guidelines and standards dealing with all aspects of the first three goals.

Consistent with these policies, the Plan establishes relevant policies and sets local priorities for:

1. protection, preservation, and conservation of natural resources;
2. economic development of coastal-related areas, recreation and tourism facilities;
3. transportation and circulation;
4. preservation and enhancement of historic, cultural and scientific aspects of coastal-related areas; and
5. protection of common-law or statutory public rights in lands and waters of coastal-related areas.

Areas of Environmental Concern (AEC's)

Wetlands, floodplains, groundwater, estuaries and surface water are all features that must be constantly monitored and are easily affected by changes in land use. These features help provide habitats for various types of wildlife, drinking water, and sources of commercial activities. These environmentally fragile areas are so important to the general public that many have been designated Areas of Environmental Concern (AEC) by the NC Coastal Resources Commission (CRC).

CAMA regulations and development guidelines limit development within AEC's. Development standards for AEC's permit only water-dependent uses, such as navigation channels, docks, piers and other boating facilities, bridges, bulkheads and seafood industry support facilities. The protection and conservation of the AEC's is foremost and CAMA standards require that estuarine shoreline development follows these basic requirements:

Development should not cause significant damage to estuarine resources;

1. Development should not interfere with public rights of access to public trust areas;
2. Development should preserve natural barriers to erosion;
3. Development must comply with state soil erosion, sedimentation and stormwater management regulations;
4. The surface of any given lot area within the AEC boundary should not be covered by more than 30% impervious material; and
5. Development must comply with the locality's most recent CAMA Land Use Plan.

Estuarine Waters

Estuarine waters are defined as the waters of the bays, sounds, rivers, and tributaries seaward of the dividing line between coastal fishing waters and inland fishing waters. Estuarine waters are among the most productive natural environments in the State. Estuarine waters support the basic aquatic life that sustains the commercial fisheries industry. Nine of the ten leading commercial catches within the State are dependent on estuarine waters for life. Nine areas within Bertie County are designated as estuarine waters:

1. Albemarle Sound
2. All manmade tributaries
3. Roanoke River

4. Conine Creek
5. Thoroughfare Creek
6. Middle River
7. Eastmost River
8. Chowan River – from confluence to 300 yards south of the US 17 bridge
9. Cashie River – from San Souci Ferry to the mouth of the river.

The management objective for these areas is to give highest protection priority in order to maintain the associated biological, social, economic, and aesthetic values. The development of navigation channels and the use of wharves are examples of appropriate alterations in these areas, provided that such changes are not detrimental to the biological and physical character of the system. Incompatible uses would include projects, which directly or indirectly block or impair existing navigational channels, increase erosion along the shore, or disrupt the ecology of the shellfish waters. In 1998, there were no such incompatible uses in the estuarine waters of Bertie County.

Estuarine Shoreline

The estuarine shoreline is considered a major component of the estuarine system because of its close association with adjacent estuarine waters. Estuarine shorelines are defined as non-ocean shorelines, which are especially vulnerable to erosion, flooding, or other adverse effects of wind and water. Estuarine shorelines are intimately connected to estuarine waters. The AEC jurisdictional area for estuarine shorelines extends for a distance of 75 feet landward from the mean high water mark of the shoreline. Unless measures have been taken to prevent erosion, no development should occur within these areas.

Public Trust Waters

Public trust waters are the third type of AEC found in Bertie County. These areas consist of all natural bodies of water excluding privately owned lakes to which the public has no right of access. Mismanagement of development in these areas could be extremely harmful to the environment. Public trust waters are critical in that they provide a valuable recreational outlet for the public and also serve to support commercial and sport fisheries. The State or Federal government presently exercises control over development in public trust waters. Bertie County can assist in managing these areas by controlling development adjacent to them with regulatory devices such as setback lines, minimum lot sizes, septic tank and flood plain regulations, and soil erosion and sedimentation controls.

Inland Wetlands

Inland wetlands are areas that have been designated by the NC Coastal Resources Commission as being important for water quality. Although these areas have not been identified as AEC's, they have the type of plants, soils, and water that make them unique. Activities within inland wetlands are governed by regulations adopted by the US Army Corps of Engineers. Inland wetlands may be natural depressions or land surrounding manmade ponds. Although many of the natural areas have been altered by changes in drainage patterns, they retain the original hydric soil and are eligible for restoration projects. The NC Division of Coastal Management has provided maps that are 89% accurate for identifying probable coastal and 404 wetlands.

Two of the larger inland wetland areas in Bertie County are the Roanoke River Valley and the Roquist Pocosin. These areas have not been greatly affected by human activity except for upriver flood control. Extended periods of flooding may, over time, change vegetation patterns in these wetlands. These areas should be closely monitored for future problems.

One of the most important factors to consider when determining the suitability of land for future urban development is the possibility of periodic flooding. Land adjacent to creeks and rivers is often subject to flooding during severe storms. With few exceptions, nearly all of these areas in Bertie County are woodlands. While it would be wise not to allow development in these areas, it is sometimes not practical. To prevent as much damage as possible, the County requires structures built within the 100-year floodplain to meet requirements set forth by the Federal Emergency Management Agency (FEMA) and adopted locally in the Bertie County Flood Damage Prevention Ordinance.

Groundwater

Groundwater is the only source of drinking water for Bertie County citizens. Private and publicly owned wells vary in depth and pumping capacity. Excessive pumping by both in-county and out-of-county industries has lowered the aquifer level. Equilibrium has been reached, but future drawdowns by new or expanding industry should be closely monitored.

1998 CAMA Plan - Storm Hazard Mitigation Plan

This section of the CAMA Plan speaks mainly to the effects of coastal storms, i.e. high winds, storm surge, wave action, flooding and erosion, on the County. In that Bertie County is located about 60 miles west of the coast, most of these actions will be minimized. To be sure, a hurricane can be as devastating in Bertie County as along the coast, depending on the location of the "eye". However, most other effects from storms will be lessened. Bertie County has experienced tornadoes and tornado type wind storms; however, these are very infrequent. Earthquake activity is non-existent.

(a) Identification of Hazard Areas

Bertie County has two major hazard areas: 1) the Chowan River shoreline and wetlands, and 2) the Roanoke River floodplain and wetlands. Other hazard areas of lesser extent are: 1) the Cashie River floodplain, 2) Black Walnut Swamp and wetlands, 3) Salmon Creek Swamp and wetlands, and 4) Roquist Creek and Pocosin. These areas are integrated into the two major hazard areas listed above. Most are located nearby or drain into the major hazard areas.

Identification of these areas has involved three major sources: 1) the County soil survey, 2) the US Geological Survey topographic maps of the area and 3) the flood insurance study. Specification of the exact location of the hazard areas is difficult in this study. Because of map scale, the boundaries are too general to specifically delineate between hazard and non-hazard areas. A boundary as such requires large scale maps commonly used in a flood insurance study which is currently in use in the County. However, for land use planning purposes, the location of boundaries at this scale is adequate.

(b) Risk of Damage in Hazard Areas

The level of damage to life and property in the hazard areas of Bertie County is considered relatively small as indicated in Figure 9. There are several clusters of development along the Chowan River that are vulnerable to storms brought about by high winds, flooding, and wave action. At the Colerain Landing, waterfront development includes a petroleum storage facility, a fish processing plant, a restaurant and a recreation area. The remaining clusters are primarily residential development with eight clusters between Bull Pond Point and Edenhouse Point, and five clusters from Edenhouse Point to Terrapin Point. Most of these residential clusters are situated above the SLOSH level (Sea, Lake, and Overland Surges from Hurricanes). However, approximately fifteen dwellings are located very close to the SLOSH zone. Other structures can be considered to be outside of storm waves and flooding. However, these structures can suffer from wind damage, falling trees, and flying debris.

While the Roanoke River has controlled flow because of several dams upstream of Bertie County, inundation can occur both naturally as well as being man induced. On the upper Roanoke River, the dwellings and roads are located above the twenty-foot contour, while trails and unimproved roads are usually more than fifteen feet.
On the lower Roanoke River the dwellings and roads are located above the fifteen-foot contour, except at Cashoke Landing where a dwelling is located at approximately ten feet. Inundation from storm tides can exceed this level, but not often enough to warrant major concern.

On Roquist-Creek near US 17, a dwelling is located very close to the floodable area and could receive floodwaters. On the Cashie River there are two areas of concern: one is at the Sans Souci ferry site where one dwelling is less than five feet above normal river level and another is less than ten feet over normal river level. At Windsor the central business district, sewage treatment plant, and a number of dwellings can be considered vulnerable to floodwaters. The occasional forcing of water upstream by high winds into the Windsor area and associated storm rainfall can create a vulnerable condition on the low lying land.

It is likely that damage to public and private utilities will occur from high winds. Additionally, it is likely that several roads at low lying bridges may be flooded during the storm period and immediately thereafter. Of particular concern are the US 17 bridges over Salmon Creek and Edenhouse Creek.

Table C-2: Severity of Risk in Hazard Areas

Hazard Area	Severity Rank	Erosion & Scour	Wave Action & Battering	Flooding & Winds	Hazard Risk
Estuarine Shorelines	1	High	High	High	High
V-Flood Zone	2	Low	Moderate	High	High
Wetlands	2	Moderate	Moderate	Moderate	High
A-Flood Zone	3	Low	Low	High	Moderate
B-Flood Zone	3	Low	Low	Moderate	Moderate
Remainder of County	4	Low	Low	Low	Moderate

Source: 1998 CAMA Land Use Plan.

(c) Estimated Severity of Possible Hazard Damage

Although the County has not been hit by recent hurricanes, we have been witness to recent damage along the Chowan River brought about by the waning energy of some nearby hurricanes. With the full force of hurricane winds or a prolonged Nor' eastern, the potential for damage exists for all frontage property along the Chowan River with other hazard areas being flooded. There are no less than fifty residential and commercial structures which are vulnerable to storm hazard damage. According to the County Tax Office, the replacement value of these structures could be as high as $6 million. The severity of risk can be seen in Figure 17.

(d) Anticipated Development in Hazard Areas

The people of Bertie County have been wise in their use of land through the years. Most development has occurred on the high ground except for a few instances. The waterfront development at Colerain is understandable since the land uses are river oriented. Other development is oriented toward residential uses.

With the increasing interest of the population within the County, as well as outside the County, there will be a demand for intensifying water oriented land uses. While Bertie County is not in the mainstream of coastal development, it should be anticipated that development in and near hazard areas will occur.

1998 CAMA Plan Hazard Mitigation Policies

According to the 1998 CAMA Plan past experience in Bertie County has not supported a need for discouraging development or pursing the public acquisition of land in hazardous areas. The 1998 Plan identified three hazard mitigation policies (note that policy #1 is not relevant since the County has had a flood damage prevention ordinance for a number of years.) (1998 Plan information on hazard susceptibility is included in Section 2.)

The following policies were set by the County in the 1998 Plan:

1. To prepare a Bertie County Flood Damage Prevention Ordinance. This ordinance should be designed to meet the National Flood Insurance Program. The ordinance should also be designed to minimize flood damage by referring to accepted practices and methods that would set forth uniform rules for developers. It should require that all existing structures must comply with requirements related to the 100-year flood elevation. These requirements should state that if any repair, reconstruction, or improvement of a structure is equal to or exceeds sixty-five percent of the market value, the improvement or repair must follow the building code regulations.

2. To prepare a Bertie County Area Redevelopment Plan. This plan is related to the Building Code and Flood Damage Prevention Ordinance. The policy is to indicate that reconstruction after a storm be subject to the regulations of the building code, which states that any building damaged in excess of sixty-five percent of its value will conform with the code requirements for new buildings when repaired.

3. To support the existing building code, this land use plan update, and the County Disaster Relief and Assistance Plan.

Emergency Services
Bertie County relies on a large number of volunteers to man volunteer fire departments and rescue squads throughout the County. The twelve volunteer fire departments are located at Askewville, Aulander, Bluejay, Colerain, Kelford, Lewiston Woodville, Midway-Merry Hill, Perrytown, Powellsville, Roxobel, Trap and Windsor. Rescue squads are located at Askewville, Aulander, Colerain, Lewiston-Woodville and Windsor.

Bertie County Emergency Plan
The County adopted the Bertie County Disaster Relief and Assistance Plan in 1983. The Plan addresses all aspects of a disaster and directly relates, in part, to post disaster reconstruction activities both in the short term and long term. It is the policy of the County to enforce the Plan when disaster occurs.

Reconstruction Over a Long Period of Time
The County Disaster Relief and Assistance Plan sets up procedures for reconstruction immediately after a disaster and continues with reconstruction activity guidelines over a long period of time as well. County policy mandates that the Disaster Relief and Assistance Plan be followed. CAMA permitting regulations will also guide reconstruction activities.

Establishment of a Recovery Task Force
The County policy is to have the Emergency Management Damage Assessment Team serve also as the Recovery Task Force. The responsibilities of the Recovery Task Force include:

1. Establishing an overall restoration schedule.
2. Setting restoration priorities, in advance, by definition.
3. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
4. Keeping the appropriate State officials informed using situation and damage reports.
5. Keeping the public informed.
6. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
7. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
8. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available from federal and state agencies, in understanding the various assistance programs, and applying for such assistance.

Establishment of a Schedule for Staging and Permitting Repairs
The County policy is to have the Recovery Task Force determine a schedule for repair activities as follows:

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building code shall be issued automatically.
2. All structures suffering major damages as defined in the County Damage Assessment Plan shall be repaired or rebuilt to conform to the provisions of the North Carolina Building Code and other related ordinances.
3. All structures suffering minor damage as defined in the County Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition provided non-conforming use regulations are met.

4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the North Carolina Building Code, the state regulations for Areas of Environmental Concern, or other ordinances appear adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies above. For AEC's, where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
5. All individual mobile homes located in mobile home parks sustaining some damage to at least 50 percent of their mobile homes in the park shall be required to conform to current ordinances.
6. Permits shall not be issued in areas subject to a Temporary Development Moratorium until the Bertie County Board of Commissioners lifts such a moratorium.

Policies for Repair and/or Replacement of Public Infrastructure

The County policies related to the repair and/or replacement of public infrastructure include:

1. All damaged water and sewer systems (both public and private) shall be repaired so as to be elevated above the 100-year floodplain or shall be flood-proofed, with the methods employed and the construction being certified by a registered professional engineer.
2. All damaged roads used as major evacuation routes in flood hazard areas shall be repaired so as to be elevated at least one foot above the 100-year floodplain evacuation.
3. All local roads that have to be completely rebuilt shall be elevated so as to be above the 100-year floodplain elevation.

Evacuation Policies

It is the policy of the County to route evacuees through the County to higher ground as quickly and safely as possible. It is also County policy to provide adequate shelters for County residents living in high-risk areas. It is County policy to notify all County citizens of impending danger related to hurricanes and flooding activities.

Evacuation Plan

The County Evacuation Plan lists, as the primary purpose, the directing and moving of evacuees through the County westward to higher ground. Evacuation traffic control points are designated at three locations:

1. Intersection of Routes 17 and 45 at Midway.
2. On Route 17 where it crosses the Cashie River in Windsor, and
3. Intersection of Routes 13 and 17 in Windsor.

Emergency Shelters
Emergency shelters have been set up in five designated schools (Table C-3).

Table C-3: Bertie County Emergency Shelters

School	Location	Capacity
Southwestern Middle	Windsor	850
West Bertie Elementary	Kelford	600
Colerain Elementary	Colerain	450
South Aulander Elementary	Aulander	450
J. P. Law Elementary	Merry Hill	250

Source: 1998 Bertie County CAMA Land Use Plan.

Publicly-Owned Land
According to the 1998 CAMA Plan, there are a number of public-owned lands within Bertie County. These include all land owned or managed by various departments of the State of North Carolina. There are a total of 13,891 acres of publicly-owned land in eight locations.

Table C-4: Publicly-Owned[1] Lands in Bertie County

Location	Size in Acres
Roanoke River Wetlands (DENR)	6,954
Great Island Game Land (DENR)	5,379
Bottom Lands of Albemarle Sound (DENR)	1,143
Agricultural Peanut Belt Research Station (ACS)	390
Windsor Boat Access Area (DENR)	18
Windsor National Guard Armory (CCPS)	4
Transportation Maintenance Yard (DOT)	2
Sans Souci Access Area (DENR)	1
Total	**13,891**

Source: 1998 CAMA Land Use Plan.
[1] DENR – NC Department of Environment and Natural Resources; ACS – NC Department of Agriculture and Consumer Services; CCPS – NC Department of Crime Control and Public Safety; DOT – NC Department of Transportation.

1998 CAMA Plan Land Classification System (1998 Plan Map C-1)
In accordance with CAMA regulations, the 1998 Land Use Plan establishes a land classification system to assist with the implementation of local policies. The land classification system is intended to work in concert with local land use control ordinances. According to the Plan, the classification system is weakened by the fact that the County does not have zoning or subdivision regulations. The Plan goes on to state that "in order for the County to assure control over future development, and to protect the citizens from undesirable development, it may be timely to consider such management growth tools."

By graphically delineating specific land use classifications, the County Board is able to apply the most appropriate planning policies to specific geographical areas. Thus, the map is to be employed by the Board to provide thoughtful guidance to future land use activities and development based on its commonly held "vision," as defined by the Land Use Plan.

The North Carolina CAMA regulations state:

"The land classification system provides a framework to be used by local governments to identify the future use of all lands. The designation of land classes allows local governments to illustrate their policy statements as to where and to what density they want growth to occur, and where they want to conserve natural and cultural resources by guiding growth."

The CAMA guidelines include seven land use classifications:

1. Developed
2. Urban Transition
3. Limited Transition
4. Community
5. Rural
6. Rural with Services, and
7. Conservation

All of the land use classifications are used in Bertie County (see Map 4 from 1998 Plan). Each classification is described below with an explanation of how Plan policies relate to each class, the type of land use in each class, and the location of each class.

Developed

As defined by CAMA, the purpose of the Developed classification is to provide for continued intensive development and redevelopment of existing cities, towns, and their urban environs. Areas classified as developed include land currently developed for urban purposes or approaching a density of 500 dwellings per square mile that are provided with the usual municipal or public services, police and fire protection. These areas are currently "urban" in character, i.e., have mixed land uses of residential, commercial, industrial and institutional, or other uses at high to medium densities. (Note: The towns of Colerain, Kelford, Powellsville and Windsor have adopted separate CAMA land use plans and are not included in the County plan.)

Developed areas shown on the land classification map correspond to existing urban areas. Most of the areas have additional land available for development; however, past growth rates show little promise for substantial future urbanization. These urban areas have more desirable land for commerce and industry. Most of the developed areas already have the necessary urban services needed for growth, but these communities must plan to solidify public infrastructure and fill in available undeveloped land. This is particularly the case within Windsor, and to a lesser extent, other communities.

Urban Transition

The purpose of the Urban Transition class is to provide for future intensive urban development on lands that are suitable and that will be provided with the necessary urban services to support intense urban development. Examples of areas defined by CAMA as meeting the intent of this class are lands included within municipal extraterritorial planning boundaries and areas being considered for annexation by incorporated communities.

In choosing land for the Urban Transition class, CAMA regulations indicate that such land should not include the following:

> "Areas with severe physical limitations which would make the provision of urban services difficult or impossible, lands which meet the definition of conservation, lands of special value (unless no other alternative exists), such as productive and unique agricultural lands, forest lands, potentially valuable mineral deposits, water supply watersheds, scenic and tourist resources including archaeological sites, habitat for important wildlife species, areas subject to frequent flooding, areas important for environmental or scientific values, lands where urban development might destroy or damage natural systems or processes of more than local concern, or lands where intense development might result in undue risk to life and property from natural or existing manmade hazards."

Further, CAMA stipulates that "even though Areas of Environmental Concern (AEC) standards occasionally permit urban transition type development on a lot by lot basis within the various AEC's, this classification should generally not be applied to any AEC."

The Urban Transition class was used in Bertie County to designate areas that are likely to experience urban-type growth in the next five to ten years. The land assigned the urban transition classification is suitable for intensive development, and can support spill over from developed areas. Urban transition land must be served, or be able to be served, by public water, sewer, and other typical urban services including public streets. Lands within the urban transition class should be generally free of severe physical limitations for urban development.

The urban transition class should not include:

1. land with high potential for water supply watersheds, tourist resources, agriculture, forestry, or mineral extraction, or land falling within extensive rural areas being managed commercially for these uses, when other lands are available for development;
2. land where urban development might result in major or irreversible damage to important environmental, scientific, or scenic values;
3. land where urban development might result in damage to natural systems or processes of more than local concern;
4. land where development will result in undue risk to life or property from natural hazards or existing land uses;
5. areas subject to frequent flooding; and
6. habitat for important wildlife species.

