Perquimans County

Adopted August 1
2005

Including the
Towns of:
Hertford and Winfall

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

Multi-Jurisdictional

Hazard Mitigation Plan

PERQUIMANS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Including the Towns of Hertford and Winfall

Board of Commissioners
Benjamin C. Hobbs
Mack E. Nixon
Tammy Miller-White
Charles H. Ward
Sue Weimar
Shirley Wiggins

Hazard Mitigation Team Members
Bobby Darden, Perquimans County Manager
William Ethridge, Perquimans County Planning Director
Harry Winslow, Perquimans County Emergency Management
Rhonda Money, Perquimans County GIS
Zeke Jackson, Perquimans County Building Inspector
John Christensen, Town of Hertford
Ken Rominger, Town of Winfall
Nigel Goodwin, Town of Winfall
Jerry Austin, Heritage Shores North (HOA)
Debrah Cowell, Elizabeth State University
Peter LeRoy, Snug Harbor (HOA)
Dave Foster, Albemarle Plantation (HOA)
James Self, American Red Cross
Richard Stone, Salvation Army

Planning Assistance Provided By

THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE

*Note: Photos on cover courtesy of www.newboldwhitehouse.org and www.hertfordonline.com

Perquimans County Multi-Jurisdictional Hazard Mitigation Plan

Including the Towns of Hertford and Winfall

Table of Contents

Appendix C: Community Capability Assessment

List of Tables

Section I: Planning Process

Section II: Mitigation Action Plan

Appendix A

Appendix B

Appendix C

Maps

Town of Hertford - Appendices

Appendix B: Assessment of Vulnerability

Appendix C: Community Capability Assessment

Town of Hertford – List of Tables

Appendix B

Appendix C

Maps

Town of Winfall - Appendices

Appendix B: Assessment of Vulnerability

Appendix C: Community Capability Assessment

Town of Winfall – List of Tables

Appendix B

Appendix C

Maps

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 Perquimans County Multi-Jurisdictional Plan was adopted (August 1, 2005) by the Perquimans County Board of Commissioners and the respective elected boards of the towns of Hertford and Winfall 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 Perquimans County Multi-Jurisdictional Hazard Mitigation Planning Team which met three times 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. This hazard mitigation plan covers all of Perquimans County, including the Town of Hertford and Winfall, as well as all the unincorporated areas of the county.

HMP Team Members

Local Government/Agency	Name	Position
Perquimans County	Bobby Darden	County Manager
Perquimans County	Harry Winslow	Emergency Management Coordinator
Perquimans County	William Etheridge	Planning Director
Perquimans County	Zeke Jackson	Building Inspector
Perquimans County	Rhonda Money	GIS Mapping
Town of Hertford	John Christensen	Town Manager
Town of Winfall	Ken Rominger	Town Councilman
Town of Winfall	Nigel Goodwin	Winfall Planning Board
Heritage Shores North	Jerry Austin	Home Owners Association
Elizabeth State University	Deborah Cowell	Campus Police
Snug Harbor	Peter LeRoy	Property Owners Association
American Red Cross	James Self	Elizabeth City Chapter
The Salvation Army	Richard Stone	Elizabeth City Chapter
Albemarle Plantation	Dave Foster	Home Owners Association
The Wooten Company	Patt Crissman, AICP/ASLA	Project Manager
The Wooten Company	Ashton Slate	Associate Planner

E. Description of the Planning Process

In early 2005, Perquimans 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 town review, making plan revisions based on review comments, and compiling the full draft plan for final review. Perquimans County and the two participating municipalities worked as a team with the consulting planner to create draft plans for each of the participating jurisdictions.

The comprehensive planning process was organized to ensure that individual mitigation projects and initiatives undertaken by the County and the two 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 Perquimans 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 March 7, 2005, Perquimans County and the participating municipalities gave public notice of the start of the hazard mitigation planning process at the Perquimans County Board of Commissioners' public meeting. The meeting was advertised in the local newspaper.

At the meeting, a presentation was made 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 Perquimans County Administrative Offices.

Once receiving 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 1, 2005 and the Board adopted the Plan on August 1, 2005 (see attached resolution of adoption); each of the participating town adopted the plan following the county's adoption.

HMP Team Meetings

The Hazard Mitigation Planning (HMP) Team met at the Perquimans County Courthouse in Hertford three times between January and May 2005 (Table I-1). The County and each of the two 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
January 28, 2005	HMP Team	Project initiation.
March 7, 2005	Perquimans County Board of Commissioners	Public meeting giving notice of the beginning of the planning process.
April 12, 2005	HMP Team	Discussion/review of draft sections.
May 20, 2005	HMP Team	Review of draft conclusions, goals and objectives, and mitigation actions.
August 1, 2005	Perquimans County Board of Commissioners	Public hearing
August 1, 2005	Perquimans County Board of Commissioners	Plan adoption.
August 8, 2005	Town of Hertford	Plan adoption.
August 8, 2005	Town of Winfall	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 Perquimans County and the two 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. Appendix A also contains two summary maps which includes the locations of critical facilities, as well as the multi-hazard and storm surge overlay.

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.

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. Appendix C also contains a map depicting the Zoning Atlas for Perquimans County.

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 the two municipalities 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 receiving approval of the NC Emergency Management, Perquimans County held a public hearing and adopted the Plan (August 1, 2005). The elected boards of the Towns of Hertford (August 8, 2005) and Winfall (August 8, 2005) also adopted the Plan.

F. Resolution of Adoption

The Resolution of Adoption for the Perquimans County Multi-Jurisdictional Plan is included on the following pages with the Resolutions of Adoption for the participating towns of Hertford and Winfall following.