Urban transition areas border developed areas (1998 Plan Map 4). The urban transition areas must be planned now for the necessary services to be in place as development occurs. These services include water, sewer, police and fire protection, and other components of the urban infrastructure. The northern communities, because of their proximity to Ahoskie, can be expected to experience some spill over growth. The transition areas near Aulander and Powellsville are expected to be sufficient to handle increased urban growth. Growth is also expected in the Colerain and Midway areas due to their proximity to the Chowan River.

Other urban transition areas occur southeast of Windsor and south of Lewiston Woodville. An urban transition area located along US 17 between the Roanoke River and Roquist Creek floodplains is considered a prime location for commercial and residential development. This is due to its proximity to Williamston and the recreational opportunities associated with the nearby natural habitats.

Limited Transition

As defined by CAMA, the purpose of the Limited Transition class is to provide for development in areas that will have some services, but are suitable for lower densities than those associated with the urban transition class, and/or which are geographically remote from existing towns and municipalities. Areas meeting the intent of this class will experience increased development during the current 5-year planning period. The limited transition Areas will be in a state of development necessitating some municipal infrastructure, facilities, and/or services. As opposed to urban transition areas, these areas are of modest densities and are often suitable for the provision of closed water systems rather than individual wells.

Bertie County officials intend that land in the limited transition class experience increased development during the next ten years. Community water and sewer, along with paved streets should be provided to support cluster-type development. The predominant land use in this area should be residential at a density of three units per acre or less. Soil types and physical characteristics may affect the density of individual projects.

The limited transition classification is designated along the Chowan River shoreline between Colerain and Morgan Swamp. All of the proposed Blackrock development is in this classification. The limited transition boundary will extend for a distance of approximately one-half mile from the shoreline. Areas classified Conservation as a result of being an AEC or within the 100-year floodplain should not be classified limited transition.

Community

The purpose of the Community classification is to provide for clustered, mixed land uses at low densities to help meet the housing, shopping, employment and other needs in the rural areas of Bertie County.

The community class provides for clustered land uses to meet the housing, shopping, employment, and public service needs within the rural areas of the County. Lands within the community classification are usually characterized by a small grouping of mixed land uses, which are suitable and appropriate for small clusters of rural development not requiring municipal sewer service.

Trap, Midway, Merry Hill, scattered sites along Indian Woods Road, Perrytown, Wakelon, Hexlena, Connarista, White's Crossroads, and Republican are typical of areas in the community classification. These communities provide services for the properties within the surrounding rural classification. Community areas will likely remain virtually unchanged over the next five years.

Rural

The Rural class provides for agriculture, forestry, mineral extraction, and other allied uses traditionally associated with an agrarian region. Other land uses, due to their noxious or hazardous nature and negative impacts on adjacent land uses may also be appropriate within this class if sited properly. Such uses may include, but not be limited to, energy generating plants, refining plants, airports, sewage treatment facilities, fuel storage tanks, and other industrial type uses.

The rural class consists of lands identified as appropriate locations for resource management and allied uses; land with high potential for agriculture, forestry, or mineral extraction; lands with one or more limitations that would make development costly and hazardous; and lands containing irreplaceable, limited, or significant natural, recreational, or scenic resources not otherwise classified.

Rural classification areas in Bertie County correspond to existing rural land uses, which are usually located between poorly drained areas. Much of Bertie County is in this land use category which includes all lands classified as prime farmland or woodland. The retention of large tracts is important for economical farming and forestry practices and should be protected.

Rural with Services

The Rural with Services classification is set aside for areas of Bertie County that are within the four planned water districts. The planned water systems are being funded by bonds provided by the US Department of Agriculture/Rural Development. The systems are designed to avert potential health problems caused by contaminated wells. Capacity will support existing development and limited growth. (Note: According to the County consulting engineer, the grant funding agency did not require that the County adopt restrictions on taps within floodplain areas.)

An area two hundred feet wide along both sides of each County road within the four water districts is classified as rural with services. Areas previously identified developed, urban transition, limited transition or community are not affected by this classification.

Conservation

According to CAMA guidelines, the Conservation class provides for effective long-term management of significant, limited, or irreplaceable resources, and includes all of the statutorily defined AEC's. However, beyond the presence of AEC's, other areas within the County, because of natural, cultural, recreational, productive or scenic value, may also require similar effective long-term management. Examples could include major wetlands (other than statutorily defined coastal wetlands); essentially undeveloped shorelines that are unique, fragile or hazardous for development; lands that provide necessary habit conditions (especially for remnant species); pocosins; or publicly-owned water supply watersheds and aquifers.

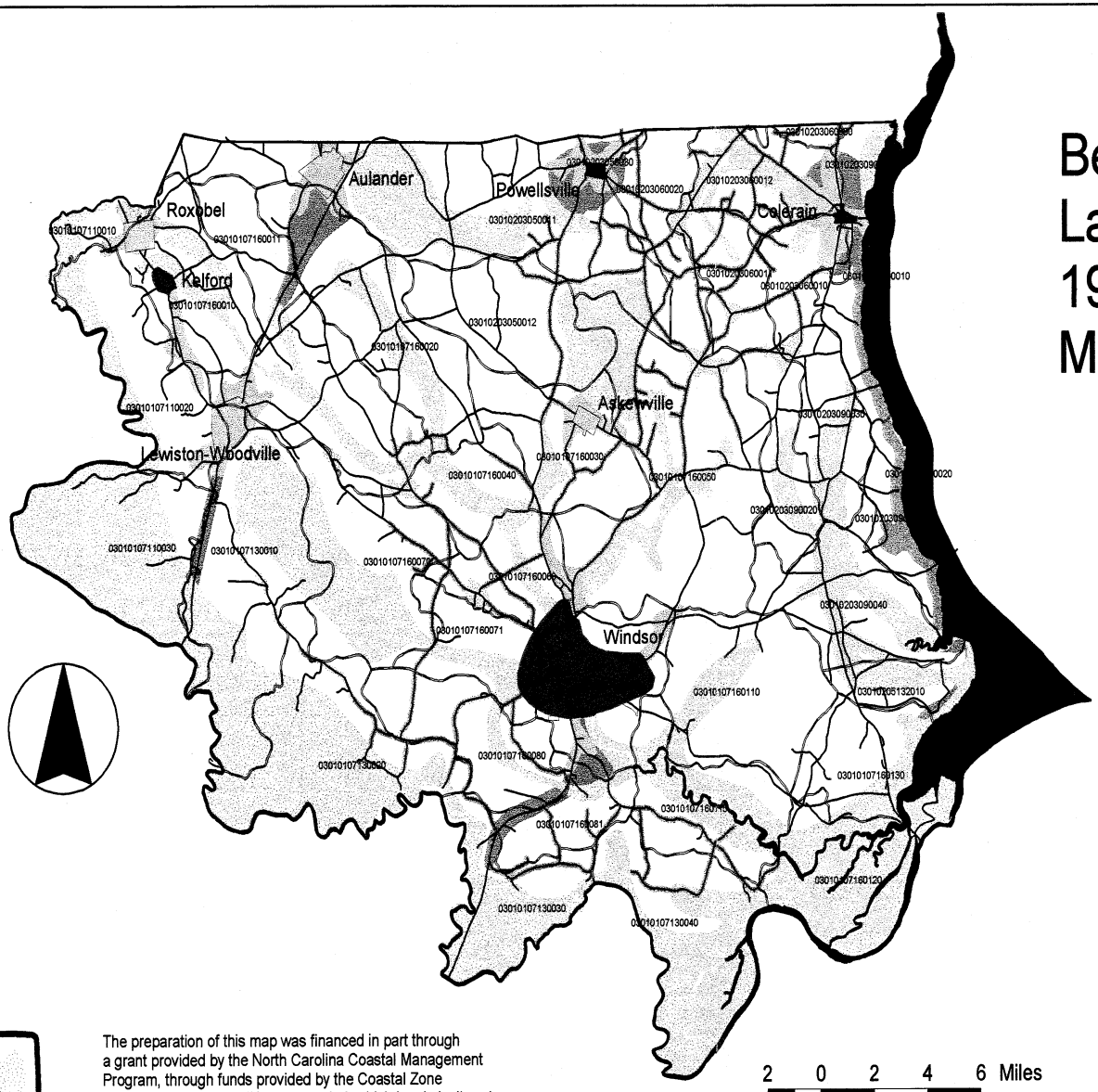
The designation as conservation should not be misconstrued to imply "non-use" but does imply a need for careful and cautious management of any allowable use. Within a conservation area, there may be high ground areas which are suitable for development, in which case development may be allowed to take place. However, within land designated conservation, the only regulatory agencies that have control would be State agencies, such as the Division of Coastal Management, the Division of Water Quality, the Division of Land Resources, and the Department of Health.

The purpose of the Conservation Areas class is to provide for the effective long-term management and protection of significant, limited, or irreplaceable areas of Bertie County. Land management is needed due to the natural, cultural, recreational, scenic, and/or natural productive values of both local and regional concern.

Examples of permitted uses in the Conservation classification include:

- Drainage: adequate drainage is essential to the economic vitality of Bertie County; therefore, drainage facilities over and through these areas, but not with the intent of draining the conservation areas, will be allowed. Such facilities may include diking, tiling, and piping systems.
- Low-density residential development as approved by the County Health Department and local, State, and Federal regulations. However, water and/or sewer services will not be extended to such a residential area merely to stimulate additional growth and development. On-site sewer services will be required and must be feasible. Site plans should be reviewed to insure that, at a minimum, regulations on impervious materials are met.
- Water-oriented uses such as piers, docks, and marinas, if they are shown not to cause detriment to the estuarine waters or the conservation lands.
- Necessary utility service lines, such as water, sewer, electrical, natural gas, etc., may be transmitted through areas classed as conservation. These lines would have a destination outside of areas classed conservation and would serve only areas outside the conservation class and would not act as a stimulus to development within the conservation class. These transmission lines shall not violate the environmental integrity of the conservation class, and if permitted, must meet all applicable Federal, State, and local regulations.
- Roadways, when construction of roadways can be conducted without significantly altering the ecological system, and in compliance with existing Federal, State, and local regulations.
- Timber harvesting and farming provided natural drainage patterns are not changed.

The conservation classification includes the 100-year flood boundary as defined by the National Flood Insurance Program, Public Trust Waters, Estuarine Waters and Estuarine Shorelines. As noted on the Land Classification Map (Map 4) conservation areas are shown for general use only and final determination of location shall be made by the responsible Federal, State, or local agency having regulatory authority. Such determination shall be made based on a field investigation of any area in question. The land would fall under the rural classification or the limited transition classification if the field investigation shows that it should not be in conservation.



Bertie County
Land Classification
1998
Map **C-1**

- Developed
- Urban Transition
- Limited Transition
- Community
- Rural
- Rural with Services
- Conservation
- Town Planning Area
- Hydrological Units

MID-EAST

The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is adminsitered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.

Flood Damage Prevention Ordinance

Bertie County's Flood Damage Prevention Ordinance, adopted in 1985, states that its purpose is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

1. Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards which result in damaging increases in erosion or in flood heights or velocities;
2. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
3. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;
4. Control filling, grading, dredging and other development which may increase erosion or flood damages; and
5. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

Specific objectives of the ordinance are as follows:

1. To protect human life and health;
2. To minimize expenditure of public money for costly flood control projects;
3. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
4. To minimize prolonged business interruptions;
5. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, street and bridges located in floodplains;
6. To help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas; and
7. To insure that potential homebuyers are notified that property is in a flood area.

Areas of Special Flood Hazard

The ordinance specifies the areas of special flood hazard identified by the Federal Emergency Management Agency in its Flood Insurance Studies dated September 29, 1978 with accompanying maps and other supporting data, and any revision thereto are adopted by reference and declared to be a part of this ordinance. The Bertie County Building Inspector is appointed by the ordinance to administer and implement the provisions of the ordinance.

Before development can occur an application for a Development Permit must be made to the building inspector. Plans must be submitted that show the nature, location, dimensions, and elevations of the area in question, any existing or proposed structures, and the location of fill, storage of materials, and drainage facilities. Specifically, the following information is required:

General Standards

In all areas of special flood hazard, the following provisions are required:

1. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure;
2. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage;
3. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages;
4. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
5. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharges from the systems into flood waters;
6. On site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding;
7. 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.

Specific Standards

In areas of special flood hazard where base flood elevation data has been provided, the following specific standards are established:

Residential Construction

New construction or substantial improvement of any residential structure shall have the lowest floor, including basement, elevated no lower than one foot above the base flood elevation.

Non-Residential Construction

New construction or substantial improvement of any commercial, industrial, or non-residential structure shall either have the lowest floor, including basement, elevated to no lower than one foot above the level of the base flood elevation or together with attendant utility and sanitary facilities, be flood-proofed so that all areas of the structure below the required elevation is water tight and with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the officials as set forth in Article IV, Part 2, § 402.1 (3).

Mobile Homes

(a) No mobile home shall be placed in a floodway or coastal high hazard area, except in an existing mobile home park or existing mobile home subdivision.

(b) All mobile homes shall be anchored to resist flotation, collapse, or lateral movement by providing over-the-top and frame ties to ground anchors. Specific requirements shall be that (i) over-the-top ties be provided at each end of the mobile home, with one additional tie per side at an intermediate location on mobile homes of less than fifty feet and one additional tie per side for mobile homes of fifty feet or more; (ii) frame ties be provided at each corner of the home with four additional ties per side at intermediate points for mobile homes less than fifty feet long and one additional tie

per mobile homes of fifty feet or longer; (iii) all components of the anchoring system be capable of carrying a force of 4,800 pounds; and (iv) any additions to the mobile home be similarly anchored.

(c) For new mobile home parks and subdivisions; for expansions to existing mobile home parks and subdivisions; for existing mobile parks and subdivisions where the repair, reconstruction or improvement of the streets, utilities and pads equal or exceed fifty percent of value of the streets, utilities and pads before the repair, reconstruction or improvement has commenced; and, for mobile homes not place in a mobile home park or subdivision require (i) stands or lots are elevated on compacted fill or on pilings so that the lowest floor of the mobile home will be at or above the base flood level; (ii) adequate surface drainage and access for a hauler are provided; and (iii) in the instance of elevation on pilings (1) lots are large enough to permit steps; (2) piling foundations are placed in stable soil no more than ten feet apart; and (3) reinforcement is provided for pilings more than six feet above the ground level.

Additional specific standards address floodways by prohibiting encroachments and the placement of any mobile homes except for within an existing mobile home park or subdivision. Specific standards for Coastal High Hazard Areas (V Zones) include placement of buildings a minimum of twenty-five (25) landward of mean high tide; elevation of buildings on pilings a minimum of one (1) foot above the base flood elevation level, no use of fill for structural support, no alteration of sand dunes or mangrove stands that would increase potential flood damage, use of lattice work or decorative screening, and prohibition on the placement of any mobile home except in an existing mobile home park or subdivision.

Subdivisions within Flood Hazard Areas

The flood damage prevention ordinance establishes standards for subdivisions within special flood hazard areas. This is especially important for flood damage control since the County does not have a subdivision ordinance. Standards for subdivisions proposed within flood hazard areas include:

1. All subdivision proposals shall be consistent with the need to minimize flood damage;
2. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage;
3. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood hazards; and
4. Base flood elevation data shall be provided for subdivision proposals and other proposed development which is greater than the lesser of fifty lots or five acres.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives. No construction activity that would disturb greater than one acre of land may commence until erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)).

Community Capability Assessment Summary

Due to the mostly rural nature of the area, Bertie County and the towns within the County have not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. As a rule, the towns depend upon the County and/or the State of North Carolina for enforcement of most all land use regulations including flood damage prevention and building inspections (County); and soil erosion and sedimentation control (State). Since the County and towns are experiencing a decline in population, the general need for these services is low.

Bertie County needs to consider employing more land use regulatory powers to assist the towns with mitigating potential damages from natural hazards. A summary of Bertie County's community capability to address hazard mitigation through existing policies and ordinances is summarized in Table C-5.

Incorporating Hazard Mitigation Requirements into Community Plans

No existing policies, programs or ordinances were found to have the effect of hindering hazard mitigation; however, there are opportunities to make current policies more effective for mitigation. The local government intends to create a process by which the requirements of this hazard mitigation plan will be incorporated into other local plans.

During the planning process for new and updated local planning documents, such as the CAMA land-use plan, flood damage prevention ordinance, or emergency management plan, the Bertie County emergency management coordinator (EMC) will provide a copy of the hazard mitigation plan to each respective advisory committee member. The EMC will recommend that advisory committee members ensure that all goals and strategies of new and updated local planning documents are consistent with the hazard mitigation plan and will not contribute to increased hazards in the jurisdiction.

The specific departments, as noted in Table C-5, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table C-5: Bertie County Community Capability Assessment

Policies and Programs	Program Status	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
1998 CAMA Land Use Plan	Existing	Low	The CAMA Land Use Plan is used to plan for future growth while respecting significant environmental features worthy of protection.	When updated as mandated by the State, the Land Use Plan can be revised to include specific hazard mitigation objectives. The County Manager is responsible for overseeing or delegating the responsibility for overseeing the update process.
Flood Damage Prevention Ordinance	Existing	High	The flood damage prevention ordinance seeks to minimize public and private losses due to flood conditions in specific flood hazard areas.	This Ordinance prohibits certain uses in flood hazard prone areas, limits development in those areas and restricts construction to decrease community vulnerability. The County Manager, through delegation of authority, is responsible for enforcement and ordinance revisions.
Building Code Enforcement	Existing	High	Establishes minimum standards for building construction.	These regulations affect hazard mitigation by ensuring adherence to minimum building standards. The State of NC is responsible for code requirements and the County inspection department is responsible for code enforcement.
Minimum Housing Code	Existing	Moderate	The code sets minimum standards for housing to ensure all housing is fit for human habitation.	The County can impact community vulnerability by using the code to force lower income housing to be brought up to minimum code standards. The County inspections department is responsible for code enforcement and code revisions.
Soil Erosion and Sedimentation Control	Existing	High	This purpose of this ordinance is to regulate land-disturbing activities to control accelerated erosion and sedimentation in order to prevent pollution of water and other damages.	The NC Sedimentation Control Commission is responsible for ordinance revisions, plan approval, and enforcement of requirements on site.

D. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards. Below is a summary of the legal authority and powers that North Carolina has conferred on local governments within the state (Local Hazard Mitigation Planning Manual, NC Division of Emergency Management, 1998, Appendix B, pp. 61-64.) These powers fall into four broad categories: regulation, acquisition, taxation, and spending. Bertie County has made limited use of these powers.

Regulation (General Police Power)

North Carolina General Statutes (NCGS) 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), municipalities 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities and Towns); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Building Codes and Building Inspection

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. Most of these standards are imposed through the building code.

North Carolina has a state compulsory building code, which applies throughout the state (NCGS 143-138(c)). However, municipalities and counties may adopt codes for their respective areas if approved by the state as providing "adequate minimum standards" (NCGS 143-138(e)). Local regulations cannot be less restrictive than the state code. Exempted from the state code are: public utility facilities other than buildings; liquefied petroleum gas and liquid fertilizer installations; and farm buildings outside municipal jurisdictions. No state permit may be required for structures under $20,000. (Note that exemptions apply only to state, not local, permits).

Local governments in North Carolina are also empowered to carry out building inspections. NCGS 160A, Art. 19. Part 5; and 153A Art. 18, Part 4 empower cities and counties to create an inspection department, and enumerates department 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.

Bertie County

Bertie County enforces building codes within County planning jurisdiction and within the corporate limits and extraterritorial jurisdiction of the municipalities within the County. Bertie County has incorporated the regulations set forth by the North Carolina State Building Code.

Land Use

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. (Bertie County has under the Coastal Area Management Act adopted a land use plan which was last updated in 1998.)

Characteristics of growth can influence 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, and to enact and enforce zoning ordinances, floodplain ordinances, and subdivision controls.

Each community possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

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 (NCGS 153A-321). 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 NCGS 153A-341, 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.

Bertie County

The current Bertie County CAMA Land Use Plan already addresses hazard response. At the next update, the scope of the plan will be expanded to consider and more directly address hazard mitigation strategies.

Zoning

Zoning is the traditional and nearly universal 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 NCGS 160A-381; and for counties in NCGS 153A-340. (Counties may also regulate inside a municipal jurisdiction at the request of a municipality (NCGS 160A-360(d)). 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 (residential, commercial, industrial) as well as minimum specifications such as lot size, building height and set backs, density of population, etc.

Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Bertie County
Bertie County does not currently employ zoning regulations.

Subdivision Regulations
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. Subdivision regulations prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or the minimum specifications for structures.

Broad subdivision control enabling authority for municipalities is granted in NCGS 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions. 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 (NCGS 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 (NCGS 160A-376(2)).

Bertie County
Bertie County does not currently enforce subdivision regulations.

Floodplain Regulation
(Although Bertie County has a flood damage prevention ordinance currently in place, the ordinance meets only the minimum standards established by FEMA.)