RESOLUTION OF ADOPTION

Perquimans County
Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Perquimans 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 Perquimans 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 Perquimans County hereby:

1. Adopts the Perquimans 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 Perquimans 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 August 1, 2005

Benjamin C. Hobbs

Benjamin C. Hobbs, Chairman
Perquimans County Board of Commissioners

Attest:

Mary P. Hunnicutt

Mary P. Hunnicutt, Clerk to the Board

SEAL

Resolution # 8/8/2005-02

RESOLUTION OF ADOPTION

Town of Hertford

Perquimans County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Perquimans 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 Perquimans 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 Perquimans County adopted the Perquimans County Multi-Jurisdictional Hazard Mitigation Plan on August 1, 2005;

WHEREAS, the Town of Hertford actively participated in the planning process of the Perquimans 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 Hertford hereby:

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

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

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

   (a) Inform all concerned parties of this action.

   (b) Develop an addendum to the Perquimans 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 Manager to assure that, in cooperation with Perquimans 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 August 8, 2005

James Sidney Eley
Mayor

Attest:

Cindy E. Sharber, Town Clerk

SEAL

RESOLUTION OF ADOPTION

Town of Winfall

Perquimans County Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, the citizens and property within Perquimans 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 Perquimans 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 Perquimans County adopted the Perquimans County Multi-Jurisdictional Hazard Mitigation Plan on August 1, 2005;

WHEREAS, the Town of Winfall actively participated in the planning process of the Perquimans 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 Winfall hereby:

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

3. Vests Ad Hoc to Planning Bd (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 Perquimans 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 Ad-Hoc (#3) (OFFICIAL, OFFICE OR AGENCY) to assure that, in cooperation with Perquimans 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 Council 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 August 8, 2005

Frederick L. Yates
Mayor

Attest:

Gloria Mason, Town 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 Perquimans 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 Perquimans County and the participating municipalities of Hertford and Winfall 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 three cooperating governmental units determined that the Perquimans County area is not at risk for tsunamis or volcanoes and that there is a "low" risk of earthquakes and landslides/sinkholes. There are also no records of any dam or levee failures within the County. Seven hazards were rated "moderate" risk – coastal and riverine erosion, droughts and heat waves, floods, hurricanes and coastal storms, severe storms and tornadoes, wildfires, and winter storms and freezes.

Moderate Hazard Threats

Coastal/Riverine Erosion (including storm surge)

Coastal/Riverine 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 Perquimans County and the participating municipalities commit to engage in activities and practices, both as individuals and as members of the larger community of Perquimans 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, Perquimans 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 Perquimans 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 Perquimans 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 2005 and 2010 – 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 cost-benefit review was given special emphasis, in light of its possible use in environmental reviews for HMGP, FMA and other federal hazard mitigation projects.

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 Perquimans 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
PW – Perquimans County Public Works
BOC – Perquimans County Board of Commissioners
ES – Perquimans County Emergency Services
PL – Perquimans County Planning Department
PB – Perquimans County Planning Board
BI – Perquimans County Building Inspections
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: Perquimans County Mitigation Action Plan

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Preventive Actions							
P-1	Monitor trees and branches at risk of breaking or falling in windstorms. Prune or thin trees or branches on county property when they would pose an immediate threat to property, utility lines, or other significant structures or critical facilities in the county.	All	1.1	Moderate	Local	PW	Ongoing
P-2	Any additional planting of trees preformed by the county or residents there of should consider the use of wind-resistant trees and plants to reduce the risk of breaking in high wind events. Consider revising the Zoning Ordinance to include such recommendations.	All	1.1	Moderate	Local	BOC	Ongoing
P-3	Record all tax parcel information and floodplain locations in a GIS system including repetitive loss areas, areas of greatest risk, and vulnerable populations.	Flood	3.1	Moderate	Local	ES PL	Ongoing
P-4	The County Tax Department will consider instituting a tax abatement program that encourages development outside of the floodplain and discourages development within it, at the next scheduled Tax Re-evaluation period in 2008.	Flood	3.1	Moderate	FEMA	PC PL	2008
P-5	Consider participating in the Community Rating System (CRS).	Flood	2.2	Moderate	Local	PC	2007
P-6	Zoning and Subdivision ordinances have recently been revised to increase lot sizes in areas with poor soils. As flooding is exacerbated by soils that cannot adequately absorb the water, areas with poor soil conditions should be avoided as much as possible in future developments. Increasing lot size within subdivisions will provide more area for soil absorption and lessen damages to properties in the area. The county land use plan policy should be implemented by revising the zoning and subdivision ordinances so that the minimum lot size in future subdivisions is increased.	Flood	1.1	Moderate	Local	BOC PB PL	2008

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
P-7	The county will consider amending the zoning ordinance to include regulations for underground chemical and gasoline storage to minimize risks to groundwater resources.	All	1.1	Moderate	Local	BOC PL	2006
P-8	The county should consider amended the zoning, mobile home parks, and subdivision ordinances to require storm shelters in all mobile home areas and other areas without basements or underground protection.	All	1.1	Moderate	Local	BI ES	2006
P-9	Continue to review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	All	1.1	Moderate	Local	BI	Ongoing
P-10	Consider delineating environmentally sensitive areas that are unsuitable for growth and development as part of the CAMA land use plan update.	All	3.1 3.2	Moderate	Local	PL	2006
P-11	Ensure that mobile manufactured homes are installed and secured properly.	All	4.1	High	Local	BI	Ongoing
P-12	Consider adding drainage as an issue to be discussed during Technical Review Committee meetings of new development plans.	Flood	2.1	High	Local	PL PW	2005-2006
Property Protection Actions							
PP-1	Continue to enforce the North Carolina Building Code. The requirement that new structures or structures undergoing significant renovations be resistant to wind loads of 110 mph is of particular importance.	Wind	1.1	Moderate	Local State	BI	Ongoing
PP-2	Continue to acquire destroyed or substantially damaged properties and relocate households. Seek State and Federal funding. (voluntary program)	All	2.2	Moderate	FEMA NCEM	BOC	On-going
PP-3	Encourage use of wind-resistant construction techniques used in coastal regions.	Wind	1.1	High	Local	BI	On-going
PP-4	Consider a policy for contractors to pick up building material and building debris prior to coastal storms.	All	1.1	Moderate	Local	BI PD	2006-2007
Emergency Services							
ES-1	In order to minimize injury from lightening strikes, shelters should be placed every 10 acres in all public open space recreation areas.	All	1.1	Moderate	Local	BOC	2008