In the summer of 2000, the North Carolina General Assembly adopted an act entitled "An Act to Prevent Inappropriate Development in the One Hundred-Year Floodplain and to Reduce Flood Hazards". By this act, the North Carolina statutes regulating development within floodways were rewritten to include floodplain regulation (NCGS 143-214.51-214.61). The purpose of the new law is to:

(1) Minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage.
(2) Prevent and minimize loss of life, injuries, property damage and other losses in flood hazard areas.
(3) Promote the public health, safety and welfare of citizens of North Carolina in flood hazard areas.

The new statute authorizes local governments to adopt a flood hazard prevention ordinance to regulate uses in flood hazard areas and to grant permits for the use of flood hazard areas that are consistent with the requirements of the statute. The statute provides for certain uses within flood hazard areas without a permit consistent with local land use ordinances (NCGS 143-215.54).

The statute establishes minimum standards for local ordinances and provides for variances for prohibited uses as follows:

(a) A flood hazard prevention ordinance adopted by a county or city pursuant to this Part shall, at a minimum:
    (1) Meet the requirements for participation in the National Flood Insurance Program and of this section.
    (2) Prohibit new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities in the 100-year floodplain except as noted in section (b) below.
    (3) Provide that a structure or tank for chemical or fuel storage incidental to a use that is allowed under this section or to the operation of a water treatment plant or wastewater treatment facility may be located in a 100-year floodplain only if the structure or tank is either elevated above base flood elevation or designed to be watertight with walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.

(b) A flood hazard prevention ordinance may include a procedure for granting variances for uses prohibited under G.S. 143-215.54(c). A county or city shall notify the Secretary (of Crime Control and Public Safety) of its intention to grant a variance at least 30 days prior to granting the variance. A county or city may grant a variance upon finding that all of the following apply:

    (1) The use serves a critical need in the community.
    (2) No feasible location exists for the location of the use outside the 100-year floodplain.
    (3) The lowest floor of any structure is elevated above the base flood elevation or is designed to be watertight with walls substantially impermeable to the passage of water and with structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.
    (4) The use complies with all other applicable laws and regulations.

The statute authorizes priority ratings for local government applications for revolving loans or grants based on adoption of a local comprehensive land use plan, a zoning ordinance, or other measures that significantly contribute to the implementation of the comprehensive land use plan and the flood hazard prevention ordinance.

The Floodplain Act also instructed the Environmental Review Commission to study and report its findings to the 2001 General Assembly on the need to:

(1) Increase the minimum elevation requirement.
(2) Increase the authority of the Secretary of Crime Control and Public Safety to enforce the new statute.
(3) Increase protection against the potential recurrence of damage to public and private property that resulted from the hurricanes of 1999, and other measures to reduce the likelihood that public assistance will be needed in response to future hurricanes and other storm events.

Bertie County

Bertie County has in place a flood damage prevention ordinance that establishes development standards for FEMA identified flood hazard areas. There is also a Bertie County Soil Survey that highlights limitations and hazards inherent in soils, and improvements needed to overcome soil limitations.

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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11).

Bertie County

Although Bertie County has suffered the effects of high winds from recent hurricanes passing through North Carolina, the County had very limited flood damages. Thus, the County has not applied for Hazard Mitigation Grant Program (HMGP) buyout grants to acquire and/or elevate flood loss properties. The County has not chosen to use the power of condemnation (eminent domain) to acquire properties.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated 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. Assessments can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

Bertie County

Bertie County does not use special assessments to impact the pattern of development within the County. The County remains for the most part very rural in nature.

Spending

The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. 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 services, a community can control growth to some extent especially in areas where 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 services. A 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.

Bertie County

Bertie County does not have a capital improvement plan.

E. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

In North Carolina, property taxes provide the primary source of revenue for counties. These taxes are typically used primarily to finance services that must be available and delivered on a daily basis, such as schools, health and social services, planning, solid waste management, and emergency services, leaving very little, if any, for additional services and projects. Fortunately, State and Federal funds are available to local governments for the development and implementation of hazard mitigation programs.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 (Lee Act) which provides for a sliding scale of state tax credits for economic investment.

The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

The most economically distressed counties are ranked in Tier 1 and the most economically prosperous in Tier 5. The rankings are evaluated annually using three factors – population growth, unemployment rate, and per capita income. The 2003 ranking places Bertie County in Tier 1.

F. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Local governments such as Bertie County typically have limited technical capability due to a lack of funding and human resources. There are, however, additional technical sources available at State and Federal levels of government. Along with resources provided by the State and Federal government, the most valuable resource the County has is the wealth of knowledge accumulated by its personnel through their years of experience. Together these capabilities can help build a more resilient community by implementing better planning before the occurrence of a natural hazard, as well as better response during the event and recovery period.

State and Federal

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes.

The manuals also include information on engineering principles, construction methods and costs and suggestions for how techniques can be financed and implemented. Other Federal agencies such as the US Army Corps of Engineers and the Natural Resource Conservation Service (formerly Soil and Water Conservation Service) also provide similar services. The North Carolina Division of Emergency Management works in concert with various Federal agencies to ensure that State and local governments are prepared to respond to natural disasters. The Statewide Floodplain Mapping Initiative, a major effort to improve technical information available to local governments, is being undertaken jointly by the State of North Carolina and the Federal Emergency Management Agency. (See Section III. Implementation for more information on the initiative.)

Technical Capability – Staff Resources

County Manager

The County Manager's office is responsible for all day-to-day decision making and operations of all county departments. The office serves to carry out the policies and guidelines established by the County Board of Commissioners.

Economic Development Department

This department is responsible for developing, promoting, and implementing sound economic strategies to improve the quality of life of Bertie County citizens.

Emergency Management Department

This department is responsible for redevelopment and implementations of county-wide comprehensive emergency programs, specifically in regards to providing guidelines to govern County reaction to both natural and man-made disasters. The department coordinates work with other governments, business, agencies, organizations, and volunteer groups.

Environmental Health Department
This department is responsible for the following areas that are state mandated: food, lodging and institutional sanitation, sub-surface waste water disposal and management, swimming pools and spas, communicable disease control, and solid waste disposal.

Animal/Litter Control Department
This department is responsible for the care, custody and control of animals which have been abandoned or are otherwise not in a caring and safe management situation, along with controlling litter throughout the County.

Finance Department
This department is charged with management of county financial resources, including general accounting and financial reporting, budget, accounts payable, payroll, cash management and investments.

Forest Ranger
The division is charged with forest protection and coordinates local departments in detecting, controlling and distinguishing forest fires in the County.

Health Department
This department is responsible for providing services that help to assure healthy citizens in a healthy environment.

Human Resources Department
This department's responsibilities include advising management on recruitment and hiring. Responsibilities include classification and pay, employee relations, equal employment opportunities, training, benefits and employee safety

Inspections Department
This department's major function is administration and enforcement of inspection laws, specifically the NC State building code. The department is charged with determining habitability of structures damaged by natural and man-made disasters.

Maintenance and Grounds Department
This department is responsible for maintaining building and grounds used by the County and the general public for delivery of services.

Recreation Department
This department is responsible for the safe use of all recreational facilities and for recreational programs.

Sheriff's Department
This department is the principal law enforcement agency for Bertie County. The Sheriff's staff is charged with general enforcement of criminal law throughout the County.

Social Services Department
This department works closely with Emergency Management to provide shelters and services when local residents are threatened by storms and natural disasters.

Tax Department
This department is responsible for appraising property, maintaining records, and collecting taxes.

Water Department
This department is responsible for providing safe water for residents to drink, and protecting county water resources.

G. Political Climate

The elected officials of Bertie County and the towns of Askewville, Colerain, Kelford, Lewiston Woodville, Powellsville, Roxobel, and Windsor are in agreement that implementation of the Hazard Mitigation Plan is a necessary tool to minimize damages from natural hazards. The elected boards of these communities support the need for hazard mitigation to reduce future loss of life and property. Each community will vigorously support hazard mitigation efforts while acknowledging the limited resources both monetarily and physically at the County's and towns' disposal.

Appendix D: State and Federal Resources

ORGANIZATIONS

North Carolina Division of Emergency Management
Web: http://www.ncem.org/mitigations/index.htm
1830-B Tillery Place
Raleigh, NC 27604
Telephone: 919-715-8000

North Carolina Center for Geographic Information and Analysis (CGIA)
Web: http://www.cgia.state.nc.us
301 N. Wilmington Street, Suite 700
Raleigh, NC 27601-2825
Telephone: 919-733-2090

UNC-CH Department of City and Regional Planning
Web: http://www.unc.edu.depts/dcrpweb/
New East, Campus Box 3140
The University of North Carolina-Chapel Hill
Chapel Hill, NC *27599-3140*
Telephone: 919-962-4775

North Carolina Division of Coastal Management (DCM)
Web: http://dcm2.enr.state.nc.us/
P0 Box 27687
Raleigh, NC 27611-7687
Telephone: 919-733-2293

DCM Field Offices

Elizabeth City	252-264-3901
Morehead City	252-808-2808
Washington	252-946-6481
Wilmington	910-395-3900

North Carolina Division of Community Assistance (DCA)
Web: http://www.dca.commerce.state.nc.us/
1307 Glenwood Avenue, Suite 250
Raleigh, NC 27605
Telephone: 919-733-2850

North Carolina League of Municipalities
Web: http://www.nclm.org
P0 Box 3069/2 15 N. Dawson Street
Raleigh, NC 27602
Telephone: 919-715-4000

North Carolina State Data Center
Web: http://sdc.state.nc.us
116 West Jones Street
Raleigh, NC 27603-8003
Telephone: 919-733-4131

Federal Emergency Management Agency (FEMA)
Web: http://www.fema.gov/about/regoff.htm
500 C Street SW
Washington, DC20472
Telephone: 202 646-3923

FEMA Regional Office
3003 Chamblee-Tucker Road
Atlanta, GA 30341
Telephone: 770-220-5200

FEMA National Emergency Training Center
Web: http://www.usfa.fema.gov/nfa/tr_eenet.htm
16825 South Seton Avenue
Emmitsburg, MD 21727
Telephone: 301-447-1000

Office of Management and Budget (OMB)
Web: http://www.whitehouse.gov/omb/
New Executive Office Building
725 17th Street, NW, Room 8002
Washington, DC 20503
Telephone: 202-395-3080

Small Business Administration (SBA)
Web: http://www.sbaonline.sba.gov/DISASTER
Disaster Assistance Division
Office of Disaster Assistance
409 Third Street SW
Washington, DC 20416
Telephone: 202-205-6734

U.S. Army Corps of Engineers (USACE)
Web: http://www.usace.army.mil
Floodplain Management Services and Coastal Resources Branch
20 Massachusetts Avenue NW
Washington, DC 20314
Telephone: 202-272-0169

U.S. Geological Survey (USGS)
Web: http://www.usgs.gov
807 National Center
12201 Sunrise Valley Drive
Reston, VA 20192
Telephone: 703-648-4000

U.S. Department of Housing and Urban Development (HUD)
Web: http://www.hud.gov
Community Planning and Development
Office of Block Grant Assistance
451 7th Street SW -
Washington, DC 20410-7000
Telephone: 202-708-1871

PUBLICATIONS AND DATA

North Carolina Division of Emergency Management
Risk Management Branch (919-715-8000)

- *Tools and Techniques for Mitigating the Effects of Natural Hazards*, 1998
- *Best Mitigation Practices for Local Governments*, 2001
- *Disaster Recovery Manual*
- *Hazard Data Diskettes (County level)*
- *Flood Insurance Rate Maps (FIRMs* also available from the NFIP Map Service Center at 1-80-358-9616)

Federal Emergency Management Agency (FEMA)
Available from the FEMA Distribution Facility (1-800-480-2520)

- *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA publication #386-2, 2001)
- *Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments* (FEMA publication #131, 1990)
- *Guide for the Review Of State and Local Emergency Operation Plans*
- *Disaster Assistance: A Guide to Recovery Programs* (FEMA publication #229(4))
- *Mitigation: Cornerstone for Building Safer Communities*, 1995

Center for Urban and Regional Studies (CURS)

- *Making Mitigation Work: Recasting Natural Hazards Planning and Implementation,* February 1997

National League of Municipalities (NLM)

- *Emergency Management Mini-Guide*, 1992

Office of Management and Budget (OBM)
Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives – available by fax (202-395-4817) or from FEMA library website – http://www.fema.gov/library/ombflood/pdf

Appendix E: Glossary

BFE - Base Food Elevation

Development
Any land-disturbing activity that changes the amount of impervious surface or partially impervious surface coverage on the land, or that otherwise decreases the infiltration of precipitation into the soil.

Disaster/Emergency
Any hurricane, tornado, storm, flood, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, drought, fire, explosion or other catastrophe in any part of the United States which, in the determination of the President, caused damage of sufficient severity and magnitude to warrant major disaster assistance under P.L. 93-288, above and beyond emergency services by the federal government, to supplement the efforts and available resources of the state, local government and disaster relief organization in alleviating damage, loss, hardship or suffering.

Drainageway
Any stream, watercourse, channel, ditch, or similar physiographic feature draining water from the land.

EMC
Emergency Management Coordinator - The emergency response person responsible to the direction and control group for coordinating the response activities of the combined government, industry, and public forces at work in a disaster.

EMS
Emergency Medical Services - Local medical response teams, usually rescue squads or local ambulance services, which provide medical services during a disaster.

EOC
Emergency Operations Center - A protected site from which government officials and emergency response personnel exercise direction and control in an emergency. The emergency Communications Center (ECC) is normally an essential part of the EOC.

EOP
Emergency Operations Plan - A brief, clear and concise description of action to be taken or instruction to be given to those concerned during a specific emergency. The plan will state the method or scheme for coordinated action based on pre-determined assumptions, objectives and capabilities.

EPA - U.S. Environmental Protection Agency

ETJ
Extraterritorial jurisdiction – that area of land outside and beyond the corporate limits of a municipality over which the municipality has planning and zoning jurisdiction.

FEMA
Federal Emergency Management Agency - A federal agency tasked with national disaster and emergency preparedness and response. FEMA also deals in temporary emergency housing, training of state and local emergency response personnel and funding of preparedness projects and functions.

FEMA Flood Zones

Zone A - Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs (base flood elevations) or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone AE and A1-A30 - Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone AH - Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet. The BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone AO - Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. The depth should be averaged along the cross section and then along the direction of flow to determine the extent of the zone. Average flood depths derived from the detailed hydraulic analyses are shown within this zone. In addition, alluvial fan flood hazards are shown as Zone AO on the FIRM. Mandatory flood insurance purchase requirements apply.

Zone AR - Zone AR is the flood insurance rate zone used to depict areas protected from flood hazards by flood control structures, such as a levee, that are being restored. FEMA will consider using the Zone AR designation for a community if the flood protection system has been deemed restorable by a Federal agency in consultation with a local project sponsor; a minimum level of flood protection is still provided to the community by the system; and restoration of the flood protection system is scheduled to begin within a designated time period and in accordance with a progress plan negotiated between the community and FEMA. Mandatory purchase requirements for flood insurance will apply in Zone AR, but the rate will not exceed the rate for unnumbered A zones if the structure is built in compliance with Zone AR floodplain management regulations.
For floodplain management in Zone AR areas, elevation is not required for improvements to existing structures. However, for new construction, the structure must be elevated (or floodproofed for non-residential structures) such that the lowest floor, including basement, is a maximum of 3 feet above the highest adjacent existing grade if the depth of the base flood elevation (BFE) does not exceed 5 feet at the proposed development site. For infill sites, rehabilitation of existing structures, or redevelopment of previously developed areas, there is a 3 foot elevation requirement regardless of the depth of the BFE at the project site.

The Zone AR designation will be removed and the restored flood control system shown as providing protection from the 1% annual chance flood on the NFIP map upon completion of the restoration project and submittal of all the necessary data to FEMA.

Zone A99 - Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplains that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone D - The Zone D designation on NFIP maps is used for areas where there are possible but undetermined flood hazards. In areas designated as Zone D, no analysis of flood hazards has been conducted. Mandatory flood insurance purchase requirements do not apply, but coverage is available. The flood insurance rates for properties in Zone D are commensurate with the uncertainty of the flood risk.

Zone V – Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone VE - Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zones B, C, and X - Zones B, C, and X are the flood insurance rate zones that correspond to areas outside the 100-year floodplains, areas of 100-year sheet flow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees. No BFEs or depths are shown within these zones.

Flood or Flooding
A general and temporary condition of partial or complete inundation of normally dry land areas from: 1) the overflow of inland or tidal waters; and 2) the unusual and rapid accumulation of runoff of surface waters from any source.

Flood Hazard Boundary Map (FHBM)
An official map issued by the Federal Emergency Management Agency (FEMA), where the boundaries of the areas of special flood hazard have been defined as Zone A.

Flood Insurance Rate Map (FIRM)
An official map on which the Federal Emergency Management Agency (FEMA) has delineated both the areas of special flood hazard and the risk premium zones applicable to a community.

Floodway
The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

Mitigation
Any activity that actually eliminates or reduces the probability of a disaster occurrence, or reduces the effects of a disaster. Mitigation includes such actions as zoning and land use management, safety and building codes, flood proofing of buildings and public education.

NCEM
North Carolina Division of Emergency Management - The North Carolina state agency tasked with protecting the general public from the effects of natural or man-made disasters.

NCDENR - North Carolina Department of Environment and Natural Resources.

NCDC - National Climatic Data Center.

NFIP – National Flood Insurance Program
Communities who participate in the NFIP must adopt and enforce floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes Federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary.

Recovery
Activities which involve assistance to enhance the return of the community to normal or near-normal conditions. Short-term recovery returns vital life-support systems to minimum operating standards. Long-term recovery may continue for a number of years after a disaster and seeks to return life to normal or improved levels. Recovery activities include temporary housing, loans or grants, disaster unemployment insurance, reconstruction and counseling programs.

Response
Activities that occur immediately before, during, and directly after an emergency or disaster. Activities involve lifesaving actions such as, the activation of warning systems, manning the emergency operations centers, implementation of shelter or evacuation plans and search and rescue.

Runoff
That portion of rainfall or other precipitation that is not absorbed by the soil, but rather flows across the ground surface and drains to a water body.

USGS - United States Geological Survey.

Watershed
The land area that drains runoff to a surface water body or watercourse. Also called a drainage basin, a watershed includes hills, lowlands, and the body of water into which the runoff drains.

Watershed Best Management Practice (BMP)
A recognized method, activity, device, maintenance procedure, or other management practice used singularly or in combination to minimize the amount of nonpoint source pollution entering surface waters.

Community Capability Assessment – Town of Askewville

A. Introduction

The Town of Askewville is located in central Bertie County, North Carolina. Askewville is located just a few miles northeast of Windsor. It was settled in the 1890's but not incorporated as a town until 1951. It is known as the center of the county's tobacco belt. The Town is small – about 0.59 square miles (+/- 278 acres) in size with a 2000 Census population of 180 – a loss of 21 people from the 1990 Census of 201. The NC Office of State Planning predicts that Bertie County will gradually lose population over the next twenty years.

The Town of Askewville is located in the Coastal Plain region of the State where the topography is generally flat to gently sloping from west to east. Storm water runoff in the Town discharges into drainage ways leading to the Cashie River.

Most of the town is developed for residential uses with the majority being single family homes and manufactured homes. Much of the surrounding area remains very rural in nature. In the 2000 Census, the Town of Askewville had 82 housing units. Twelve of these housing units (14.6%) were classified as mobile/manufactured homes and 70 (85.4%) single family housing.

The economy of Askewville depends largely on the educational, health, and social services industry, which as of 2000, represented 28.7% of the total workforce. The mean travel time to work was approximately 18 minutes. In 2000, approximately 27% of the total population within the Town of Askewville had less than a high school education; however, seventy-three (73) percent of citizens had a high school or higher degree.

The 2000 Census median family income in Askewville was $42,917. Seventy-eight percent of the housing stock within Askewville is owner-occupied, with an average household size of 2.40 persons. In 2000, the median age of citizens within the Town of Askewville was 43, with 78.3% of the population above the age of 21.

The Town of Askewville has a volunteer fire department located at 137 N. Railroad Street. A Bertie County rescue squad facility is also located in the Town (see Bertie County Appendix B for more information on critical facilities). These facilities would be considered critical during the event of a natural disaster and would need to stay or be operational within 24 hours. Those facilities are absolutely necessary for response and recovery efforts during and after a disaster.

B. Planning Authority

The Town of Askewville has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans. The Town of Askewville has not used its legislated regulatory power to adopt and implement many local land use ordinances.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County, including the Town of Askewville.

In addition to addressing general building code issues, the code also addresses the need to minimize potential wind damage. Since 2002, the State of North Carolina has used the International Building Code.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County, including the Town of Askewville.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives.

No construction activity that would disturb greater than one acre of land may commence until an erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)). All development in North Carolina that exceeds State standards must be approved by either the local governing body or the State.

Community Capability Assessment Summary

The overall assessment of Town of Askewville community capability to address hazard mitigation through existing policies and ordinances is summarized in Table 1. The Town of Askewville has not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. The Town, in cooperation with Bertie County, needs to consider employing more of these powers to assist in mitigating potential damages from natural hazards.

Incorporating Hazard Mitigation Requirements into Community Plans

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Mayor, along with Bertie County, will be responsible for providing a copy of the Hazard Mitigation Plan and for ensuring that the responsible department (see Table 1) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table 1, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table 1: Community Capability Assessment – Town of Askewville

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Town of Askewville

Bertie County enforces the building code within the County planning jurisdiction (outside corporate limits and ETJs) and through interlocal agreement the ordinance is enforced within the Town of Askewville.

Land Use

Each community in North Carolina possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

Town of Askewville

The Town of Askewville does not have a Land Use Plan; therefore such mapping does not currently exist. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Zoning

Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Town of Askewville

The Town of Askewville does not have a zoning ordinance; therefore such mapping does not currently exist. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Subdivision Regulations

Broad subdivision control enabling authority for municipalities is granted in NCGS 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions. 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 (NCGS 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 (NCGS 160A-376(2)).

Town of Askewville

The Town of Askewville does not have a subdivision ordinance.

Floodplain Regulation

NC statutes authorize priority ratings for local government applications for revolving loans or grants based on adoption of a local comprehensive land use plan, a zoning ordinance, or other measures, such as a flood damage prevention ordinance, that contribute to reduction community vulnerability to flood hazards.

Town of Askewville

The Town of Askewville does not have a flood damage prevention ordinance but intends to adopt an ordinance by November 1, 2004 as required by FEMA/NCEM.

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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11). The Town of Askewville has not used the power of acquisition to further hazard mitigation efforts.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated areas, thereby discouraging development. The Town of Askewville does not use special assessments to impact the pattern of development.

Spending

The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. 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 services, a community can control growth to some extent especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. The Town of Askewville does not have a CIP.

D. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants. The most economically distressed counties are ranked in Tier 1 and the most economically prosperous in Tier 5. The rankings are evaluated annually using three factors – population growth, unemployment rate, and per capita income. The 2004 NC Department of Commerce ranking places Bertie County in Tier 1.

E. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Smaller local governments such as the Town of Askewville typically have limited technical capability due to a lack of funding and human resources.

State and Federal Resources

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. More information about State and Federal resources can be found in Section III of the Plan.

Local Resources

The Town depends on Bertie County to provide technical resources including building inspections, emergency management services and communications, and minimum housing code enforcement. The County does not currently have a geographic information system but is planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Askewville are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Board supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board continues to strive to make the Town of Askewville a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.

Community Capability Assessment - Town of Colerain

A. Introduction

The Town of Colerain is located in the northeastern corner of Bertie County, North Carolina just west of the Chowan River. The Chowan River is in the upper portion of the Albemarle/Pamlico Sound which is the second largest estuarine system on the east coast of the United States. Colerain is the largest commercial fishing area in Bertie County.

The topography of the Town is generally flat with the land gently sloping from west to east. Storm water runoff in the Town discharges into the Chowan River. The 2000 Census population of the Town of Colerain was 221. The State Office of Planning projects that the population of Bertie County will decline over the next twenty years.

B. Planning Authority

The Town of Colerain has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans.

The Town of Colerain has used its legislative power to adopt a sketch level Coastal Area Management Act (CAMA) Land Use Plan (1989) and update (1994), a zoning ordinance to regulate land use and development and adopted an Extraterritorial Jurisdiction (ETJ) ordinance in 2002 to extend the Town's zoning authority to approximately a one mile radius outside the Town limits. These plans and ordinances were not created specifically for hazard mitigation purposes, but they can be utilized to implement hazard mitigation initiatives.

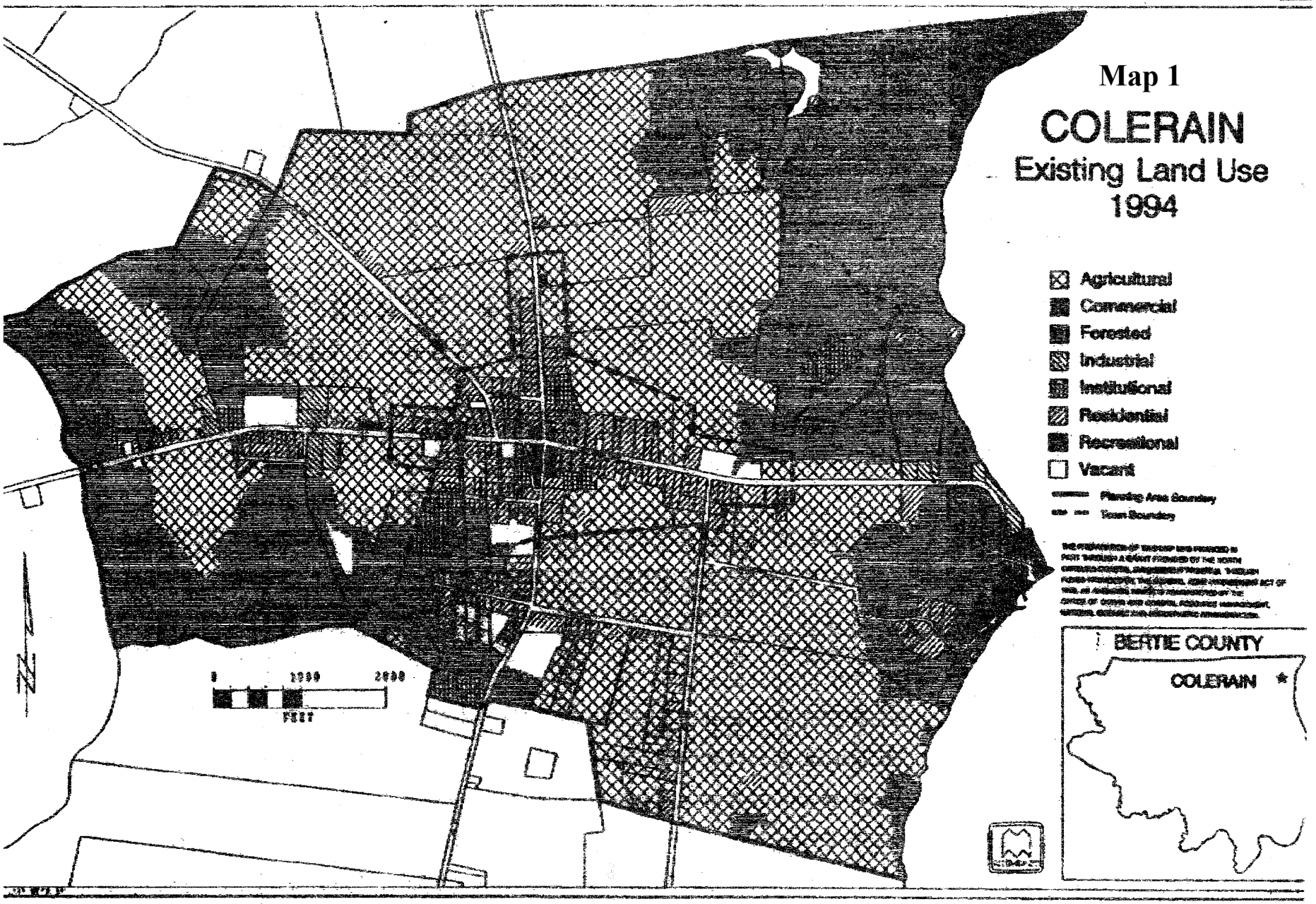
Local government enabling legislation requires that zoning regulations, when adopted by a municipality, be made in accordance with a comprehensive plan. The existence of a comprehensive plan ensures that town boards and staff are developing regulations and ordinances that are consistent with the overall goals of the community. The general plan for the Town of Colerain is contained in the town's CAMA Land Use Plan (1989, 1994).

Town of Colerain CAMA Land Use Plan (Sketch Level) (1989, 1994)

The Land Use Plan is intended to develop methods of public participation, research existing land use, and develop policies based on identified relevant issues. The plan covers the Town of Colerain and the area immediately adjacent but outside the town's planning jurisdiction. The areas outside the town were analyzed by land uses and land classifications to illustrate future goals of the town.

The Town of Colerain is a small fishing and farming community, surrounded on all sides by rural farmland. Most developed land within the town is used for residential purposes. A small business district in the center of town includes grocery stores, offices, a bank, and other retail and service companies. Institutional uses include the Post Office, Town Hall, cemetery and Colerain Elementary School. A major east coast seafood processing facility, the Perry Wynns Fish Company, borders the river.

According to the Land Use Plan (1989, 1994), the land use trends in Colerain have been static since the early 1970s. However, the expansion of water and sewer systems to serve the area east of Town along the Chowan River has the potential to develop for residential uses. There are no industries within the town limits of Colerain.



The "Planning Area" represents an unofficial jurisdiction beyond the established corporate authority of the Town.

Municipal Water System
The town turned its water service responsibility to Bertie County in 1994, after the town secured a CDBG grant to add water service facilities to the Long Branch community, a small minority community just south of the town limits. The County included the town in its District 2 water project and a completely new water distribution system was installed in the town.

Municipal Sewer System
The wastewater collection and treatment facilities for Colerain serve 221 in town residents and 107 out of town residents. It is a new collection and treatment system constructed in 1997 and expanded in 1999. The new system consists of new collection piping and lift stations, and a state of the art lagoon / spray-field treatment facility. Two major Clean Water Grants funded the construction of the new system which replaced an outdated treatment/discharge system. Capacity of the new system is licensed at 75,000 gpd (gallons per day), and is currently operating at approximately 40% capacity. This gives the town sufficient capacity for future development. Residents in areas surrounding the Town's collection system are on private septic tank systems.

Drainage
The town's storm water drainage system drains excess water into outlying areas beyond town corporate limits. Storm water drainage is a problem for the Long Branch neighborhood located south of town. This neighborhood is situated in a low lying area with poor drainage that contributes to high bacteria within the neighborhood water supply.

Transportation
Two major highways intersect at the center of Colerain. NC 42 runs east to the Chowan River and west to the Town of Powellsville. NC 45 runs north to Harrellsville and south parallel to the Chowan River.

Police, Fire and Rescue
The town relies on the Bertie County Sheriff Department for police protection. Fire protection is provided by the Town of Colerain Volunteer Fire Department with approximately 20 fire fighters and two pumpers and one tanker. Rescue operations are provided by the volunteer rescue squad with nineteen emergency medical technicians, two ambulances and one rescue unit. In addition to the local fire and rescue squads, the town has a mutual aid agreement with all the towns in Bertie County for additional support when needed. Additional medical services are available through the Bertie County Health Department, as well as surrounding communities such as Ahoskie, Windsor, and Edenton.

Critical Facilities
In addition to the police, fire and rescue facilities, the Town of Colerain owns land in the center of town that contains a town hall, library, community building, and a small park. There is one public school in town - Colerain Elementary School (grades K – 8) – a part of the Bertie County public school system, serving both town residents and the surrounding area. The elementary school has a capacity of 475 students. High school students are bused to Bertie High School about 20 miles away.

Issues, Policy Statements, and Implementation Strategy

Below is a brief outline of the issues identified in the Colerain CAMA Plan along with a list of implementation strategies as adopted by the Town?

Issue #1: Areas of Environmental Concern

The Coastal Resources Commission has designated three Areas of Environmental Concern (AECs) in the Colerain Land Use Plan Study Area. These areas are the public trust area of the Chowan River, the estuarine waters associated with the River, and a seventy-five foot estuarine shoreline bordering the River.

The wetlands in the Colerain Land Use Study Area are under supervision by the Army Corps of Engineers, who enforces the Clean Water Act. Any discharge of dredged or fill materials into these waters are regulated by the Corps' permit process.

Policy Statement

The Town of Colerain will undertake appropriate measures to increase public awareness of environmentally fragile areas by supporting and advising citizens on how to comply with State and Federal environmental programs.

Implementation Strategy

The Town will make available to citizens information on the area's environmental resources and promote their preservation.

Issue #2: Historical Resources

The Town of Colerain wishes to preserve its historical resources.

Policy Statement

The Town, along with any owners of property with significant historical value, will seek preservation of properties through local, State, and Federal means.

Implementation Strategies

- The Town will inventory the properties in the area which may be of significant historical value.
- The Town will make available to those historic property owners additional information concerning nomination to the National Register of Historic Places.
- The Town will seek to keep its residents informed of the historical resources it possesses and will participate in and support the protection of all historical sites and areas.

Issue #3: Stormwater Drainage

Drainage in the outlying areas of Colerain needs improvement in order to avoid periodic yard flooding and standing water problems.

Policy Statement

The Town of Colerain will develop a specific area-wide drainage plan to implement as developed and developing areas are brought into the Town's jurisdiction.

Implementation Strategies

- The Town will utilize recent detailed soil maps from the Bertie County Soil Conservation Service in developing a detailed area-wide drainage plan.
- The Town will seek financial and/or technical assistance from State and/or Federal agencies to help implement a specific drainage improvement plan as necessary.

Issue #4: Sewer System

The town has a wastewater treatment system that with expansion can support and encourage development.

Policy Statement

The Town recognizes the need and supports the expansion of the existing sewer system in order to attract development.

Implementation Strategies

- The Town will analyze the existing sewer system and determine what needs to be done to expand this system.
- If feasible, the Town will apply for grants for sewer system expansion.

Issue #5: Growth

Although the Town is committed to a moderate rate of growth, there are no existing controls for an orderly growth pattern.

Policy Statement

Developing land use and planning controls will be of primary importance as a means for promoting orderly growth and development.

Implementation Strategies

- The Town Council will appoint a Planning Board.
- All adopted land use related plans will be continuously reviewed and updated as necessary.
- All land use control ordinances will be reviewed for needed revisions at least annually.

Issue #6: Police Protection

Police protection is important to the safety and welfare of the Town's residents.

Policy Statement

The Town of Colerain will make efforts to promote a safe environment for its citizens by increasing police protection in the Town.

Implementation Strategy

- The Town will investigate financing possibilities for the employment of at least a part-time police officer.

Other Policy Issues

1. **Types and Location of Desired Industries.**
   Commercial fishing and agriculture have been the historic primary economic activities in the Colerain area, and the Town would like to see more industries developed which are related to these activities. Examples include seafood, aquaculture, and agricultural processing. Other industries are also encouraged to promote the economic development of the Colerain area and to provide more employment opportunities for the area's residents. Such industries should be located only where State and Federal environmental guidelines can be met.

2. **Types, Location, and Density of Residential Development.**
   Colerain would like to maintain the low-density, single-family residential character of the Town. The most desirable locations for such development would be on land already cleared and on sites which are economically accessible to water and/or sewer lines.

3. **Energy Facility Siting.**
   The Town would not like to see any of the Colerain area's natural resources adversely affected by the nearby placement of energy facilities. However, such facilities that have no adverse effects on the environment, such as a solar energy facility, should be permissible and located only where stringent environmental regulations can be met.

1994 Policy Objectives and Implementation Strategies

This plan represents an update of the Towns' 1989 plan. The Coastal Area Management Act regulations specify that all land use plan shall contain policy statements of local policy areas; resource protection, resource production and management, economic and community development, storm hazard mitigation, and continued public participation.

Resource Protection

There are areas within the Town of Colerain that are considered Areas of Environmental Concern. These environmentally sensitive areas are associated with the waters and land adjacent to the Chowan River. The Chinkapin Swamp area located about one mile West of Colerain could prove to be wetlands. Development in these areas should be limited not only because of negative environmental impacts but also because of the possibility of damage to the structures caused by flooding. Encroachments or development on floodplains, such as artificial fills, reduce the flood carrying capacity and add to flood heights, thereby increasing the possibility of flooding in other areas beyond the encroachment itself.

The following is a listing of policy objectives the Town has adopted to protect its sensitive natural resources (specific strategies are further explained in the 1994 Land Use Plan Update).

Constraint to development

- Soils
- Floodplain Areas
- Development in Areas of Environmental Concern (AECs)
- 404 Wetlands

- Outstanding Resource Waters (ORWs)
- Freshwater Swamps and Marshes
- Cultural and Historic Resources
- Hurricane and Flood Evacuation Plans
- Means of protecting potable water Supply
- Use of Package Treatment Plants
- Storm water Runoff

Resource Production and Management
- Productive Agricultural Lands
- Commercial Forest Lands
- Existing or Potential Mineral Production Areas
- Commercial and Recreational Fisheries; Including Nursery and habitat Areas, ORW's and Trawling Activities in Estuarine Waters
- Off Road Vehicles
- Residential, commercial, and industrial land development impacts on any resources
- Peat or Phosphate mining impact on any resource

Economic and Community Development
- Types of Location of industry Desired
- Local Commitment to Providing Services to Development
- Re-development of Developed Areas
- Commitment to State and Federal Programs
- Assistance to Channel maintenance and beach nourishments projects
- Energy Facility Siting and Development
- Tourism
- Costal and Estuarine Water Beach Access
- Types densities, location, units per acre of anticipated residential development and services to support development

Continuing Public Participation
- Review and approval of the land use plan by the Town Council who are elected by the citizens
- Conduct an opinion survey to solicit public opinion
- Give news interviews of the Land Use Planning Committee activities.
- All meetings are open to the general public
- Hold public hearing once draft is completed
- Hold public hearing prior to the adoption of the plan

Storm Hazard Mitigation, Post-Disaster Recovery Policies

The Town of Colerain is located in close proximity to the Chowan River shoreline and wetlands, which is one of the major hazard areas in the county. In the event of a major storm, the Mayor of Colerain would act as a liaison between the Town and the Bertie County Office of Emergency Management. The County's multi-hazard plan includes an evacuation area shelter at Colerain Elementary School.

Land Classification System

The purpose of the land classification system is to provide a uniform way of looking at how the use of land interacts with environmentally sensitive areas and with the development needs of a particular locality. It is not a strict regulatory device in the sense of a zoning ordinance or zoning map. It represents a tool to aid in understanding the relationships between various land use categories and how these relationships help shape local policy. Particular attention is focused on the intensity at which land is used and the level of services needed to support that intensity. The Coastal Area Management Act's land use planning guidelines state:

> 'The land classification system provides a framework to be used by local government to identify the future use of all lands in each county. The designation of land classes allows the local government to illustrate their policy statements as to where and to what density they want growth to occur, and where they want to conserve natural and cultural resources by guiding growth." (7B.0204)(a)

The land classifications, along with a land classification map (page CCA-12), are therefore intended to serve as a visual representation of the Town's policies. The map depicting these classifications must be as flexible as the policies that guide them. (See Land Classification Map). Please keep in mind that although the area surrounding the Town is included in the map, the Town's current jurisdiction is limited to the area in the present corporate limits of Colerain. The land classifications indicated outside Town represent the future classification intention of Colerain to be implemented when the Town's jurisdiction is expanded. (In 2002, the Town of Colerain adopted an Extraterritorial Jurisdiction (ETJ) ordinance to extend the Town's zoning authority to approximately a one mile radius outside the Town limits.)

A. Developed

The purpose for this class is to provide for continued intensive development and redevelopment of existing cities. Areas meeting the intent of the developed land classification are currently urban in character where minimal undeveloped land remains and have in place, or are scheduled for the timely provision of, the usual municipal or public services. Urban in character includes mixed land uses such as residential, commercial, industrial, institutional, and other uses at high to moderate densities. Services include water, sewer, recreational facilities, streets and roads, police and fire protection. Most land classified "developed" lies within the Town (see land classification map, page CCA-12).

B. Urban Transition

Urban Transition land is classified as those lands providing for future intensive urban development within the ensuing ten years on lands that are most suitable and that will be scheduled for provision of necessary public utilities and services. They may also provide for additional growth when additional lands in the developed class are not available or when they are severely limited for development.

Lands classified for "transition" may include:

1. lands currently having urban services, and
2. other lands necessary to accommodate the urban population and economic growth anticipated within the planning jurisdiction over the next ten years.

Lands classified for the latter reason must:

a. be served or be readily served by water, sewer, and other urban services, including streets, and
b. be generally free of severe physical limitations for urban development.

The "transition" class should not include:

1. lands of high potential for agriculture, forestry, or mineral extraction, or land falling within extensive rural areas being managed commercially for these uses, when other lands are available;
2. lands where urban development might result in major or irreversible damage to important environmental, cultural, scientific, or scenic values; or
3. land where urban development might result in damage to natural systems or processes of more than local concern; and
4. lands where development will result in undue risk to life or property from natural hazards or existing land uses, e.g., frequently flooded areas.

Transitional lands are those areas where public investment decisions will be required to provide the necessary urban services. With long-range planned improvements in water and sewer services, the areas classified "transition" should have accessibility to these services. The relationship between "developed" and "transitional" make those lands classified as developed important areas to closely monitor. The Coastal Resources Commission has further clarified this relationship as described below.