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
ES-2	Develop and adopt an Emergency Operations Plan. This plan should contain detailed information on responsible parties and contact information. This information should be updated as positions and contact information change.	All	1.1 1.3	High	Local	ES ES	Ongoing
ES-3	Maintain evacuation routes.	All	1.1	Moderate		BOC	Ongoing
ES-4	Warning System Improvements. Several options exist and the county will explore and decide upon the most feasible option to warn county residents.	Tornado / High Wind	1.1	Moderate	Local	ES	Ongoing
ES-5	Ensure adequate evacuation time in case of major hazard events.	All	1.1 1.3	High	Local	ES	Ongoing
Natural Resource Protection							
NR-1	In order to reduce storm water runoff, the county should minimize construction of additional impervious surfaces within floodplains. This should include limiting construction of impervious surface parking lots in the areas near the rivers.	All	1.1 3.1	Moderate	Local	BOC	Ongoing
NR-2	Although the presence of hydric soils may indicate the location of wetlands, an on-site analysis is needed to positively identify and designate wetlands within the Perquimans County area. Such analysis will have to be completed by the US Army Corp of Engineers at the request of Perquimans County.	All	3.1	Moderate	USACE	PL	2007
NR-3	Continue to support NC Sedimentation Control Commission efforts to ensure erosion and sedimentation control measures are properly installed and maintained during construction.	Flood	3.2	High	Local NCDENR	PL PW	Ongoing
Public Information Activities							
PI-1	As with other hazards of concern to Perquimans County, the county should sponsor a hazard mitigation symposium for county residents, including information on preparedness for all significant hazards. The symposium should address the options of elevation, relocation, and flood proofing.	Flood	1.2	Moderate	Local	BOC ES	Ongoing
PI-2	Post information about emergency evacuation routes.	All	1.2	High	Local	ES	2007
PI-3	Use written materials to educate contractors about principles for quality redevelopment and safe housing	All	1.2	Moderate	Local	BI	Ongoing

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
	development.						
PI-4	Provide new home and property buyers with information on wind proofing. The information is probably most effectively dispersed by the tax assessor's office as all home transactions are recorded there.	Wind	1.1 1.2	Moderate	Local	PC	2006
PI-5	Create and disperse information about the plan and relevant emergency response actions the public can take. Also, ensure each county department has a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.	All	1.2	High	Local	ES	2007
PI-6	Continue to provide flood maps for public use with staff continuing to be available for public assistance.	Flood	1.1 1.2	High	Local	PL	Ongoing
PI-7	Collect FEMA and NCEM educational material on natural hazards and place in public library.	All	1.1 1.2	High	Local	PL	2004-05

Source: Perquimans County.

Table II-2: Mitigation Action Plan - Town of Hertford

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party*	Target Completion Date
P-1	Update the CAMA Land Use Plan in conjunction with the County's Core Land Use Plan	All	1.1	Moderate	Local	HM	2007
P-2	Consider revising Hertford's Zoning Ordinance and Subdivision Regulations to improve storm water management practices in developments.	All	1.1 3.1	Moderate	Local	HM	2007
P-3	Update the Town of Hertford's Zoning Ordinance and Subdivision Regulations.	All	1.1	Low	Local	HM	2009
P-4	Work in conjunction with NCDOT and other agencies to ensure that storm water facilities are maintained to allow for reasonable flows.	All	1.1 3.1	Moderate	State	NCDOT HM	Ongoing
PP-1	In cooperation with Perquimans County, continue to review areas adversely impacted by major storm events and to examine existing policies that can minimize repetitive losses in those areas.	Flood	1.1 3.1	Moderate	Local	PC HM	Ongoing
ES-1	In cooperation with Perquimans County, study the feasibility of combining water and sewer facilities.	All	2.1	High	Local	PC HM	2006
S-1	In conjunction with NCDOT, continue to examine the roadways of the town to determine if improvements are needed in areas affected by development.	All	1.1	Moderate	State	NCDOT HM	Ongoing

Source: Town of Hertford

**Abbreviations: Hertford Town Manager (HM), North Carolina Department of Transportation (NCDOT), and Perquimans County (PC).*

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

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Preventive Actions							
P-1	Complete Land Use Plan and ensure that hazard mitigation objectives are addressed.	All	1.1	High	Local	TC PB PC	2006
P-2	Review, update and evaluate new zoning ordinance to ensure objectives in the Hazard Mitigation Plan are addressed and that growth is consistent with the land classification map, land use plan, and within the capabilities of the waste water collection system and water supply.	All	1.1	High	Local	PB TC	2005
P-3	Complete new subdivision regulations and ensure that hazard mitigation objectives are addressed.	All	1.1	High	Local	PB TC	2006
P-4	As needed, review and update the Flood Damage Prevention Ordinance.	Flood	3.2	Moderate	Local	PB TC	2006
P-5	Update as needed the wastewater collection system and water system ordinances to meet hazard mitigation objectives.	All	2.1	Moderate	Local	PB TC	2006
P-6	Continue to encourage efforts towards countywide water and sewer systems with Perquimans County and the Town of Hertford.	All	1.1	Moderate	Local	TC	Ongoing
P-7	Continue efforts to improve roads and bridges (both public and private) for critical services – fire, rescue, medical, evacuation, etc.	All	3.1	Moderate	State	TC	Ongoing
Property Protection Actions							
PP-1	Seek funding and/or action to clear debris in canals, waterways and drainage ditches to prevent flooding and to improve drainage and water quality.	Flood Storms	1.1	Moderate	NCDOT NCDENR	TC	Ongoing
PP-2	Work with the County Building Inspector to continue to enforce the NC Building Code, in particular, the tie down of buildings and resistance to wind loads.	High Winds	4.1	Moderate	Local	PC TC	Ongoing