"The Developed and Transitional classes should be the only lands under active consideration by a county or municipality for intensive urban development requiring urban services. The area within these classes is where detailed local land use and public investment planning will occur. State and Federal expenditures on projects associated with urban development (water, sewer, urban street systems, etc.) will be guided to these areas. Most of the "transitional" lands in the Town of Colerain corporate limits should have access to centralized water and/or sewer systems during the planning period."

Land classified "transition" on the land classification map (page CCA-12) includes the following areas:

a. All undeveloped land within the Town's limits.
b. The elementary school property (currently undeveloped) located adjacent to the school and outside the Town's limits.
c. Property west of Town currently being used for industrial and residential uses but not connected to municipal water and sewer.
d. The Long Branch neighborhood south of Town.
e. Additional land south of Town currently being used for agricultural and residential uses but planned for the future development of a trailer park and lands adjacent to roads where the future extension of water lines is planned.

C. Rural

The "rural" class provides for agriculture, forest management, mineral extraction, and other low-intensity uses on large sites, including residences where urban services are not required and where natural resources will not be unduly impaired. These lands are identified as appropriate locations for resources management and allied uses: land with high potential for agriculture, forestry, or mineral extraction; lands with one or more limitations that would make development costly and hazardous; and land containing irreplaceable, limited, or significant natural, recreational, or scenic resources not otherwise classified.

Rural lands in the Colerain Study Area surround the Town, excluding lands where urban services are likely to be extended and lands that may be subject to flooding (see land classification map; page CCA-12).

D. Conservation

The "conservation" class provides for effective long-term management of significant limited or irreplaceable areas. This management may be needed because of its natural, cultural, recreational, productive, or scenic values. This class should be limited to lands that contain: major wetlands; essentially undeveloped shore lands that are unique, fragile, or hazardous for development; necessary wildlife habitat or areas that have a high probability for providing necessary habitat conditions; publicly-owned water supply watersheds and aquifers; and forestlands that are undeveloped and will remain undeveloped for commercial purposes. Also, by definition, all Areas of Environmental Concern should be classified as "conservation."

On the eastern portion of the Colerain Study Area, land bordering the Chowan River is designated as conservation. This area is mostly wetlands with sloping cliffs and soils unsuitable for agriculture. The Colerain Beach and Boat Club and several industrial, residential, and recreational uses are located in this area. Although partially developed, the Town of Colerain wishes to preserve this fragile environmental area.

West of Colerain lies the Chinkapin Swamp. This forested area, designated as conservation, is totally undeveloped with the exception of the Town's yard waste site. The classification of this area will influence future policy concerning expansion or relocation of this existing yard waste site.

Summary

The issues, policy statements, and implementation strategies identified herein should serve as primary decision-making tools to aid the Town of Colerain in the day-to-day operation of the planning program. Adherence to these policies will minimize arbitrary planning decisions. In addition, the implementation strategies identified will provide the methodology to successfully meet the needs and demands of future Town growth. Implementation of the policies will depend completely upon the cooperation of the Colerain Town Council, the Planning Board (when established), and most importantly, the residents of Colerain.

Town of Colerain Zoning Ordinance

The purpose section of the Colerain zoning ordinance states that the zoning regulations and districts established are intended "to accomplish compatible development of the land within the Town's limits in a manner which will best promote the health, safety, and general welfare of the people, as well as to provide for efficiency and economy in the process of development; to make adequate provisions for traffic; to secure safety from fire, panic and other dangers; to provide for light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to facilitate the adequate provision of transportation, water, sewage, schools, parks, and other public requirements; to promote desirable living conditions and the sustained stability of neighborhoods; to protect property against blight and depreciation and for other purposes in accordance with the Town of Colerain Land Use Plan".

The zoning ordinance establishes seven zoning districts that regulate the use of land. The seven zoning districts are described in Table 1. The zoning ordinance does not address the placement of homes in flood plain or flood hazard areas. Note: The Town does not have a reproducible size zoning map at this time.

Table 1: Town of Colerain Zoning Districts

Zoning District	Description
A-R Agricultural-Residential District	The A-R District is a district in which the principal use of land is for low density residential and agricultural purposes. The regulations of this district are intended to protect the agricultural sections of the community from the influx of uses likely to render it undesirable for farms and future development, and to insure that residential development not having access to public water supplies and dependent upon septic tanks and outdoor privies for sewage disposal will occur at sufficiently low densities for a healthful environment.
N-R Neighborhood-Residential District	The N-R District is a district in which the principal use of land is for single-family residences. The regulations of this district are intended to provide areas of the community to be used as low-density, quiet residential neighborhoods.
MFR Multi-Family Residential District	The MFR District is a district in which the principal use of the land is for multi-family, two-family, and single-family homes. The regulations of this district are intended to provide areas of the Town where high density residential development is appropriate.
O-I Office and Institutional District	The O-I District is a district in which the principal use of land is for offices, institutions, and public buildings. The regulations of this district are intended to designate areas of the community where office and institutional type uses are compatible with their surroundings.
CB Central Business District	The CB District is a district in which well established commercial uses in the central and oldest part of Town are grouped. The regulations of this district are intended to suit existing conditions in this well established area and provide for its continued commercial use.
GB General Business District	The GB District is a district in which the principal use of land is commercial. The regulations of this district are designed to accommodate a wide variety of uses.
I Industrial District	The I District is a district in which the principal use of land is for industrial purposes. The regulations of this district are designed to accommodate industrial development in appropriate locations.

Source: Town of Colerain Zoning Ordinance.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County including within the Town of Colerain.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County, including the Town of Colerain.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives.

No construction activity that would disturb greater than one acre of land may commence until erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)). All development in North Carolina that exceeds State standards must be approved by either the local governing body or the State.

Community Capability Assessment Summary

The overall assessment of Town of Colerain community capability to address hazard mitigation through existing policies and ordinances is summarized in Table 2. The Town of Colerain has not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. The Town, in cooperation with Bertie County, needs to consider employing more of these powers to assist in mitigating potential damages from natural hazards.

Incorporating Hazard Mitigation Requirements into Community Plans

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Mayor, along with Bertie County, will be responsible for providing a copy of the Hazard Mitigation Plan and for ensuring that the responsible department (see Table 2) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table 2, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table 2: Community Capability Assessment – Town of Colerain

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
CAMA Land Use Plan	High	The purpose of the CAMA Land Use Plan is to promote an orderly and efficient land use development pattern, which allows for a variety of land uses and is sensitive to environmental and social concerns.	As the Land Use Plan is updated, revise goals and strategies to more specifically address hazard mitigation. The Town Mayor is responsible for plan updates.
Zoning Ordinance	Moderate	The Zoning Ordinance regulates the height, number of stories, and size of buildings and other structures, the size of yards, and other open spaces, the density of population, and the location and use of buildings, structures, and land.	Continue to investigate ways to improve zoning standards to address issues that pertain to hazard mitigation, including limiting development in flood prone areas and zoning sensitive environmental areas for protection from development. The Town Mayor is responsible for ordinance enforcement and revisions.
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Town of Colerain

Bertie County enforces the building code within the County planning jurisdiction (outside corporate limits and ETJ's) and through interlocal agreement the ordinance is enforced within the Town of Colerain.

Land Use

Each community in North Carolina possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

Town of Colerain

The Town of Colerain has a CAMA Land Use Plan; however, the map does not show hazard overlays. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Zoning

Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Town of Colerain

The Town of Colerain currently has a zoning ordinance, however, does not currently have a reproducible map. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Subdivision Regulations

Broad subdivision control enabling authority for municipalities is granted in NCGS 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions. 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 (NCGS 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 (NCGS 160A-376(2)).

Town of Colerain

The Town of Colerain does not have a subdivision ordinance.

Floodplain Regulation

NC statutes authorize priority ratings for local government applications for revolving loans or grants based on adoption of a local comprehensive land use plan, a zoning ordinance, or other measures, such as a flood damage prevention ordinance, that contribute to reduction community vulnerability to flood hazards.

Town of Colerain

The Town of Colerain does not have a flood damage prevention ordinance but intends to adopt an ordinance by November 1, 2004 as required by FEMA/NCEM.

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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11). The Town of Colerain has not used the power of acquisition to further hazard mitigation efforts.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated areas, thereby discouraging development. The Town of Colerain does not use special assessments to impact the pattern of development.

Spending

The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. 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 services, a community can control growth to some extent especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. The Town of Colerain does not have a CIP.

D. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants. The most economically distressed counties are ranked in Tier 1 and the most economically prosperous in Tier 5. The rankings are evaluated annually using three factors – population growth, unemployment rate, and per capita income. The 2004 NC Department of Commerce ranking places Bertie County in Tier 1.

E. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Smaller local governments such as the Town of Colerain typically have limited technical capability due to a lack of funding and human resources.

State and Federal Resources

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. More information about State and Federal resources can be found in Section III of the Plan.

Local Resources

The Town depends on Bertie County to provide technical resources including building inspections, emergency management services and communications, and minimum housing code enforcement. The County does not currently have a geographic information system but is planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Colerain are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Council supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Council continues to strive to make the Town of Colerain a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.

Community Capability Assessment – Town of Kelford

A. Introduction

The Town of Kelford is located in the northwestern corner of Bertie County, North Carolina at the headwaters of the Cashie River. The topography of the Town is generally flat with the land gently sloping from west to east. Storm water runoff in the Town discharges into the Cashie River. The 2000 Census population of the Town of Kelford was 245. The State Office of Planning projects that the population of Bertie County will decline over the next twenty years.

B. Planning Authority

The Town of Kelford has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans.

The Town of Kelford has used its legislated power to adopt a Coastal Area Management Act (CAMA) Land Use Plan (last updated 1994). The land use plan was not created specifically for hazard mitigation purposes, but it can be utilized to implement hazard mitigation initiatives.

CAMA Land Use Plan (1994)

The Town of Kelford encompasses approximately 1 square mile. NC Highway 308 bisects the Town in a north-south direction and the Seaboard Coastline railway bisects the community along an east-west axis. The great majority of the land in the Town has been developed for residential purposes. Twenty-three percent of the ninety-four residential units in the town are manufactured homes (see Bertie County Appendix B).

There are no industrial uses in the Town and only two small commercial uses located on NC 308. Institutional uses include the town hall, fire station, post office, a community park and several churches. The area surrounding Kelford is used primarily for agricultural purposes.

The Town of Kelford has not been mapped by the Federal Emergency Management Agency and has no floodplain regulations in effect. Bertie County enforces the State Building Code. The Town has adopted a minimum housing code to facilitate the demolition of deteriorated structures.

Land Use Policies

Resource Protection

1. Discourage building in areas where land is not physically suitable for development.
   A. Support the efforts of the Army Corps of Engineers to control the alteration of freshwater wetlands through the 404 wetlands permitting program.
      - The Town continues to support the efforts of the Army Corps of Engineers in 404 permitting program.
   B. Support strict enforcement of the State Environment Health Code regarding the installation, operation, and maintenance of in-ground sewage treatment system.

- The County Health Department is responsible for issuing all septic tank permits in Kelford. The Town continues to support strict enforcement of all septic tank permit regulations.

2. Preserve and promote the Town's history and cultural resources.
   A. Work with the existing and future owners of the former Kelford School to ensure that the property is properly preserved and maintained. Encourage owners to have the property listed on the National Register of Historic Places.
      - The Town has not been successful in having the former Kelford School placed on the National Register of Historic Places. The Royal Lodge 471 currently owns the property; however, the Town seeks to ensure the house is properly maintained.
   B. Support the use of County tax dollars to help finance a cultural resource inventory for Bertie County.
      - The County Manager stated that no cultural resource inventory has been completed for Bertie County.

3. Protect the Town's present and future water supply.
   A. Oppose additional water withdrawals by large water users in Virginia; support state efforts to work with Virginia officials to limit groundwater withdrawals.
      - The Town continues to oppose large water withdrawals from large companies in Virginia that would result in less water in the Upper Cape Fear Aquifer.
   B. Support State efforts to develop a groundwater management plan for eastern North Carolina.
      - In March of 1994 the Town of Kelford adopted a Water Supply Plan. This plan will become part of the State Water Supply Plan, to be prepared by the Division of Water Resources.
   C. Support strict compliance with regulations addressing underground storage tanks.
      - The Town continues to support all regulations concerning the placement and monitoring of underground storage tanks.

Resource Production and Management

1. Protect and enhance agricultural uses in the Kelford area.
   A. Classify agricultural areas outside of Town as Rural on the Town's Land Classification Map.
      - The majority of agricultural land outside of Town was classified as rural on the Land Classification Map in the previous plan.
   B. Encourage farmers outside of Town owning ten acres or more to apply for use-value of their property.
      - The Town continues to encourage farmers to apply for use-value of their property.
   C. Support State, Federal and County policies and programs which encourage diversification of the local agricultural economy.
      - The Town continues to support the efforts of different levels of government that encourage the diversification of the local agricultural economy.

2. Preserve areas of prime farmland.
   A. Use the County's detailed Soil Survey to identify areas of Prime Farmland; to the extent feasible, direct development to other areas and reserve Prime Farmland for agricultural uses.
      - Much of the area outside of Town that was identified in the County Soil Survey as Prime Farmland was classified as Rural on the Land Classification Map. Recommended uses in areas classified as "Rural" are, farming, forestry and low density residential.
   B. Support State legislative efforts to develop a comprehensive statewide program for farmland preservation.
      - The Town continues to support the efforts of the legislators in developing a comprehensive statewide program for farmland preservation.
      -
3. Ensure efficient, environmentally sound agricultural production.
   A. Support the use of Best Management Practices for land management and agricultural production.
      - The Town continues to support the use of Best Management Practices by farmers.
   B. Work with the Soil Conservation Service to encourage participation in the State's Agricultural Cost Share Program.
      - The Town continues to support participation in the State's Cost Share Program.

Economic and Community Development

1. Support expansion of existing area industries and recruitment of new industrial and commercial enterprises.
   A. Work with Perdue officials and the County industrial developer to attract a Perdue-related service industry to Kelford.
      - The Town has talked with Perdue and Duke Power about the possibility of Perdue building an electric generator plant. Duke Power would re-open the rail-road line in order to supply the plant with coal. However due to the changes in the economic climate the project was not feasible.
   B. Support the efforts of the Bertie County industrial developer to attract a Perdue-related service industry to Kelford.
      - The Town continues to support the efforts of Mr. Robert Spivey and the Bertie County Economic Development Commission to bring new businesses into the County.
   C. Publicize opportunities for technical assistance for small businesses available from groups such as the Mid-East Commission and the Small Business Center at Roanoke-Chowan College.
      - The Town has not in the past publicized the availability technical assistance from the above agencies. However there are plans to place a notice on the bulletin board in Town Hall to inform small businesses of services provided.

2. Provide for the orderly growth of Kelford and land outside of Town.
   A. Consider developing and adopting regulations controlling the location and appearance of mobile homes.
      - The Town has not developed any ordinance regulating mobile homes.
   B. Try to "market" the community for residential purposes.

- The Town has not worked towards this goal.

3. Preserve and enhance the quality of life in Kelford.
   A. Develop, adopt and enforce a housing code.
      - In 1989 as a prerequisite to receiving CDBG funds the Town adopted a minimum housing code.
   B. B. Apply for assistance to construct tennis courts in the Town recreation park.
      - The Town has not been successful in receiving funds to construct tennis courts.

4. Strive for increased government cooperation.
   A. Encourage the County to adopt and enforce a trash ordinance.
      - The County installed recycling centers in different locations throughout the County. Residents are encouraged to bring house trash to these locations to be recycled.
   B. The Town is working with the Bertie County Sheriff, and his deputies to provide police protection for the Town.
   C. Contact State transportation officials, State Highway Patrol and Perdue officials, should traffic hazards posed by N.C. 308 continue to increase.
      - The Highway Patrol agreed to try to monitor traffic along Highway 308 about twice a week; this has helped to reduce the speed of traffic coming though Kelford. The Town also has an agreement with Perdue officials whereby Town officials can report the license plate of all Perdue trucks seen speeding though Town.

Storm Hazards

Storm Hazards Mitigation policies and Post-Disaster and Recovery Plans were approved by the EMS Director for Bertie County. Changes in the 1988 plan will be reflected in the section of this plan entitled “Storm Hazard Mitigation, Post-Disaster Recovery and Evacuation Plans”.

Public Participation

1. Solicit citizen input in all planning decisions.
   A. Advertise all special Council meetings in the Bertie Ledger-Advance and the News-Herald.
      - The Town advertises all required public hearings in one of the local newspapers. The Town also places the schedule of all regular Board of Commissioners meetings in the window of Town Hall.
   B. Conduct an annual evaluation of the policies and strategies to see what progress is being made.
      - The Town did not implement an annual evaluation of local policies and strategies.

Zoning Ordinance

The purpose section of zoning ordinance, effective October 2000, states the purpose "shall be to promote the public health, safety, morals and general welfare; provide for the orderly development of the Town of Kelford; secure safety from fire, panic and other dangers; provide adequate light and air; prevent the overcrowding of land; avoid undue concentration of population; and facilitate the adequate provision of transportation, water, sewage, schools, parks, and other public services."

The zoning ordinance establishes three zoning districts that regulate the use of land. The seven zoning districts are described in Table 1. The zoning ordinance does not address the placement of homes (site-built, modular and manufactured) in flood hazard areas. Note: At this time the Town of Kelford does not have a reproducible size zoning map.

Table 1: Town of Kelford Zoning Districts

Zoning District	Description
R-15 Residential District	This district is intended for developed areas, as well as areas planned for residential development where single family dwellings on small individual lots are the primary land use. Site-built, modular and Class A and B manufactured homes are permitted. Existing Class C manufactured units (constructed prior to 1976) may continue to be used, but are specifically not permitted to be moved into the planning area. Compatible uses such as churches and bed and breakfast homes are allowed. High density development such as apartments or manufactured home parks is excluded.
B-1 Business District	This district is intended for areas within the town established for commercial activities that cater to the traveling public. Uses not consistent with the small town character are not allowed.
M-1 Manufacturing District	This district is intended for areas established for limited manufacturing, wholesale, warehouse and related business uses/services, which in their normal operation conduct most of their operation inside the principal structures on the property with few negative external impacts such as outdoor storage of equipment or products, high noise levels, or offensive odors. Uses that have a detrimental impact on adjoining uses are prohibited.

Source: Town of Kelford.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County, including the Town of Kelford.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County, including the Town of Kelford.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives.

No construction activity that would disturb greater than one acre of land may commence until an erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)). All development in North Carolina that exceeds State standards must be approved by either the local governing body or the State.

Community Capability Assessment Summary

The overall assessment of Town of Kelford community capability to address hazard mitigation through existing policies and ordinances is summarized in Table 2. The Town of Kelford has not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. The Town, in cooperation with Bertie County, needs to consider employing more of these powers to assist in mitigating potential damages from natural hazards.

Incorporating Hazard Mitigation Requirements into Community Plans

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Mayor, along with Bertie County, will be responsible for providing a copy of the Hazard Mitigation Plan and for ensuring that the responsible department (see Table 2) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table 2, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table 2: Community Capability Assessment – Town of Kelford

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
CAMA Land Use Plan	High	The purpose of the CAMA Land Use Plan is to promote an orderly and efficient land use development pattern, which allows for a variety of land uses and is sensitive to environmental and social concerns.	As the Land Use Plan is updated, revise goals and strategies to more specifically address hazard mitigation. The Town Mayor is responsible for plan updates.
Zoning Ordinance	Moderate	The Zoning Ordinance regulates the height, number of stories, and size of buildings and other structures, the size of yards, and other open spaces, the density of population, and the location and use of buildings, structures, and land.	Continue to investigate ways to improve zoning standards to address issues that pertain to hazard mitigation, including limiting development in flood prone areas and zoning sensitive environmental areas for protection from development. The Town Mayor is responsible for ordinance enforcement and revisions.
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Town of Kelford

Bertie County enforces the building code within the County planning jurisdiction (outside corporate limits and ETJ's) and through interlocal agreement the ordinance is enforced within the Town of Kelford.

Land Use

Each community in North Carolina possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

Town of Kelford

The Town of Kelford has a CAMA Land Use Plan, however, does not currently have a reproducible map. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Zoning

Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Town of Kelford

The Town of Kelford currently has a zoning ordinance, however, does not currently have a reproducible map. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Subdivision Regulations

Broad subdivision control enabling authority for municipalities is granted in NCGS 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions. 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 (NCGS 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 (NCGS 160A-376(2)).

Town of Kelford

The Town of Kelford does not have a subdivision ordinance.

Floodplain Regulation

NC statutes authorize priority ratings for local government applications for revolving loans or grants based on adoption of a local comprehensive land use plan, a zoning ordinance, or other measures, such as a flood damage prevention ordinance, that contribute to reduction community vulnerability to flood hazards.