Action #	Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Natural Resources							
NR-1	Minimize construction of impervious surfaces adjacent to floodplains or near storm water drainage routes that empty into the river.	All	4.1	Moderate	Local	ZA	Ongoing
Emergency Services							
ES-1	Establish program for evacuation and improvement of Town critical services and facilities – water system and wastewater collection system.	All	1.1 2.1	Moderate	Local	TC FD Staff	Ongoing
ES-2	Continue to partner with Perquimans County in the development of the Emergency Operations Plan (i.e. evacuation warnings, removal of persons in flood prone areas).	All	1.1	High	PC Town	PC TC	Ongoing
ES-3	Partner with Perquimans County to improve warning system, to ensure residents understand the system and that homebound residents are notified.	All	1.1 1.2	Moderate	Local	TC PD FD	Ongoing
ES-4	Evaluate flood or access problems for critical facilities; develop protection options. Identify command post and alternates.	All	1.1	High	Local	PD Staff TC	Ongoing
Structural Projects							
S-1	Continue to work on removal of projectile/debris such as junked vehicles, mobile homes and dilapidated homes.	All	1.1	Moderate	Local	TC Staff	Ongoing
S-2	Evaluate those businesses with potential hazardous liquids for adequate protection of the public.	All	1.1 4.2	Moderate	Town Private	TC	Ongoing
Public Information Activities							
PI-1	Establish an annual schedule for reviewing and updating the Hazard Mitigation Plan.	All	1.1	High	Local	PB TC	2005
PI-2	Establish both a regular and emergency plan to communicate with residents.	All	1.2	High	PC Town	TC	Ongoing
PI-3	Create and disseminate information on emergency actions procedures – notification, shelters, evacuation routes, etc.	All	1.2	High	Local	TC Staff	Ongoing
PI-4	Each Town department establish/update plans for their respective operations for emergency operation situations.	All	1.1	High	Local	TC Staff FD	Ongoing

Source: Town of Winfall
Abbreviations: TC – Town Council, PB – Planning Board, PC – Perquimans County, ZA – Zoning Administrator, FD – Fire Department, PD – Police Department, Staff – Mayor, Clerk, Public Utilities.

III. Plan Implementation

A. Process

The Perquimans County Multi-Jurisdictional Hazard Mitigation Plan will be implemented through the delegation of assignments as specified in Section II. Mitigation Action Plan. Each Perquimans 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. Perquimans County and the two 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 Perquimans 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 Perquimans County Manager shall direct the Perquimans County Planning Director with the responsibility for monitoring the progress of the plan's mitigation actions through ongoing communication with the parties responsible for their implementation. Through the monitoring process, the Planning Director will gather the information necessary to evaluate the progress of the mitigation plan activities. 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 Perquimans County Board of Commissioners and the elected board of the two participating municipalities 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 the two participating municipalities will provide the public with an opportunity to review and comment on the annual progress report at a regularly scheduled public meeting.

If the Perquimans 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 Planning Director 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 Perquimans 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 Perquimans 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 Planning Director 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.

State and Federal Agency Review

The amended/updated Plan shall be completed and forwarded within 5 years, to NCEM and FEMA 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 and FEMA approved draft Plan Amendment, the Perquimans 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 Perquimans 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

This section of the hazard mitigation plan provides details on the natural hazards that could affect Perquimans County. The Federal Emergency Management Agency (FEMA) and the State of North Carolina require the twelve natural hazards listed below be considered in planning for local hazard mitigation. The threat of each hazard in Perquimans County is unique in terms of probable level of impact, frequency of occurrence, likelihood of occurrence, and combined hazard index for potential harm to persons or property. *(Source of Photo: Natural Hazard Center, PSU.)*

This section includes a description and history of natural hazard events that are known to have specifically affected Perquimans County. Detailed data on hazard events within specific locations (including municipalities) were provided as available. Primary data sources are two national databases – the National Climatic Data Center (NCDC - http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms) and the Spatial Hazard Events and Losses Database for the United States (SHELDUS* - http://go2.cla.sc.edu/hazard/db_registration). All historical data searches were conducted for the period 1950 to 2004. Other data from the County are included as available. For hazards that do not refer to a specific location, the hazard was assumed to have affected Perquimans County in its entirety, including the (2) participating towns; Hertford and Winfall.

*Note: SHELDUS information concerning certain hazards causing fatalities and injuries are in decimal form. Casualties and damages are often listed without specific spatial reference, for instance severe thunderstorms affected Eastern NC. In order to assign the damage amount to a specific county, SHELDUS divides the total number of fatalities or injuries by the number of counties affected. For example, if a severe thunderstorm affected Perquimans, Chowan, Gates, and Pasquotank counties and resulted in 1 fatality, each county would receive a 0.25 rating.

As required by FEMA, all twelve potential hazards that could affect Perquimans County are profiled in this section of the Plan. The Perquimans County Composite Hazard Index Table (Table A-28) includes those hazards that were categorized as either “moderate” or “high” risk based on a review of all twelve hazard histories.

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. Coastal and Riverine Erosion (including storm surge)

(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.

Storm Surge (Map A-1: Perquimans County Critical Facility/Storm Surge Map)
A storm surge is a dome of fast-rising water that comes just ahead of a hurricane's landfall along a coastal area. If rivers, creeks, harbors or bays are present, they act as transfers of storm water to low-lying areas. Persons living less than 20 feet above mean sea level are at risk to flooding, even if they do not reside on waterfront property. (Federal Emergency Management Agency)

Flooding used to be the major cause of hurricane deaths until the 1970s when better weather forecasting and coastal evacuations greatly reduced the number of people exposed to storm surges. Storm surges are still a potential killer and are the primary reason coastal areas are evacuated. Map A-1 shows areas of Perquimans County affected by storm surge. Storm surge is categorized by intensity through the Saffir-Simpson Hurricane Scale (categories 1-5). This table, including damage potential is further explained in Table A-13.

Hurricane winds stir up domes of water, which dissipate in deep ocean waters, but as the storm nears land, the rising sea floor blocks the escape of the water domes. The result is the dome of water comes ashore as a deadly, destructive storm surge. An intense hurricane can send a dome of water 18 to 20 deep ashore as the storm hits land. In the Northern Hemisphere, a storm surge is highest on the right side of the eye of the storm. Storm strength, speed, direction, shape and depth of the ocean floor, and shape and height of the shore all combine to determine the height of the storm surge and which land areas will be flooded.

Likelihood of Occurrence of Coastal Erosion

There is no recorded history of significant coastal erosion occurring in Perquimans County, however, the close proximity to the Albemarle Sound and the Perquimans River increases the likelihood of occurrence and therefore rated as "likely".

Likely Range of Impact for Coastal Erosion

The potential for coastal erosion is confined to areas directly adjacent to water bodies within the County, thus the range of impact can be classified as "medium".

Probable Level of Impact for Coastal Erosion

With possible occurrence and a small exposure, the probable level of impact of coastal erosion in Perquimans County can be categorized as "negligible".

Perquimans County Hazard Index for Coastal Erosion

The hazard index for coastal erosion in Perquimans County is categorized as "moderate" based on a "likely" occurrence, "medium" range of impact, and "negligible" level of impact. This hazard index of "moderate" indicates that coastal erosion poses a relatively moderate threat and that local hazard mitigation efforts should be directly when applicable towards limiting impacts on exposure to future events.

Perquimans County, NC

Map A-1 Critical Facilities & Storm Surge

Critical Facilities
- Fire & Police
- Fire
- Electric Sub-station
- NCDOT
- Municipal Buildings
- Court
- EMS
- Emergency Management
- Health Department
- Library
- Senior Center
- Central Communications
- Beacon Academy
- Public Schools

Critical Sewer Facilites
- Sewer Pump
- Sewer Discharge
- WWTP

Critical Water Facilities
- Water Department
- Water Tower w/ Communications
- Water Tower or Elevated Tank
- Water Well
- Minor Water Treatment
- Water Tank
- Water Pump
- WTP
- Hurricane Evacuation Routes

Storm Surge (Fast)
- Category 1 & 2
- Category 3
- Category 4 & 5
- Rivers & Sounds
- Corporate Limits

Municipal Maps Provide Detail of This Area.

Bethel Community Inset

Perquimans River

ALBEMARLE SOUND

THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE

No Perquimans County Storm Surges are predicted beyond the scope of this map.

August 1, 2005

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 Perquimans County, however, Perquimans County is located in direct contact with the Perquimans River and the Albemarle Sound, thus the likelihood of occurrence is rated as "likely".

Likely Range of Impact for Riverine Erosion

The potential for riverine erosion is confined to areas of the County where effects from storm surges could contribute to riverine erosion, thus the range of impact can be classified as "medium".

Probable Level of Impact for Riverine Erosion

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

Perquimans County Hazard Index for Riverine Erosion

The hazard index for riverine erosion in Perquimans County is categorized as "moderate" based on a "likely" occurrence, "medium" range of impact, and "negligible" level of impact. This hazard index of "moderate" indicates that riverine erosion poses a relative threat and that local hazard mitigation efforts should be directed to areas that present the greatest vulnerability to effects from riverine erosion.

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

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.

Perquimans County Hazard Index for Dam Failure

There are no dams listed within the National Inventory of Dams (http://crunch.tec.army.mil/nid/webpages/nid.cfm) for Perquimans County, thus dam failure is not included in the natural hazard index analysis.

Company levee failure, Georgia, Sept. 14, Georgia Tech) 1994.

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*

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 Perquimans 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 .

With regards to the national database SHELDUS, there were reports of drought events that affected the northeastern portions of North Carolina during the first week of April 1985, where extensive periods of drought were related to property damages exceeding $50,000 resulting from droughts, wind, and fire. During the first weeks of May and July of 1986, reports of wildfire hazards resulted in .07 fatalities and property damage exceeding $150,000. Other notable events that affected a much larger region are mentioned in Table A-6 above.

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 Perquimans County

There are two recorded instances of extreme heat occurring in Perquimans County on July 1, 1987, and May 18, 1996. Information available on past droughts and heat waves specific to Perquimans County indicate excessive temperatures that extended from May 18, 1996 through May 21, 1996, during which highs exceeded 90 degrees and lows only in the 80 degree range. This weather event affected the entire northeast portion of North Carolina. No other details were available from the national data bases (NCDC and SHELDUS).

Hazard Analysis

*Note: Droughts and heat waves have regional impact thus historical data on the impact of droughts and heat waves in North Carolina (Table A-7) was assumed to have affected the entire 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. The National Climatic Data Center has recognized Fayetteville has having the highest recorded temperature within NC at 110 degrees Fahrenheit on August 21, 1983, these hazards, both droughts and heat waves can be considered “likely” in Perquimans 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, however both are separate events, when 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 “negligible”.

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 Perquimans County
There is no history of earthquake damage in Perquimans County.

Likelihood of Occurrence of an Earthquake
The probability of a notable earthquake occurring in Perquimans 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 Perquimans 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 Perquimans 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 Perquimans County area can be classified as "negligible".

Perquimans County Hazard Index for Earthquakes
Earthquakes have been assigned a hazard index of "low" for the Perquimans 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. There have been no prior instances of earthquake activity in Perquimans County; therefore earthquakes are not included in the hazard index.

5. Floods

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 Perquimans County

Since 1966, fourteen flood events have been reported in Perquimans County. The National Climatic Data Center also reported two other heavy rain events within Perquimans County in the Town of Hertford occurring on 1/27/98 and 2/4/98. No flooding was reported with these rain events.