Town of Kelford

The Town of Kelford does not have a flood damage prevention ordinance but intends to adopt an ordinance by November 1, 2004 as required by FEMA/NCEM.

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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11). The Town of Kelford has not used the power of acquisition to further hazard mitigation efforts.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated areas, thereby discouraging development. The Town of Kelford does not use special assessments to impact the pattern of development.

Spending

The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. 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 services, a community can control growth to some extent especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. The Town of Kelford does not have a CIP.

D. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants. The most economically distressed counties are ranked in Tier 1 and the most economically prosperous in Tier 5. The rankings are evaluated annually using three factors – population growth, unemployment rate, and per capita income. The 2004 NC Department of Commerce ranking places Bertie County in Tier 1.

E. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Smaller local governments such as the Town of Kelford typically have limited technical capability due to a lack of funding and human resources.

State and Federal Resources

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. More information about State and Federal resources can be found in Section III of the Plan.

Local Resources

The Town depends on Bertie County to provide technical resources including building inspections, emergency management services and communications, and minimum housing code enforcement. The County does not currently have a geographic information system but is planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Kelford are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Board of Commissioners supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board continues to strive to make the Town of Kelford a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.

Community Capability Assessment – Town of Lewiston Woodville

A. Introduction

The Town of Lewiston Woodville is located in the western portion of Bertie County, North Carolina. The towns of Lewiston and Woodville were separately incorporated in 1881 and 1911. The two towns merged in 1981 to operate as one municipal government unit. Lewiston Woodville is located abut 15 miles from the county seat of Windsor.

The Town is small – about 1.97 square miles (+/- 1,261 acres) in size with a 2000 Census population of 613 – a loss of 188 people from the 1990 Census of 801. The NC Office of State Planning predicts that Bertie County will gradually lose population in the next twenty years.

Most of the Town is developed for residential uses with the majority being single family homes and manufactured homes. Much of the surrounding area remains very rural in nature. In the 2000 Census Lewiston Woodville had 291 housing units. Ninety-five of these housing units (32.6%) were classified as mobile/manufactured homes and 196 (67.3%) as single family residential.

The economy of Lewiston Woodville depends largely on the manufacturing and retail trade industries, which as of the 2000 Census represented 51.7% of the total workforce. The mean travel time to work in 2000 was approximately 24 minutes. Approximately 31% of the total population had less than a high school education in 2000; however, sixty-nine (69%) percent of the citizens of Lewiston Woodville have a high school or higher degree.

The median family income in Lewiston Woodville in 1999 was $26,389. In the 2000 Census, sixty-eight percent of the housing stock within Lewiston Woodville was owner-occupied, with an average household size of 2.56 persons. The median age of citizens within the Town of Lewiston Woodville was 37, with 66.4% of the population above the age of 21.

The Town of Lewiston Woodville has a volunteer fire department located at 103 Church Street. The Bertie County rescue squad has a facility also located on Church Street (see Bertie County Appendix B Community Vulnerability Assessment for a list of critical facilities). These facilities would be considered critical during the event of a natural disaster and would need to stay operational or be operational within 24 hours. Those facilities are absolutely necessary for response and recovery efforts during and after a disaster.

B. Planning Authority

The Town of Lewiston Woodville has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans.

Town of Lewiston Woodville Zoning Ordinance

The Lewiston Woodville zoning ordinance was adopted in 1988 and last amended in 2001. The Zoning Ordinance was prepared in accordance with a comprehensive plan for the development of the town and is designed to lessen the congestion in the streets; to secure the safety from fire, panic, and other dangers; to promote health and the general welfare; to provide adequate light and air; to prevent the over crowding of land; to avoid undue concentration of population; to facilitate the adequate provision of transportation, water,

sewerage, schools, parks, and other public requirements and to give reasonable consideration to the expansion and development of the town so as to provide for its orderly growth and development.

The zoning ordinance establishes four zoning districts (Table 1) that regulate the use of land with the corporate limits. The zoning ordinance does not address the placement of homes in floodplain or flood hazard areas. (Note: At this time, the Town does not have a reproducible size zoning map.)

Table 1: Town of Lewiston Woodville Zoning Districts

Zoning District	Description
R-1 Low Density Residential District	The R-1 District is intended to encourage the development of permanent low density residential neighborhoods. These districts are located primarily in areas which are protected from more intensive uses of land. Each dwelling should be connected to public sewer and water systems, but population density should not exceed two (2) families per acre.
R-2 General Residential District	The General Residential district is established to control the development of areas which exhibit a pattern of urban growth characterized by a mixture of dwelling types in relatively close proximity. These regulations are intended to permit the continued development of those areas but to control factors which will minimize the conflict between residential use of the land and other areas.
GB – General Business	The intent of this district is to provide for a centrally located commercial, trade, and services areas. These regulations are designed to encourage the continued use of land for commercial purposes and to permit use of the land for commercial purposes and to permit concentrated development of the district while maintaining a substantial relationship between intensity of land use and the capacity of utilities and streets.
H-C Highway Commercial	The purpose of this district is to provide for and encourage the proper grouping and development of roadside uses which will best accommodate the needs of the motoring public.

Source: Lewiston Woodville Zoning Ordinance.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County, including the Town of Lewiston Woodville.

In addition to addressing general building code issues, the code also addresses the need to minimize potential wind damage. The State of North Carolina currently uses the Southern Building Code but is transitioning to the International Building Code by the end of 2002.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives.

No construction activity that would disturb greater than one acre of land may commence until an erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)). All development in North Carolina that exceeds State standards must be approved by either the local governing body or the State.

Community Capability Assessment Summary

The overall assessment of Town of Lewiston Woodville community capability to address hazard mitigation through existing policies and ordinances is summarized in Table 2. The Town of Lewiston Woodville has not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. The Town, in cooperation with Bertie County, needs to consider employing more of these powers to assist in mitigating potential damages from natural hazards.

Incorporating Hazard Mitigation Requirements into Community Plans

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Mayor, along with Bertie County, will be responsible for providing a copy of the Hazard Mitigation Plan and for ensuring that the responsible department (see Table 2) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table 2, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table 2: Community Capability Assessment – Town of Lewiston Woodville

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
Zoning Ordinance	Moderate	The zoning ordinance regulates use of land through establishes zoning districts and standards for development.	Amend ordinance to include regulations for underground chemical and gasoline storage. The Mayor is the lead person responsible for ordinance enforcement and revisions.
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Town of Lewiston Woodville

Bertie County enforces the building code within the County planning jurisdiction (outside corporate limits and ETJs) and through interlocal agreement the ordinance is enforced within the Town of Lewiston Woodville.

Land Use

Each community in North Carolina possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

Town of Lewiston Woodville

The Town of Lewiston Woodville does not have a Land Use Plan; therefore such mapping does not currently exist. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

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Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

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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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11). The Town of Lewiston Woodville has not used the power of acquisition to further hazard mitigation efforts.

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The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated areas, thereby discouraging development. The Town of Lewiston Woodville does not use special assessments to impact the pattern of development.

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The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

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D. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

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E. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Smaller local governments such as the Town of Lewiston Woodville typically have limited technical capability due to a lack of funding and human resources.

State and Federal Resources

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. More information about State and Federal resources can be found in Section III of the Plan.

Local Resources

The Town of Lewiston Woodville has limited staff to enforce local regulations. The Town depends on Bertie County to provide technical resources including building inspections, emergency management services and communications, and minimum housing code enforcement. The County does not currently have a geographic information system but is planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Lewiston Woodville are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Board supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board continues to strive to make the Town of Lewiston Woodville a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.

Community Capability Assessment – Town of Powellsville

A. Introduction

The Town of Powellsville is located in north central Bertie County, North Carolina. The Town is small – about 0.29 square miles in size with a 2000 Census population of 259 – a loss of 20 people from the 1990 Census. Powellsville is located on a low plateau about 20 feet above mean sea level with land sloping gently away on all sides to form swampland and intermittent wetlands.

The Town of Powellsville originated as a crossroads community for major trading routes. In the late 1890s a rail line was constructed through Powellsville connecting Ahoskie and Windsor, the County seat and the Town gained importance as a service center for the surrounding farming community. As the importance of the railroad for conveyance of goods diminished, the Town began to diminish in population and business concerns.

Most of the town is developed for residential uses with the majority being single family homes and manufactured homes. Much of the surrounding area remains very rural in nature. The Town has a public water system and has received a $3 million grant to construct a public sewer system that may increase development as the soils in the area are poorly suited for septic tank use. However, no substantial increase in growth is expected as the Office of State Planning predicts that Bertie County will gradually lose population in the next twenty years. In the 2000 Census Powellsville had 137 housing units. Twenty-six of these housing units (19%) were classified as mobile homes or trailers and only 4 (2.9%) multi-family units.

B. Planning Authority

The Town of Powellsville has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans.

The Town of Powellsville has used its legislated power to adopt a sketch level Coastal Area Management Act (CAMA) Land Use Plan (1989) and a zoning ordinance to regulate land use and development. The land use plan and the zoning ordinance were not created specifically for hazard mitigation purpose, but they can be utilized to implement hazard mitigation initiatives.

Local government enabling legislation requires that zoning regulations, when adopted by a municipality, be made in accordance with a comprehensive plan. The existence of a comprehensive plan ensures that town boards and staff are developing regulations and ordinances that are consistent with the overall goals of the community

CAMA Land Use Plan (1998)

The Town of Powellsville adopted an initial CAMA Land Use Plan in 1988. The Plan was most recently updated in 1998. The 1998 update establishes policy statements in five categories. Under each category there is a list of policy statements and mitigation strategies that are intended to cover issues associated with growth on the Town in the coming years.

A. Resource Protection

There are a limited number of natural resources in the Town with the major natural resources being farmland, woodland and small areas of freshwater wetlands. There are no major creeks or rivers, no Areas of Environmental Concern (AECs), no floodplain, and no rare natural or geological features. The Town values its historic cultural resources in the form of older homes and buildings. The Town also places high importance on protection of groundwater which is the source of the public water supply. The Town strongly opposes any activity that could threaten the quality of the groundwater.

Policy 1. Constraints to Development

Discourage building in areas that are not suitable for septic systems.

- Support and strictly enforce State and Local Environmental Health Codes regarding the installation, operation, and maintenance of in-ground sewage treatment systems.

Policy 2. Wetland of Highest Functional Significance

Rely on the Army Corps of Engineers' efforts to regulate wetland areas.

- Report any development activities on land believed to be wetlands to the Army Corps of Engineers.

Policy 3. Other Hazardous/Fragile Areas

Support the preservation of the Town's historic and cultural resources.

- Continue to work with property owners of older structures in the Town to ensure that structures are properly maintained.

Policy 4. Means of Protecting Potable Water Supply

Conserve and protect the Town's water supply.

- Report the location of underground storage tanks to the appropriate State agencies; update the "Town of Powellsville Water Supply Plan" every five years as required by G.S. 143-355(1).

Policy 5. Stormwater Runoff

Reduce the amount of pollutants being washed into creeks and ponds.

- Encourage new home builders to leave undisturbed as much of the natural vegetation as possible. Encourage farmers to use BMPs to reduce the amounts of chemicals used in agricultural production.

Policy 6. Water Quality Problems and Management Measures to Reduce Local Sources of Pollution

Rely on State and Federal regulations.

- The Town of Powellsville does not have adequate staff to initiate local programs that protect water quality, but the Town favors agricultural best management practices, local citizens monitoring programs, and other state measures, based on sound science, to reasonably protect present and future water quality.

B. Resource Production and Management

Bertie County's fertile agricultural land is considered the area's most valuable resource. The Town would like to encourage the use of land outside the Town for agricultural production and will support efforts to increase the viability of the County's agricultural economy. The Town would also like to limit the negative impact that farming might have on other activities in the area. The Town will support commercial forestry operations that will not have a negative impact on the environment.

The Town of Powellsville does not have any water bodies large enough to support commercial fishing operations. There are no mining operations or mineral production activities taking place in the Powellsville area. Powellsville does not have any local recreational facilities to sponsor organized sporting activities.

Policy 1. Productive Agricultural Lands

Encourage agricultural diversification and encourage farmers outside of Town to apply for use-value of their property.

- Inform farmers of the tax advantages in applying for a use-value assessment. Support the efforts of farmers that choose to diversify.

Policy 2. Residential, Commercial and Industrial Development Impact on Resources

Support State requirements on erosion control plans for developments involving more than one acre of land.

- Contact the Land Quality Section, Division of Land Resources when any development disturbs one acre or more of land.

C. Community and Economic Development

The Town of Powellsville has lost population in recent years. Residents would like to see new businesses in Town that would not only increase the tax base and provide job opportunities for residents, but also increase the aesthetics of the Town. Town officials are looking for development along NC Highway 42 and Secondary Road 1321.

Policy 1. Types and Locations of Desired Industries

Support industrial location based on the needs of the industry and environmental impacts.

- Work with State and Federal agencies regulating industrial control standards.

Policy 2. Local Commitment to Providing Services for New Development

Allow new out of Town water users to connect to the water system.

- Charge out of Town residents $1 more than in Town residents for water services; pursue grant funds for a sewer system for the Town; or allow the Town to hook onto a neighboring system.

Policy 3. Desired Growth Patterns

Rely on the local zoning ordinance for guiding urban growth into areas classified as "Developed" or "Urban Transition" on the Land Classification Map.

- Implementation shall occur through strict enforcement of the adopted zoning ordinance and updates of local ordinances as necessary.

Policy 4. Anticipated Residential Development and Services Needed

Allow septic tank requirements to determine development densities.

- Implementation shall occur by supporting the septic tank permitting program of the Bertie County Environmental Health Department.

Policy 5. Redevelopment of Developed Areas

Rehabilitate substandard housing and vacated buildings and upgrade local services.

- Continue to pursue grant funding to address community development needs.

Policy 6. Commitment to State and Federal Programs

Powellsville will support all State and Federal programs, especially those that improve the quality of life for its citizens.

- Voice concerns to State officials about unfunded mandates.

Policy 7. Energy Facility Siting and Development

The Town will encourage the location of generating plants only in appropriate areas.

- Support the location of generating plants in rural, sparsely populated areas.

Policy 8. Tourism

Continue the current level of support for the Historical Albemarle Tour program.

- Implementation shall occur by making literature about the Historical Albemarle Tour available at Town Hall.

D. Storm Hazard Mitigation, Post Disaster Recovery and Evacuation Plans

The Town of Powellsville area has no major creeks or rivers, or floodplain areas as identified by the Federal Emergency Management Agency (FEMA) that will pose a threat during a major storm event. Powellsville has no Areas of Environmental Concern (AECs). High winds pose the greatest storm threat in the Powellsville area. Falling trees and blowing debris could severely damage property and threaten human safety.

Heavy rains also pose risks. Although there are no official FEMA-mapped floodplain areas within the community, drainage ditches have been dug throughout most of the Town and there are several low-lying areas where water collects during normal rains. Heavy rain encountered with a major storm event will quickly fill drainage channels and low spots, and localized areas of flooding are likely to develop.

Policy 1. Evacuation and Reconstruction

Powellsville is under the jurisdiction of the 1994 Bertie County Emergency Operations Plan. The County's Emergency Management Coordinator is responsible for developing and conducting exercises to test the evacuation plan and will coordinate the action of local emergency services and operations during a storm event. Powellsville residents are directed to the Colerain Elementary School in the event of an emergency.

Policy 2. Mitigation

Powellsville has no low lying areas associated with local tributaries. The greatest potential for storm damage would be flooding due to heavy rains, not the rising of a tributary. Powellsville has a stormwater drainage problem during heavy rain periods.

1. Reduce the potential for loss of lives and property through regulatory controls.
   a. Enforce the State Building Code in all new construction.
   b. Enforce the Housing Code.

2. Increase public awareness of the need for hurricane preparation.
   a. Support the "preparedness" program the County Office of Emergency Management conducts in local schools.
   b. Participate in practice and drill exercises sponsored by the Office of Emergency Management.

E. Public Participation

The Town Planning Board solicited public input during the land use plan update planning process. The Planning Board continues to meet as needed to assist the Town Council in implementing strategies for obtaining policy objectives proposed in the 1998 Land Use Plan.

F. Continuing Public Participation

Public Education on Planning Issues

During the update process, citizen input was requested by a citizens' survey.

Continued Public Participation in Planning

Make regular efforts to draw more public participation.

- Advertise meetings in local newspaper.

Method of Obtaining Citizen Input

Respect and encourage the input of citizens on planning issues presented to town boards.

- Encourage citizens to participate in planning issues and to attend planning board meetings.

Land Classification

Powellsville adopted a system of land classification and an official Land Classification Map to assist local officials in attaining policy objectives of the Plan. The Map sets out a proposed development pattern for the Powellsville planning area. The land classifications reflect proposed future land development uses and attempt to link land use, policy objectives, and implementation actions. The Map includes the area within ½ mile outside of the Town corporate limits as a statement of preference since the Town does not control planning within this area.

Classification Scheme

The land classification scheme is based on the guidelines for land classification outlined in the Coastal Area Management Act's Land Use Planning Guidelines. Of the seven possible classifications, the Town of Powellsville applies four.

1. Developed
The Developed Class encompasses much of the land within the corporate limits of the Town. This classification represents the existing and proposed development pattern for the community. Classifying all areas in the Town as developed is intended to facilitate this type of development where public services are already provided.

2. Urban Transition
Transition areas adjoin the Developed area and delineate areas of existing or anticipated high density development outside of the Town's corporate limits. Transition areas adjoin the major thoroughfares entering and leaving Town along US 13, NC 42 and SR 1321. A mix of commercial and residential development is expected to occur along US 13 and residential development is anticipated along NC 42 and SR 1321.

3. Limited Transition
No areas have been designated as Limited Transition in the Powellsville planning area.

4. Community
No areas have been designated as Community in the Powellsville planning area.

5. Rural
No areas have been designated as Rural in the Powellsville planning area.

6. Rural with Services
The Rural with Services classification encompasses most of the land outside the Town limits. These areas have scattered residential development, farmland and woodland. The Town supports the use of this land as agriculture and low-density residential use.

7. Conservation
The "conservation" class designates areas in the Powellsville planning area that the Town believes should be kept in a natural condition. A low-lying area north of the Town limits is wet at certain times of the year and would be subject to flooding in time of heavy rain. Development in this area poses hazards to developers and to the environment.

Intergovernmental Cooperation
The Map has been designed to guide the actions of private developers and public agencies at all levels of government in activities affecting land development. The objectives set forth in the Plan will enhance the land use goals of neighboring communities, the County, and the coastal region as a whole. The Town will work with various public groups to ensure that the planning objectives and policy actions adopted in the Plan will be implemented as the Town develops.

Relationship of Policies to Land Classification
All development that occurs within the Powellsville planning area is subject to the local zoning regulations and the State building Code enforced for the Town by the Bertie County Inspections Office as well as other ordinances.

Town of Powellsville Zoning Ordinance

The most recent update of the Powellsville zoning ordinance was adopted in 2000. The purpose section of the zoning ordinance states that the zoning ordinance was "updated in accordance with a plan for the development of Powellsville and is designed to avoid congestion in the streets; to secure safety from fire, panic, and their dangers; to promote health, general welfare, and a quality lifestyle; to provide adequate light and air; to prevent the over development of land; to avoid undue concentration of populations; to facilitate the adequate provision of transportation, electricity, water, sewerage, schools, parks, and other public requirements and to give reasonable consideration to the future expansion and development of the town so as to provide for its planned growth and development."

The zoning ordinance establishes four zoning districts (Table 1) that regulate the use of land with the corporate limits. The zoning ordinance does not address the placement of homes in flood plain or flood hazard areas. Note: The Town does not have a reproducible size zoning map at this time.

Table 1: Town of Powellsville Zoning Districts

Zoning District	Description
Residential District (R)	District is designed and intended to secure for the persons who reside there a comfortable, healthy, safe and pleasant environment in which to live sheltered form incompatible and disruptive activities that properly belong in nonresidential districts.
Mobile Home Park (MHP)	This district is designed to accomplish the purposes of the Residential District, and at the same time, to permit mobile homes (Class A and/or Class B) as single-family residences. The mobile home park district is a "floating" district, meaning that such districts are established on a case-by-case basis, by special use permit from the Board of Adjustment. Mobile Home Park Districts shall only be p[permitted within areas designated Developed or Transition in the Town's Coastal Management Act Land Use Plan.
Neighborhood Business District (B-1)	This district is designed to accommodate a variety of commercial activities (particularly those that are pedestrian-oriented) that will result in the most intensive and attractive use of the Town's central commercial area.
Highway Business District (B-2)	This district is designed to accommodate a wide variety of high-impact commercial uses.

Source: Powellsville Zoning Ordinance.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County, including the Town of Powellsville. In addition to addressing general building code issues, the code also addresses the need to minimize potential wind damage. The State of North Carolina currently uses the International Building Code.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives.