Table A-11: Flood Event Data for Perquimans County – 1966 – 1999

Location	Date	Time	Type	Deaths
Perquimans County	2/13/1966	N/A	Flooding	0.01
Perquimans County	2/28/1966	N/A	Flooding	0
Perquimans County	3/4/1966	N/A	Flooding	0
Perquimans County	10/24/1982	N/A	Flooding	0.14
Perquimans County	3/17/1983	N/A	Flooding	0
Perquimans County	11/4/1985	N/A	Flooding	0
Perquimans County	10/10/1990	N/A	Flooding	0.02
Perquimans County	10/22/1990	N/A	Flooding	0
Perquimans County	8/16/1992	N/A	Flooding	0
Perquimans County	3/27/1994	N/A	Flooding	0
Hertford	1/27/1998	2:00 PM	Heavy Rain	0
Hertford	2/4/1998	12:00 AM	Heavy Rain	0
Countywide	9/16/1999	8:00 AM	Flood	0
Countywide	10/17/1999	5:30 PM	Flash Flood	0
Totals				**0.17**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

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.

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. Substantial damages associated with Hurricane Isabel within Perquimans County as reported by Emergency Services, are outlined in Table A-12.

Table A-12: Hurricane Isabel Damage Assessment for Perquimans County

Category	Damages
Property (homes) Damages	$10,000,000
Timber Damages	$38,000,000
Crop Damages	$12,000,000
Total	**$60,000,000**

Source: Perquimans County Emergency Management.

Additional information provided by the Perquimans County Emergency Management Coordinator indicates that countywide flooding was a direct result from Hurricane Floyd in 1999. Also, flash flood warnings were reported associated with Hurricane Dennis (1999).

Likelihood of Occurrence of Floods

Localized flooding can occur several times a year in Perquimans 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

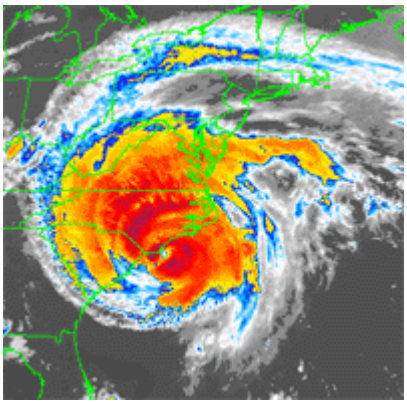
Flooding is normally confined to specific, known flood hazard areas where development can be controlled or limited. The likely range of flood impact can be classified as "medium".

Probable Level of Impact for Floods

Localized flooding typically has a "negligible" level of impact, whereas area wide flooding can have a "limited" level of impact in Perquimans County, however combined, flooding poses a negligible level of countywide impact.

Perquimans County Hazard Index for Floods

The hazard index for floods in Perquimans County is categorized as "moderate" based on a combined "likely" level of occurrence, "medium" range of impact, and a "negligible" level of impact. The hazard index for flooding indicates that this particular hazard poses a relatively "moderate" threat and that hazard mitigation efforts should be concentrated in areas where known flood hazards exist. Because of the topography of Perquimans County, the threat level for widespread flooding only poses a likely threat due to the soils ability to absorb water.



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 Perquimans County

During the time period from 1996 - 2004, nine hurricanes or tropical storms impacted Perquimans County - Hurricanes Bertha (July 1996), Fran (September 1996), Tropical Storm (October 1996), Bonnie (August 1998), and Tropical Storm/Hurricane Dennis I and II (September 1999), Floyd (September 1999), Gert (October 1999), Isabel (September 2003) and a Tropical Storm (August 2004). 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: www.hertfordonline.com)*

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

Date	Storm Name	Deaths and Injuries in NC		Damages in NC	
		Deaths	Injuries	Property	Crop
7/29/1960	Tropical Storm	0	0	$1,429	$1,429
9/11/1960	Donna	0.23	2.86	$142,857	$142,857
10/16/1964	Isbell	0	0	$500	$500
8/29/1971	Tropical Storm	0	0	$1,429	$142,857
9/4/1979	Tropical Storm	0.01	0	$50,000	$5,000
8/19/1981	Tropical Storm	0	0	$0	$156,250
9/11/1984	Tropical Storm	0.09	0.09	$1,428,571	$142,857
7/24/1985	Tropical Storm	0	0	$7,692	$0
9/26/1985	Tropical Storm	0	0.05	$238,095	$23,810
8/17/1986	Charley	0.05	0	$26,316	$26,316
7/12/1996	Bertha	0	0	$22,222	$3,333
9/5/1996	Fran	0	0	$111,111	$0
10/7/1996	Tropical Storm	0	0	$11,111	$0
8/26/1998	Bonnie	0.17	0	$2,233,333	$0
9/1/1999	Dennis	0	0	$5,833	$0

Date	Storm Name	Deaths and Injuries in NC		Damages in NC	
		Deaths	Injuries	Property	Crop
9/15/1999	Floyd	0	0	$2,000,000	$10,566,667
10/17/1999	Gert	0	0	$5,167	$0
9/18/2003	Isabel	1	0	$16,900,000	$0
8/14/2004	Tropical Storm	0	0	$0	$0
Totals		**1.55**	**3**	**$23,185,666**	**$11,211,875**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

Additional information provided by the Perquimans County Emergency Management coordinator indicates that within Perquimans County in October 1954 was impacted by Hurricane Hazel, causing flooding along Grubb St. and the Causeway; one fatality was reported. In September of 1985, Hurricane Gloria caused $10,000 in mobile home damage and minor flooding. In July 1996, Hurricane Bertha caused shingle and roof damage totaling $200,000 in structural damage and $1,000,000 in crop damages. Category 3 winds caused by Hurricane Fran in July 1996 resulted in $1,000,000 in property damages. In 1996 (October) winds resulting from a tropical storm caused $100,000 in damages. A category 2, Hurricane Bonnie caused $13,400,000 in damages and resulted in 1 fatality.

September of 1999, Hurricane Dennis brought category 1 force winds and caused $35,000 in crop damages. Two weeks later, Hurricane Floyd (category 2) caused roads to flood (Ferry Rd.) and resulted in 5 houses qualifying for the FEMA buyout program due to flooding. Sound Side house had 1 house destroyed, as well as 1 mobile home on New Hop Rd.; property damages were estimated at $1,000,000, as well as $3,400,000 in crop damage. Also in 1999, Hurricane Irene resulted in high winds causing $31,000 in property damage. The most substantial damages occurred in 2003 with Hurricane Isabel. This category 1 storm brought high winds resulting in major damage to homes from fallen trees. Perquimans County suffered $10,000,000 in property damage, $38,000,000 in timber damage, and $12,000,000 in crop damage. In August of 2004, Hurricane Bonnie and Charley (both category ones) caused an estimated crop damage well over $1,100,000. (Source of photo: www.hertfordonline.com)

As reported by the NC State Historic Preservation Office (Hurricane Isabel), "a number of properties, including Stockton and the Jacocks House, suffered damage from wind that pushed water through cracks to interiors. The Jacocks House also experienced damage due to Hurricane Floyd where the smokehouse collapsed due to high winds. Elsewhere, wind toppled chimney stacks: at Cove Grove, three chimney caps fell and some of the metal roof came off; a falling chimney stack at Land's End damaged the ca. 1830s slate roof and the chimney of the ca. 1730 Sutton-Newby House was damaged, as was the roof, but the extent remains unknown. The Sutton-Newby House also lost its plank smokehouse, crushed by a tree. At the ca. 1730 Newbold-White House, extensive water that came in through the shingle roof has curled original interior sheathing. North of Hertford, two huge 19th-century barns lost most of their metal covering, exposing the frame to the weather. Also very early, the John Bogue House lost a portion of its tin roof and a few windows. (Source of damage report: http://www.hpo.dcr.state.nc.us/IsabelReport.pdf)

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 Perquimans 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 Perquimans County. Hurricanes tat 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 Perquimans 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 Perquimans County. The probability of the Perquimans 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 Perquimans 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 Perquimans 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 Perquimans County can be classified as "limited". Although most hurricanes cause only limited damage within the area, past hurricane experience indicates the likelihood of occurrence.

Perquimans County Hazard Index for Hurricanes and Coastal Storms

The hazard index for hurricane impacts in Perquimans 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.

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]

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

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 Perquimans 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 Perquimans 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.”

Perquimans 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 Perquimans 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 Perquimans 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 Perquimans 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 Perquimans 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 Perquimans County.

Perquimans County Hazard Index for Landslides and Sinkholes

The Hazard Index for landslides and sinkholes in Perquimans 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 Perquimans 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 Perquimans 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 Perquimans County

A number of thunderstorm/high wind storm events and thunderstorm related events (hail and lightning) have been reported in Perquimans 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 1961 – 2004

Location	Date	Time	Magnitude (in knots)	Damages in NC	
				Injuries	Property
Perquimans Co.	2/25/1961	N/A	N/A	0	$500
Perquimans Co.	3/6/1962	N/A	N/A	1.79	$0
Perquimans Co.	11/9/1962	N/A	N/A	0	$649
Perquimans Co.	11/26/1962	N/A	N/A	0	$0
Perquimans Co.	11/29/1963	N/A	N/A	0	$500
Perquimans Co.	1/20/1964	N/A	N/A	0	$6,579
Perquimans Co.	8/29/1964	N/A	N/A	0	$500
Perquimans Co.	9/29/1964	N/A	N/A	0.1	$50,000
Perquimans Co.	6/12/1965	N/A	N/A	0	$588

Location	Date	Time	Magnitude (in knots)	Damages in NC	
				Injuries	Property
Perquimans Co.	7/1/1965	N/A	N/A	0	$0
Perquimans Co.	8/20/1967	N/A	N/A	0	$962
Perquimans Co.	3/12/1968	N/A	N/A	0	$500
Perquimans Co.	5/26/1968	N/A	N/A	0	$3,571
Perquimans Co.	11/9/1968	N/A	N/A	0.02	$5,000
Perquimans Co.	12/28/1968	N/A	N/A	0	$500
Perquimans Co.	10/2/1969	N/A	N/A	0	$2,083
Perquimans Co.	4/2/1970	N/A	N/A	0.01	$5,000
Perquimans Co.	8/16/1970	N/A	N/A	0	$0
Perquimans Co.	10/30/1970	N/A	N/A	0	$500
Perquimans Co.	1/26/1971	N/A	N/A	0	$500
Perquimans Co.	3/1/1971	N/A	N/A	0	$500
Perquimans Co.	8/16/1971	N/A	N/A	0	$1,786
Perquimans Co.	8/27/1971	N/A	N/A	0	$3,333
Perquimans Co.	10/1/1971	N/A	N/A	0	$1,316
Perquimans Co.	2/2/1973	N/A	N/A	0	$5,000
Perquimans Co.	5/12/1974	6:00 PM	0	0	$0
Perquimans Co.	3/24/1975	N/A	N/A	0.11	$5,747
Perquimans Co.	4/3/1975	N/A	N/A	0.01	$500
Perquimans Co.	12/31/1975	N/A	N/A	0.06	$694
Perquimans Co.	10/30/1977	N/A	N/A	0	$0
Perquimans Co.	1/25/1978	N/A	N/A	0.1	$50,000
Perquimans Co.	8/11/1981	N/A	N/A	0	$1,220
Perquimans Co.	2/27/1984	N/A	N/A	0	$5,000
Perquimans Co.	7/10/1985	3:00 PM	0	0	$0
Perquimans Co.	2/12/1985	N/A	N/A	0	$694
Perquimans Co.	8/5/1987	3:58 PM	0	0	$0
Perquimans Co.	10/25/1990	N/A	N/A	0.01	$5,000
Perquimans Co.	3/19/1992	2:25 PM	0	0	$0
Hertford	6/12/1995	12:23 AM	0	0	$0
Hertford	11/11/1995	9:30 PM	0	0	$0
Winfall	3/15/1996	3:45 PM	0	0	$0
Hertford	5/11/1996	6:40 PM	0	0	$3,000
Perquimans Co.	5/11/1996	N/A	N/A	0	$3,000
Perquimans Co.	7/24/1997	N/A	N/A	0	$3,667
Belvidere	5/26/1998	4:30 AM	0	0	$2,000
Winfall	6/13/1998	4:00 PM	0	0	$2,000
New Hope	4/11/1999	1:15 PM	0	8	$15,000
Beach Spring	8/1/1999	7:15 PM	0	0	$2,000
Countywide	5/22/2000	4:15 PM	50	0	$2,000
Hertford	7/24/2000	10:45 PM	50	0	$4,000
Southern Shores	8/16/2000	7:00 PM	50	0	$3,000
Hertford	4/3/2002	7:40 PM	52	0	$0
Countywide	5/2/2002	8:15 PM	0	0	$2,000
New Hope	5/13/2002	9:15 PM	0	0	$2,000
Winfall	6/14/2002	3:30 PM	0	0	$5,000
Perquimans Co.	4/10/2003	N/A	0	0	$30,000
Belvidere	6/18/2004	5:40 PM	50	0	$15,000
Total				**10.21**	**$252,391**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