No construction activity that would disturb greater than one acre of land may commence until an erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)). All development in North Carolina that exceeds State standards must be approved by either the local governing body or the State.

Community Capability Assessment Summary

The overall assessment of Town of Powellsville community capability to address hazard mitigation through existing policies and ordinances is summarized in Table 2. The Town of Powellsville has not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. The Town, in cooperation with Bertie County, needs to consider employing more of these powers to assist in mitigating potential damages from natural hazards.

Incorporating Hazard Mitigation Requirements into Community Plans

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Mayor, along with Bertie County, will be responsible for providing a copy of the Hazard Mitigation Plan and for ensuring that the responsible department (see Table 2) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table 2, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table 2: Community Capability Assessment – Town of Powellsville

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
CAMA Land Use Plan	High	The purpose of the CAMA Land Use Plan is to promote an orderly and efficient land use development pattern, which allows for a variety of land uses and is sensitive to environmental and social concerns.	As the Land Use Plan is updated, revise goals and strategies to more specifically address hazard mitigation. The Town Mayor is responsible for plan updates.
Zoning Ordinance	Moderate	The Zoning Ordinance regulates the height, number of stories, and size of buildings and other structures, the size of yards, and other open spaces, the density of population, and the location and use of buildings, structures, and land.	Continue to investigate ways to improve zoning standards to address issues that pertain to hazard mitigation, including limiting development in flood prone areas and zoning sensitive environmental areas for protection from development. The Town Mayor is responsible for ordinance enforcement and revisions.
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

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Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants. The most economically distressed counties are ranked in Tier 1 and the most economically prosperous in Tier 5. The rankings are evaluated annually using three factors – population growth, unemployment rate, and per capita income. The 2004 NC Department of Commerce ranking places Bertie County in Tier 1.

E. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Smaller local governments such as the Town of Powellsville typically have limited technical capability due to a lack of funding and human resources.

State and Federal Resources

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. More information about State and Federal resources can be found in Section III of the Plan.

Local Resources

The Town depends on Bertie County to provide technical resources including building inspections, emergency management services and communications, and minimum housing code enforcement. The County does not currently have a geographic information system but is planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Powellsville are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Board supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board continues to strive to make the Town of Powellsville a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.

Community Capability Assessment – Town of Roxobel

A. Introduction

The Town of Roxobel is located in the far northwestern corner of Bertie County, North Carolina. The topography of the Town is generally flat with the land gently sloping from west to east. Storm water runoff in the Town discharges into the Cashie River. The 2000 Census population of the Town of Roxobel was 263. The State Office of Planning projects that the population of Bertie County will decline over the next twenty years.

B. Planning Authority

The Town of Roxobel has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans.

The Town of Roxobel has recently used its legislated regulatory power to adopt a zoning ordinance to regulate land use and development. Although the ordinance was not created specifically for hazard mitigation purposes, it can be utilized to implement hazard mitigation initiatives. The Town Board is also creating and appointing a Planning Board to serve as an advisory body on planning matters.

Local government enabling legislation requires that zoning regulations, when adopted by a municipality, be made in accordance with a comprehensive plan. The existence of a comprehensive plan ensures that town boards and staff are developing regulations and ordinances that are consistent with the overall goals of the community. The Town of Roxobel is included in the Bertie County CAMA Land Use Plan (see Bertie County Hazard Mitigation Plan Appendix C for more detail).

Zoning Ordinance

The purpose section of the Roxobel zoning ordinance states that the purpose of the ordinance is "to promote the public health, safety, morals and general welfare; provide for the orderly development of the Town of Roxobel; secure safety from fire, panic and other dangers; provide adequate light and air; prevent the overcrowding of land; avoid undue concentration of population; and facilitate the adequate provision of transportation, water, sewage, schools, parks, and other public services." The ordinance is also "designed to assist the citizens, elected and appointed boards, and the administrator in guiding land development within the planning jurisdiction and was developed with a spirit of concern for both the individual rights of the land owners and the public responsibility to promote the orderly development of the community."

The zoning ordinance establishes zoning districts (Table C-1) that regulate the location, height, bulk, number of stories and size of buildings, and the uses of land, buildings and other structures. Note: The Town does not have a reproducible size zoning map at this time.

Table C-1: Town of Roxobel Zoning Districts

Zoning District	Description
R-15 Residential District	Intended for developed areas as well as areas planned for residential development, where single family dwellings on small individual lots are the primary land use. Site-built (including modular), Class A and B manufactured home units are permitted. Existing Class C manufactured home units may continue to be used indefinitely, but units constructed prior to 1976 are specifically not permitted to be moved into the planning area. Compatible uses such as churches and bed and breakfast homes may be allowed provided the residential character of the community is not harmed. High density development such as apartments or manufactured home parks, as well as Class C manufactured homes on individual lots, are excluded because they are inconsistent with development patterns promoted by this district. Public water is generally expected for all developed lots in this district.
B-1 Business District	Intended for areas within the town established for commercial activities that cater to the traveling public in motor vehicles. Uses that are not consistent with the small town character will not be allowed.
M-1 Light Manufacturing District	Intended for areas established for limited manufacturing, wholesale, warehouse and related business uses/services, which in their normal operation conduct most of their operation inside the principle structures on the property with few negative external impacts such as outdoor storage of equipment or products, high noise levels, or offensive odors. Uses that have a detrimental impact on adjoining uses shall be prohibited. These activities need to be located in areas better suited to accommodate heavy industrial uses in other parts of the county.

Source: Town of Roxobel Zoning Ordinance.

Site Plan Submittals

Site plan submittals require that existing natural features and fragile environmental areas be shown. Proposed changes to existing features or new features required to be shown include drainage facilities.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County, including within the Town of Roxobel.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A. The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County, including within the Town of Roxobel.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are adequate to resist normal forces of nature and that substandard dwellings are demolished so that they do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Bertie County is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives.

No construction activity that would disturb greater than one acre of land may commence until an erosion and sedimentation control plan has been reviewed by the County and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)). All development in North Carolina that exceeds State standards must be approved by either the local governing body or the State.

Community Capability Assessment Summary

The overall assessment of Town of Roxobel community capability to address hazard mitigation through existing policies and ordinances is summarized in Table 1. The Town of Roxobel has not found it necessary to implement many of the regulatory powers conferred upon local governments by the State of North Carolina. The Town, in cooperation with Bertie County, needs to consider employing more of these powers to assist in mitigating potential damages from natural hazards.

Incorporating Hazard Mitigation Requirements into Community Plans

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Mayor, along with Bertie County, will be responsible for providing a copy of the Hazard Mitigation Plan and for ensuring that the responsible department (see Table 1) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table 1, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table 1: Community Capability Assessment – Town of Roxobel

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
Zoning Ordinance	Moderate	The Zoning Ordinance regulates the height, number of stories, and size of buildings and other structures, the size of yards, and other open spaces, the density of population, and the location and use of buildings, structures, and land.	Continue to investigate ways to improve zoning standards to address issues that pertain to hazard mitigation, including limiting development in flood prone areas and zoning sensitive environmental areas for protection from development. The Town Mayor is responsible for ordinance enforcement and revisions.
Site Plan Submittal	High	This plan requires that existing natural features and fragile environmental areas be identified, as well as proposed changes to existing or new features including drainage facilities.	Continue incorporating site plan submittals with all new and existing development so not to build within fragile areas. Consider strengthening the requirement so not to allow any development within areas that are considered environmental sensitive areas. The Town Mayor is responsible for enforcement and revisions.
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Town of Roxobel

Bertie County enforces the building code within the County planning jurisdiction (outside corporate limits and ETJ's) and through interlocal agreement the ordinance is enforced within the Town of Roxobel.

Land Use

Each community in North Carolina possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

Town of Roxobel

The Town of Roxobel does not have a Land Use Plan; therefore such mapping does not currently exist. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps with desired overlays.

Zoning

Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Town of Roxobel

The Town of Roxobel does not have a zoning ordinance; however, there is not currently a map of reproducible size that incorporates hazard overlays. As stated in Section II: Mitigation Actions, the Town in conjunction with Bertie County will actively pursue implementing a GIS system, enabling the production of such maps.

Subdivision Regulations

Broad subdivision control enabling authority for municipalities is granted in NCGS 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions. 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 (NCGS 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 (NCGS 160A-376(2)).

Town of Roxobel

The Town of Roxobel does not have a subdivision ordinance.

Floodplain Regulation

NC statutes authorize priority ratings for local government applications for revolving loans or grants based on adoption of a local comprehensive land use plan, a zoning ordinance, or other measures, such as a flood damage prevention ordinance, that contribute to reduction community vulnerability to flood hazards.

Town of Roxobel

The Town of Roxobel does not have a flood damage prevention ordinance but intends to adopt an ordinance by November 1, 2004 as required by FEMA/NCEM.

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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11). The Town of Roxobel has not used the power of acquisition to further hazard mitigation efforts.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated areas, thereby discouraging development. The Town of Roxobel does not use special assessments to impact the pattern of development.

Spending

The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. 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 services, a community can control growth to some extent especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. The Town of Roxobel does not have a CIP.

D. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

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The Town depends on Bertie County to provide technical resources including building inspections, emergency management services and communications, and minimum housing code enforcement. The County does not currently have a geographic information system but is planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Roxobel are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Board supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board continues to strive to make the Town of Roxobel a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.

Community Capability Assessment – Town of Windsor

A. Introduction

The Town of Windsor, the county seat, is located on the Cashie River in south central Bertie County, North Carolina. Primary highway arterials serving the area include US 17 and US 13. The Town of Windsor is about 2.47 square miles (+/- 1,581 acres) in size, with an additional 7.9 square miles (+/- 5,056 acres) within the extraterritorial jurisdiction.

In the 2000 Census, the Town of Windsor had a population of 2,283 – an increase of 227 people from the 1990 Census. According to town projections, the population should increase to approximately 3,200 by 2010, making the Town of Windsor the fastest growing municipality in Bertie County. However, the NC Office of State Planning predicts that Bertie County will gradually lose population in the next twenty years.

Approximately half of the planning area is covered with forestland, which is mostly owned by the forest industry; over 20% of the land area is used for agricultural purposes. A flat to gently sloping topography defines the landscape, with elevations ranging from 10 to 20 feet above sea level. In areas along the Cashie River, however, some areas are slightly below sea level. A cretaceous aquifer, underlain by granite bedrock, is located beneath the Town.

Most of the Town of Windsor is developed for residential uses including primarily single family homes and manufactured homes. In the 2000 Census Windsor had 1,092 housing units. One-hundred and twenty-five of these housing units (11.5%) were classified as mobile/manufactured homes, 117 multi-family (10.7%) and 850 (77.9%) single family residential homes.

The economy of Windsor depends largely on the educational, health, and social services industry, which as of 2000, represented 30.5% of the total workforce. The mean travel time to work in 2000 was approximately 18 minutes. Approximately 34% of all residents within the Town of Windsor had less than a high school education in 2000; however, sixty-six (66) percent of the citizens of Windsor have a high school or higher degree.

The median family income in Windsor in the 2000 Census was $34,107. Sixty-three (63) percent of the housing stock within Windsor is owner-occupied, with an average household size of 2.33. The median age of citizens within the Town of Windsor in 2000 was 42, with 72.1% of the population above the age of 21.

The Town of Windsor has a fire department, located at 501 North King Street, and a Bertie County Rescue Squad located at 208 Granville Street (see Bertie County Appendix B Community Vulnerability Assessment for a list of critical facilities). These facilities would be considered critical during the event of a natural disaster and would need to stay operational or be operational within 24 hours. Those facilities are absolutely necessary for response and recovery efforts during and after a disaster.

B. Planning Authority

The Town of Windsor has the statutory authority to plan for growth and development including the power to make studies of the town, to determine growth objectives, to prepare and adopt plans for achieving those objectives and to develop policies, ordinances and the administrative means to implement plans. The Town has adopted the following land use plans and ordinances:

- CAMA Land Use Plan
- Hazard Mitigation Plan
- Subdivision Ordinance
- Zoning Ordinance
- Floodway Management Ordinance
- Wastewater Systems Improvement Ordinance
- Building Code Enforcement Ordinance
- Minimum Housing Code

CAMA Land Use Plan (1999)

The Town of Windsor has adopted a 1999 Coastal Area Management Act (CAMA) Land Use Plan. The plan consists of five (5) sections, each of which provides an overview of development trends and potential development areas. Information from the Plan is outlined below.

Section I: Analysis of existing conditions (Map 1)

Residential land use within the planning jurisdiction of the Town of Windsor predominantly consists of low density, single-family development. Existing commercial land uses are concentrated in the Central Business District (CBD), located at the intersection of US-13 and King Street. Public/Semi Public land uses are predominantly owned by the Town of Windsor and consists of parks and public buildings. Industrial land uses are concentrated along the US-17 Bypass, off US-13/17 South in the industrial park. Future industrial development is expected to occur within the park. The majority (50%) of land use is consumed by Forest and Agricultural Lands, which are primarily owned by the forest industry for the production of forest products.

Section II: Projected Land Development Analysis

Population projections for Bertie County, including the Town of Windsor, indicate a population loss 2000 to 2010. Bertie County is expected to experience a 2.8% decrease in population. The Land Use Plan indicates that the Town of Windsor will continue, however, as the fastest growing municipality within Bertie County.

Commercial and industrial development trends are not expected to change significantly over the Land Use Plan planning period. Gradual development is expected along US-13 at the intersection of King Street. The Town of Windsor developed strategy goals for sustaining commercial/industrial development, examples of which include: continue providing sound infrastructure for water and sewer, provide regional accessibility through roadways, and protect the central business district. Residential development is expected to continue to as primarily low-density housing. The Town of Windsor does not expect any substantial acquisition in public land.

Section III. Land Classification System

CAMA regulations require classification of land categories. Classifications within the Town of Windsor include:

Developed

These are areas where electric, police, fire, sanitation, recreation and other municipal services are provided. The major land use is residential development. The maximum height for residential structures is 35 feet. Specific densities in the various areas of the town are dictated by the Town of Windsor Zoning Ordinance.

Map 1
Town of Windsor
Existing Land Use

The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.

Developed Commercial
These are areas where electric, police, fire, sanitation, recreation, and other municipal services are provided to support higher density commercial development, including office and institutional uses. The developed commercial classification is concentrated along the US-13 Bypass, US-13 North, the Central Business District, US-17 North, US-13/17 South and the Granville Street Corridor.

Developed Manufactured
The developed manufactured land classification includes all light and non-noxious industrial land uses. All areas in the Town of Windsor and its extraterritorial jurisdiction which are classified developed manufacturing are zoning M-1 Industrial District.

Developed Transition (TR)
Areas included in the developed transition classification are presently being developed for urban purposes, or will be developed in the next five to ten years. These areas should require complete urban services within the planning period. This classification includes areas with partial municipal facilities that are usually adjacent to developed areas. Development which occurs must be compatible with adjacent land uses. However, uses allowed in any of the developed land classifications may be allowed within the developed transition category as long as the uses are consistent with the Town of Windsor Zoning Ordinance and the policies contained in the CAMA Land Use Plan.

Rural with Services (RS)
Areas included within the rural with services classification are developed at low density. Land uses are primarily agricultural and residential. Water and sewer services may be provided to avert existing or projected health problems. Lot sizes will be large, and the provision of services will not disrupt the primary rural character of the landscape.

Conservation (CON)
The following environmentally sensitive areas are included in the conservation classification:

- 404 Wetlands
- Cashie River Floodway and Hardwood Swamps
- Public Trust Areas

Section IV: Policy Statements

The Town of Windsor desires to continue and expand its role as a service center for Bertie County. The community will preserve its historic heritage and protect its valuable natural resources which include the Cashie River and the adjacent hardwood swamps. The Town of Windsor will endeavor to expand its economic opportunities by supporting an increase in the number of business and industries. However, significant changes in the land use pattern are not expected during the planning period. The town will expand its incorporated area by pursuing an aggressive annexation policy.

Section V: Relationship of Policies and Land Classifications

CAMA regulations require a relationship between the policies and the land classifications.

Developed Class

The developed land classification includes the following categories: Developed Residential, Developed Commercial and Developed Industrial. These categories include residential, commercial/office-institutional and industrial zoning districts as defined by the Town of Windsor Zoning Ordinance.

Few changes in the location of the land classification categories as shown on the Land Classification Map are anticipated during the planning period. The Town of Windsor's residential development should continue to be primarily low to moderate density development. Commercial development will be concentrated in the central business district and along US-13 Bypass. Industrial development will be concentrated in the Windsor Industrial Park.

Developed Transition Class

The developed transition class will provide lands to accommodate future urban growth within the planning period. All uses which are permitted within the developed land classification will also be allowed within the developed transition classification. However, it is anticipated that most development within this classification will be low density residential development. Complete urban services, including central water and sewer service, may be extended into the developed transition areas within the planning period.

Rural with Services

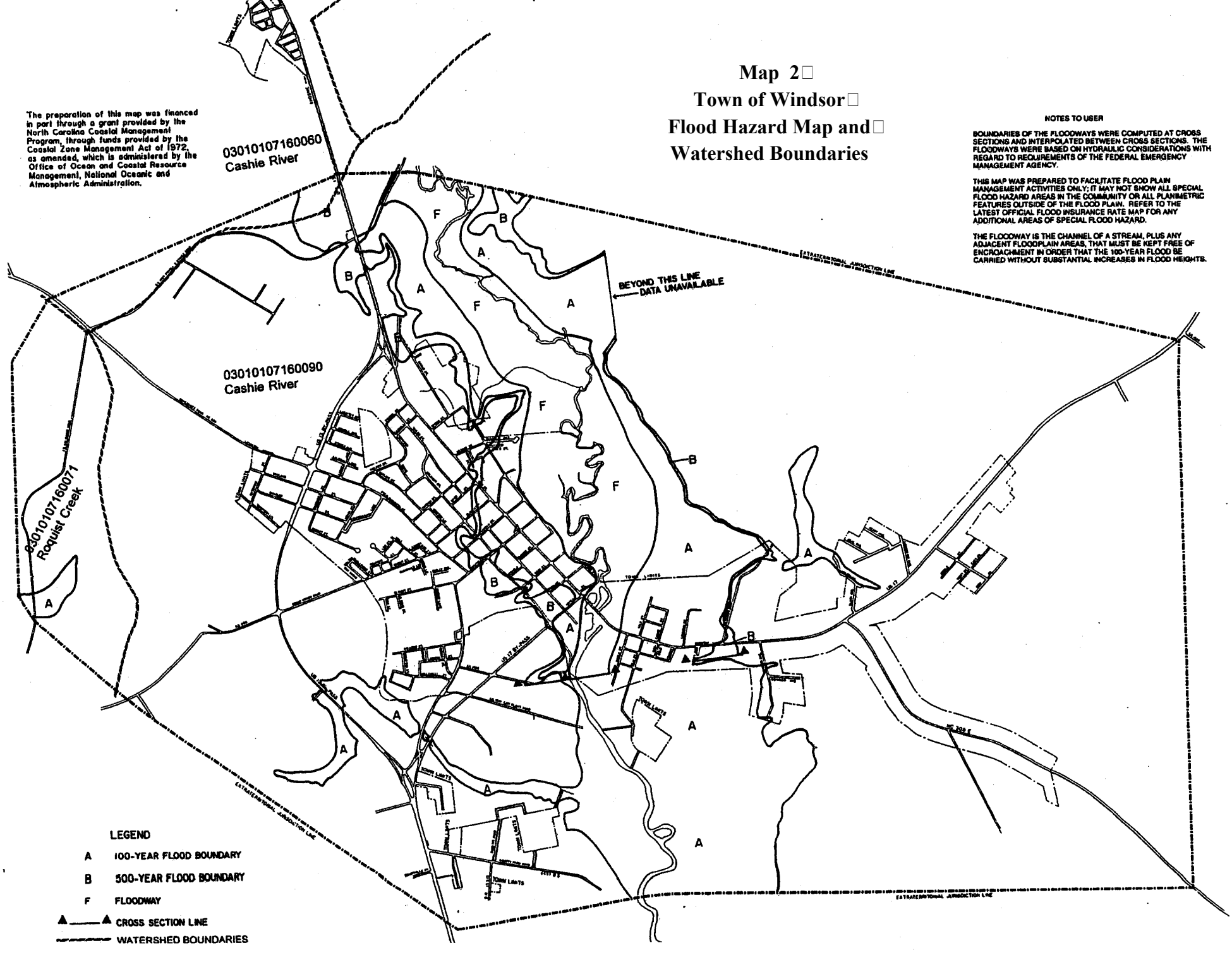
The rural with services classification is intended to provide for low density land uses including residential use where limited water services are provided in order to avert an existing or projected health problem. Areas meeting the intent of this class are appropriate for low intensity residential uses where lot sizes are large and where the provision of services will not disrupt the primary rural character of the landscape. Both water and sewer utilities may be provided by the Town of Windsor. Most of the extraterritorial jurisdiction is classified rural with services. The rural with services category includes areas which are zoned RA-20, single-family residential district.

Conservation Class

The conservation class is intended to provide for the effective long-term management of sensitive or irreplaceable fragile and environmentally sensitive areas. Areas of Environmental Concern as defined by 15A NCAC 7H include the Cashie River public trust area. Other fragile areas which are classified conservation include the Cashie River floodway/hardwood swamps and wetlands. Only the following development should be allowed in the Cashie River floodway - marinas as defined by 15A NCAC 7H which satisfy the Town of Windsor Zoning Ordinance and all applicable state and federal regulations; structures which existed on January 1992; and uses as allowed in public trust areas as defined by 15A NCAC 7H. Only development which is permitted by the US Army Corps of Engineers and allowed by the Windsor Zoning Ordinance will be allowed in 404 wetlands areas. The conservation classification will deter development from occurring in approximately 20% of the town's total planning jurisdiction.

Map 2
Town of Windsor
Flood Hazard Map and
Watershed Boundaries

The preparation of this map was financed in part through a grant provided by the North Carolina Coastal Management Program, through funds provided by the Coastal Zone Management Act of 1972, as amended, which is administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.



NOTES TO USER

BOUNDARIES OF THE FLOODWAYS WERE COMPUTED AT CROSS SECTIONS AND INTERPOLATED BETWEEN CROSS SECTIONS. THE FLOODWAYS WERE BASED ON HYDRAULIC CONSIDERATIONS WITH REGARD TO REQUIREMENTS OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

THIS MAP WAS PREPARED TO FACILITATE FLOOD PLAIN MANAGEMENT ACTIVITIES ONLY; IT MAY NOT SHOW ALL SPECIAL FLOOD HAZARD AREAS IN THE COMMUNITY OR ALL PLANIMETRIC FEATURES OUTSIDE OF THE FLOOD PLAIN. REFER TO THE LATEST OFFICIAL FLOOD INSURANCE RATE MAP FOR ANY ADDITIONAL AREAS OF SPECIAL FLOOD HAZARD.

THE FLOODWAY IS THE CHANNEL OF A STREAM, PLUS ANY ADJACENT FLOODPLAIN AREAS, THAT MUST BE KEPT FREE OF ENCROACHMENT IN ORDER THAT THE 100-YEAR FLOOD BE CARRIED WITHOUT SUBSTANTIAL INCREASES IN FLOOD HEIGHTS.

Hazard Mitigation Plan (Map 2)
The Town of Windsor adopted a single jurisdiction Hazard Mitigation Plan in 2001. This plan outlines specific measures to reduce the vulnerability of the Town and its citizens by implementing mitigation actions to increase the community's resiliency to the effects of natural disasters. The plan considers and evaluates the potential impact of the natural hazards that could occur in North Carolina. The plan found that the Town of Windsor is most susceptible to hurricanes, thunderstorms, tornadoes, and flooding. The adopted plan (April 2001) includes hazard reduction strategies that are being incorporated into the Bertie County Multi-Jurisdictional Plan (see Section II. Mitigation Action Plan).

Subdivision Ordinance (1994)
The Town of Windsor initially adopted a subdivision ordinance in 1973 with last revisions adopted in 1994. The purpose of the subdivision ordinance is to establish procedures and standards for the regulation and control of the subdivision of land within the present and future jurisdiction of the Town in order to promote the public health, safety and general welfare of the community. Subdivision regulations are designed to promote the orderly layout and development of land; provide for the coordination and dedication of land for streets and public utilities; ensure adequate provision for transportation facilities; sewers, water supply, schools, parks, playgrounds, and other public facilities; ensure the proper distribution of population and traffic and to avoid congestion and overcrowding; provide adequate light, air, and open space, ensure grater safety from fire, flood and other dangers; and ensure proper legal description, identification, monumentation, and recording of subdivision properties.

The subdivision ordinance mandates special restrictions for land subject to flooding and sets standards for adequate drainage infrastructure. Any land subject to flooding within the jurisdiction of the subdivision ordinance is prohibited from residential occupancy or any other use that may threaten life, health, or property, or increase a flood hazard. Further, the ordinance provides for drainage right-of-ways or storms easements when a subdivision is traversed by a "water course, drainage way, channel, or stream." Additionally, a subdivision must be connected to a public storm water sewer system or provide for drainage structures that conform to town design standards. In areas of special flood hazards, subdivision proposals are required to provide for adequate drainage to reduce exposure to flood damage.

Town of Windsor Zoning Ordinance
The Town of Windsor adopted a Zoning ordinance in 1977 with the latest revision in 2001. The zoning ordinance is designed to encourage the growth of the various physical elements of the Town and to guide the future development of the Town in accordance with a comprehensive plan of land use and population density so that the Town may realize its full potential as a place to live and work. Zoning districts are described in Table C-1.

Zoning standards specific to hazard mitigation include provisions for mobile home parks which are more susceptible to natural hazards. Parks are prohibited in areas subject to flooding. Additional flood control measures are required in the form of grading to prevent ponding for accumulation of water seeding of sloped ditch banks.

Table C-1: Town of Windsor Zoning Districts

Zoning District	Description
RA-20 Single-Family Residential District	The RA-20 Residential District is established as a district in which the principal use of land is for low density residential and agricultural purposes. The regulations of this district are intended to protect the agricultural sections of the community, and to insure that residential development not having access to public water supplies and dependent upon septic tanks and outdoor privies for sewage disposal will occur at sufficiently low densities for a healthy environment.
R-15 Single-Family Residential District	The R-15 Residential District is established as a district in which the principal use of land is single-family residence. The regulations of this district are intended to discourage any use which because of its character would substantially interfere with the development of single-family residences in the district and would be detrimental to the quiet nature of the areas included in this district.
R-10 Single and Two-Family Residential District	The R-10 Residential District is established as a district in which the principal use of land is single and two-family residences. The regulations of this district are intended to discourage any use which, because of its character, would substantially interfere with the development of single and two-family residences in the distinct and would be detrimental to the quiet nature of the areas included within the district.
R-7 Single and Two-Family Residential District	The R-7 Residential District is established as a district in which the principal use of land is for single and two-family residences. The regulations are intended to discourage any use which, because of its character, would interfere with the residential nature of this district.
R-5 Single-Family Residential District	The R-5 Residential District is established as a district in which the principal use of the land is for single family dwellings. The regulations of this district are designed primarily for developed residential areas where dwellings exist on small lots creating relatively high density neighborhoods.
R-5-MH Single-Family Residential District	This district is established as a district in which the principal use of the land is for single family residences including mobile homes and modular homes. The regulations of this district are intended to discourage any use, which because of its character, would substantially interfere with the district and would be detrimental to the quiet nature of the areas included with the district. This district comprises many new neighborhoods within the Town planning jurisdiction that do not have the established architectural/design character found in older neighborhoods. New architecture styles and building technologies are appropriate in this area and, therefore, mobile homes and modular homes are permitted.
R-10-MH Single - Family and Two-Family Residential District	The district is established as a district in which the principal use of the land is for single and two family residences including manufactured homes and modular homes. The regulations of this district are intended to discourage any use which, because of its character, would substantially interfere with the development of single and two-family residences in the district and would be detrimental to the quiet nature of the areas included within the district. This district comprises many new neighborhoods within the Town planning jurisdiction that do not have the established architectural/design character found in older neighborhoods. New architectural styles and building technologies are appropriate in this area and, therefore manufactured and modular homes are permitted.
R-75 Residential District	The R-75 Residential District is established as a district in which the principal use of land is for single-family dwellings, including single-wide and double-wide manufactured homes. It is intended that single-family manufactured homes meeting specific standards may be placed on a lot that is zoned R-75 and that the R-75 district shall provide an opportunity for manufactured homes to be placed in a single-family residential district as well as to provide on opportunity for alternative, affordable housing, subject to the requirements set forth in the zoning district.

Zoning District	Description
O-I Office and Institutional District	The Office and Institutional District is established as a district primarily for institutional and office uses and for commercial activities having only limited contract with the general public, not involving the sale of merchandise at retail except incidentally. The regulations of this district are intended to encourage structures surrounded with ample open space for yards and for off-street parking and loading of vehicles.
C-I Central Commercial District	The Central Commercial District is established as the centrally located trade and commercial service of the community. The regulations of this district are designed to encourage the continued use of land for community trade and commercial services uses and to permit a concentrated development of permitted issues while maintaining a substantial relationship between the intensity of land uses and the capacity of utilities and streets.
C-2 Highway Commercial District	The Highway Commercial District is generally located on major thoroughfares and collector streets in the planning area. The district is intended to provide for personal services and the retailing of durable and convenience goods for the community. Because these commercial uses are subject to public view and are important to the economy of the area, they should have ample parking, controlled traffic movement, and suitable landscaping.
M-I Industrial District	The M-I Industrial District is established for those areas of the community where the principal use of the land is for industrial and warehousing uses. These uses, by their nature, may create some nuisances not properly associated with residential, commercial, and/or service establishments. These uses normally seek outlying locations on large tracts of land where the operations involved do not detract from the development potential of nearby undeveloped properties.

Source: Town of Windsor Zoning Ordinance.

Floodway Management Ordinance

The Town of Windsor Floodway Management Ordinance addresses development in all areas designated as special flood hazard within the town planning jurisdiction. The ordinance requires all new construction and substantial improvements be constructed to minimize flood damage. This includes a provision requiring residential construction to be elevated to or above the base flood elevation (the elevation which has a one percent chance of being equaled or exceeded by floodwaters in a given year). Non-residential construction must comply with the same requirements or employ satisfactory floodproofing measures. Other specific regulations in the ordinance include:

- Water systems designed to minimize flood water infiltration;
- Sanitary sewage systems designed to minimize flood water infiltration;
- Onsite waste disposal systems located to prevent contamination;
- Manufactured homes prohibited in special flood hazard areas, except those already existing when the ordinance was adopted. Also, manufactured homes are to be anchored with over the top frame ties.
- Non-conforming buildings or uses may not be enlarged, replaced or rebuilt unless they conform to the ordinance.

Development is prohibited within floodways. The floodplain ordinance is coordinated with the subdivision ordinance in that floodplain provisions require subdivision proposals to be consistent with the need to minimize flood damage. The floodway management ordinance is intended to help retain floodway carrying capacity and require verification of structure elevation. The ordinance is enforced by the Town of Windsor Zoning Administrator.

Wastewater System Improvements Ordinance

The Town of Windsor, in conjunction with Bertie County Water District II, has been approved for water, wastewater, and electrical improvements funded in part with a US Department of Economic Development Administration (EDA) grant. The grant funded the completion of 8.700 linear feet of wastewater system improvements consisting and the construction of two sewage pump stations. Under the terms of the grant, the Town has adopted an ordinance that denies wastewater system services from the EDA funded facilities to any new development within a Jurisdictional Freshwater Wetland(s), Federal Emergency Management (FEMA) designated 100-year floodplain, prime farmland, or engendered or threatened species habitat.

Building Code Enforcement Ordinance

Bertie County adopted an ordinance to cover enforcement of the North Carolina State Building Code in 1985. The ordinance provides for enforcement of the current edition of the building code including any revisions and amendments. The County enforces the ordinance throughout all incorporated and unincorporated parts of the County, including the Town of Windsor. In addition to addressing general building code issues, the code also addresses the need to minimize potential wind damage. The State of North Carolina currently uses the International Building Code.

Minimum Housing Code

Bertie County adopted an ordinance establishing minimum housing standards in 1988. The intent of the ordinance was to protect the health, safety and welfare of residents of the County by establishing minimum standards of fitness for the initial and continued occupancy of all buildings for human habitation as expressly authorized by NC General Statute 153A.

The County minimum housing code ordinance is enforced throughout all incorporated and unincorporated parts of the County, including the Town of Windsor.

Setting minimum standards of fitness for dwellings and dwelling units helps to mitigate the impact of natural hazards by ensuring that dwellings are structurally adequate to resist the normal forces of nature and that substandard dwellings are demolished so that they cannot be occupied and do not become windborne storm debris. The ordinance establishes minimum standards for the structural condition of a dwelling, for basic plumbing, heating and electrical equipment facilities, for ventilation, for space, use and location, for safe and sanitary maintenance, and for control of insects, rodents, and infestations.

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation is soil erosion and sedimentation control. The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment. Controlling erosion and sedimentation reduces the loss of valuable topsoil and reduces the likelihood of water pollution and damage to watercourses. Although its intended purpose is not targeted at hazard mitigation, it can impact mitigation initiatives. No construction activity that would disturb greater than one acre of land may commence until erosion and sedimentation control plan has been reviewed by the Town and approved by the NC Sedimentation Control Commission (NCGS 113A-57(4)).

Community Capability Assessment Summary

The overall assessment of Town of Windsor community capability to address hazard mitigation through existing policies and ordinances is summarized in Table C-2.

Incorporating Hazard Mitigation Requirements into Community Plans

No policies, programs or ordinances have been found to have the effect of hindering hazard mitigation; however, there are opportunities to make current policies more effective for mitigation. Existing policies and ordinances are regularly reviewed and considered for updates/revisions to meet changing community needs and to stay in compliance with State and Federal regulations.

The Town will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The town administrator will be responsible for providing a copy of the Hazard Mitigation Plan to each Town department and for ensuring that the responsible department (see Table C-2) incorporates hazard mitigation goals, objectives and actions into plan updates and ordinance revisions to ensure that updates and revisions do not contribute to increased community vulnerability to natural hazards.

The specific departments, as noted in Table C-2, that are responsible for implementation, enforcement, and updates to community plans and ordinances will be charged with monitoring programs and regulations for opportunities to improve hazard mitigation actions. More specific information on recommendations for new or revised policies and programs is detailed in Section II. Mitigation Action Plan.

Table C-2: Community Capability Assessment – Town of Windsor

Policies and Programs	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
CAMA Land Use Plan	Moderate	The CAMA Land Use Plan provides guidance for the Town in the approval of proposed land development plans.	The Plan includes a land use classification system and policy statements to help guide local official approval of development plans. The town administrator is the lead position responsible for plan implementation and updates.
Hazard Mitigation Plan	High	The plan evaluates the potential impact of natural hazards that could occur in the Town of Windsor and establishes strategies for limiting hazard vulnerabilities to protect people and property.	The hazard mitigation plan is being incorporated into the Bertie County Multi-Jurisdictional Hazard Mitigation Plan. Hazard mitigation strategies will be reviewed annually for progress and the plan will be updated on a 5-year schedule. The town administrator is the lead person responsible for monitoring progress.
Zoning Ordinance	Moderate	The zoning ordinance regulates use of land through establishes zoning districts and standards for development.	Amend ordinance to include regulations for underground chemical and gasoline storage. The town administrator is the lead person responsible for ordinance enforcement and revisions.
Subdivision Ordinance	Moderate	Subdivision regulations control the division of land into parcels for the purpose of building development or sale.	Continue enforcing the subdivision ordinance to ensure that development is regulated in flood hazard areas. The town administrator is the lead person responsible for subdivision ordinance enforcement and revisions.
Floodway Management Ordinance	High	Establishes standards for development of land within flood hazard areas.	Prohibits use of areas that are hazard prone, limits development in those areas and restricts construction to decrease flood levels. The town administrator is the lead person responsible for ordinance enforcement and revisions.
Wastewater Systems Improvement Ordinance	High	Limits wastewater system service taps in flood hazard areas.	This ordinance is a key factor in decreasing development in flood hazard areas. The town administrator is the lead person responsible for ordinance enforcement and revisions.
Building Code Enforcement Ordinance	High	Building Code enforcement addresses general building code issues and the need to minimize potential wind damage.	Continue to incorporate and enforce any revisions to State Building Code standards. Under interlocal agreement, Bertie County provides code enforcement.
Minimum Housing Code	Moderate	The minimum housing code provides for safe and decent housing construction and maintenance.	The minimum housing code helps reduce substandard structures and decreases the potential for windborne debris. Under interlocal agreement, Bertie County enforces the minimum housing code.
Soil Erosion and Sedimentation Control	High	The purpose of soil erosion and sedimentation control is to regulate land-disturbing activities to control accelerated erosion and loss of sediment	Continue to enforce and enhance soil erosion and sedimentation control standards that will reduce erosion and damage to the carrying capacity of area streams and rivers. The State of North Carolina Division of Land Quality is responsible for code enforcement.

Source: Town of Windsor

C. Legal Capability

Local governments in North Carolina have a wide array of powers that enable counties and municipalities to adopt and implement policies and ordinances that may be used to mitigate the potential harmful effects of natural hazards.

Regulation (General Police Power)

North Carolina bestows 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), County's, 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 (NCGS 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities); 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

Town of Windsor

Bertie County enforces the building code within the County planning jurisdiction (outside corporate limits and ETJs) and through interlocal agreement the ordinance is enforced within the Town of Windsor planning jurisdiction.

Land Use

Each community in North Carolina possesses great power to prevent unsuitable development in hazard-prone areas. (NCGS 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties; Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); Part 3 (Zoning).

Town of Windsor

The Town of Windsor has a CAMA Land Use Plan, as well as an Existing Land Use map (Map 1).

Zoning

Local governments are authorized to divide their territorial jurisdictions into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair, or use of buildings, structures or land within those districts (NCGS 160A-382). Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Town of Windsor

The Town of Windsor has a zoning ordinance.

Subdivision Regulations

Broad subdivision control enabling authority for municipalities is granted in NCGS 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions. 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 (NCGS 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 (NCGS 160A-376(2)).

Town of Windsor
The Town of Windsor has a subdivision ordinance.

Floodplain Regulation
NC statutes authorize priority ratings for local government applications for revolving loans or grants based on adoption of a local comprehensive land use plan, a zoning ordinance, or other measures, such as a flood damage prevention ordinance, that contribute to reduction community vulnerability to flood hazards.

Town of Windsor
The Town of Windsor has a floodway management ordnance, as well as a Flood Hazard and Watershed Boundary map (Map2).

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 simple 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 (NCGS 153A. Art. 8; 160A. Art. 11). The Town of Windsor has used the power of acquisition to further hazard mitigation efforts by participating in the FEMA buy-out program following Hurricane Floyd. The Town acquired and demolished several properties through this program.

Taxation
The power to levy taxes and special assessments is an important tool delegated to local governments by North Carolina law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in a community. Communities can set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands, floodplains) 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 (NCGS 160A-238). This can serve to increase the cost of building in designated areas, thereby discouraging development. The Town of Windsor does not use special assessments to impact the pattern of development.

Spending
The fourth major power that has been delegated by the North Carolina 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 a local government, including adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. 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 services, a community can control growth to some extent especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive. The Town of Windsor does not have a CIP.

D. Fiscal Capability

Beyond legal authority and political willpower, fiscal capability is a key component to effectively developing and implementing a hazard mitigation plan. In addition to local tax funds, non-profits and other non-governmental organizations are often interested in helping to implement hazard mitigation projects. Local governments can also apply for State and Federal funds to implement hazard mitigation initiatives.

Ability to Pay

In recognition of the disparate economic prosperity of the State's one hundred counties, the North Carolina Department of Commerce ranks counties in an economic tier system. The impetus for this system was the William S. Lee Quality Jobs and Business Expansion Act of 1996 which provides for a sliding scale of state tax credits for economic investment. The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants.

The Lee Act has become the State's main development tool in an effort to help smaller rural counties be more economically competitive. The tier ranking is also used by the State as a measure of an individual county's ability to pay when applying for state and federal grants. The most economically distressed counties are ranked in Tier 1 and the most economically prosperous in Tier 5. The rankings are evaluated annually using three factors – population growth, unemployment rate, and per capita income. The 2004 NC Department of Commerce ranking places Bertie County in Tier 1.

E. Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Smaller local governments such as the Town of Windsor typically have limited technical capability due to a lack of funding and human resources.

State and Federal Resources

Agencies such as the Federal Emergency Management Association (FEMA) and the North Carolina Division of Emergency Management (NCDEM) have made available numerous Hazard Mitigation implementation manuals and other resource documents. These manuals provide information on mitigation techniques for various hazards, including hurricanes, floods, wildfires, tornadoes and earthquakes. More information about State and Federal resources can be found in Section III of the Plan.

Local Resources

The Town of Windsor has limited staff to enforce local regulations. The Town depends on Bertie County to provide technical resources including building inspections, 911 communications services and minimum housing code enforcement. The County and the Town of Windsor do not currently have a geographic information system but are planning to implement a system within the next 5 years – see Section II. Mitigation Action Plan.

F. Political Climate

The elected officials of the Town of Windsor are in agreement that implementation of the Hazard Mitigation Plan is essential to minimize damages from natural hazards. The Town Board supports the need for hazard mitigation to reduce future loss of life and property while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board continues to strive to make the Town of Windsor a safer community, and sees the Hazard Mitigation Plan as a means to help achieve that goal.