Table A-17: Hail Storm Data for Perquimans County 1961 – 2002

Location	Date	Time	Magnitude (in inches)
Perquimans Co.	4/12/1961	N/A	N/A
Perquimans Co.	6/26/1961	N/A	N/A
Perquimans Co.	5/21/1963	N/A	N/A
Perquimans Co.	7/15/1965	N/A	N/A
Perquimans Co.	3/15/1967	N/A	N/A
Perquimans Co.	5/7/1967	N/A	N/A
Perquimans Co.	5/28/1967	N/A	N/A
Perquimans Co.	5/29/1967	N/A	N/A
Perquimans Co.	7/4/1970	N/A	N/A
Perquimans Co.	6/21/1970	N/A	N/A
Perquimans Co.	7/20/1970	N/A	N/A
Perquimans Co.	8/18/1970	N/A	N/A
Perquimans Co.	9/11/1971	N/A	N/A
Perquimans Co.	1/13/1972	N/A	N/A
Perquimans Co.	5/29/1979	3:00 PM	1.50 in.
Perquimans Co.	8/1/1980	N/A	N/A
Perquimans Co.	6/24/1986	2:16 PM	1.75 in.
Belvidere	5/8/1998	3:00 PM	1.00 in.
Beach Spring	8/1/1999	7:15 PM	0.75 in.
Belvidere	5/10/2000	9:25 PM	0.75 in.
Perquimans Co.	5/22/2000	N/A	N/A
Southern Shores	8/16/2000	7:00 PM	0.75 in.
Hertford	4/28/2002	8:40 PM	0.88 in.

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

Table A-18: Lightning Data for Perquimans County 1962 – 1999

Location	Date	Time	Deaths	Injuries	Damages in NC Property
Perquimans Co.	4/8/1962	N/A	0.11	0	$1,389
Perquimans Co.	1/30/1965	N/A	0.05	0	$500
Perquimans Co.	12/7/1968	N/A	0	0	$1,389
Perquimans Co.	12/18/1971	N/A	0.1	0.02	$847
Perquimans Co.	3/31/1973	N/A	0	0	$10,204
Belvidere	6/24/1996	9:30 PM	0	0	$50,000
Beach Spring	8/1/1999	7:15 PM	0	0	$15,000
Total			**0.26**	**0.02**	**$79,329**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

Additional events (provided by Perquimans County Emergency Management Coordinator) associated with severe storms indicate that in 1979, Perquimans County was impacted by a hail storm causing 1.5 inch size hail to fall, however, do damage was reported. In June of 1986 a thunderstorm resulted in 1.75 inch size hail to fall, however no reports of damage occurred. In July of 1997 high winds (50 kts.) associated with a thunderstorm resulted in $33,000 in property damage. A countywide thunderstorm in 2000 resulted in property damages exceeding $15,000.

Likelihood of Occurrence of Thunderstorms

There is an extensive history of thunderstorms, hail and lightning storms in Perquimans 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 Perquimans County can be categorized as "negligible".

Perquimans County Hazard Index for Thunderstorms

The hazard index for severe thunderstorms in Perquimans 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 Perquimans County, the impacts are not at the level that requires a concentration of local hazard mitigation efforts.

8.2 Tornadoes

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 Perquimans 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 Perquimans 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 Perquimans County as a "moderate" risk for tornadoes.

Historic records indicate that eight tornados hit Perquimans County between 1955 and 2000 (Table A-21). Of these, the 1984 tornado (F2) was the most severe with 1 death, 1 injury, and $250,000 in damages. Tornado damages resulted in over $500,000 in Perquimans County over the 45 year span.

Table A-21: Tornado Data for Perquimans County – 1955-2000

Location	Date	Time	Magnitude	Damages in North Carolina		
				Deaths	Injuries	Property Damages
Perquimans Co.	5/5/1955	9:00 PM	F1	0	0	$25,000
Perquimans Co.	6/25/1955	2:45 PM	F1	0	0	$25,000
Perquimans Co.	7/16/1967	3:00 PM	F2	0	0	$25,000
Perquimans Co.	3/28/1984	9:20 PM	F2	1	1	$250,000
Perquimans Co.	8/20/1991	9:05 AM	F0	0	0	$3,000
Perquimans Co.	11/23/1992	N/A	N/A	0	0	$55,556
Durants Neck	9/15/1999	10:30 PM	F1	0	0	$125,000
Belvidere	6/22/2000	3:49 PM	F0	0	0	$0
Totals				**1**	**1**	**$508,556**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

More detailed information from the Perquimans County Emergency Management Coordinator indicates the impacts of tornado events. In 1998, a tornado caused $50,000 in damages to the Woodland Church and one mobile home. Also, in 2002, high winds resulted in damages to 3 mobile homes within the Meads Trailer Park, causing over $15,000 in damages.

Likelihood of Occurrence of Tornadoes

Since 1955, tornadoes have impacted Perquimans County almost once every six years on average. This translates to a "likely" level of occurrence.

Likely Range of Impact for Tornadoes

Tornadoes in Perquimans County typically have a very localized effect over a "medium" area.

Probable Level of Impact for Tornadoes

Although tornadoes occur on a fairly sporadic basis in Perquimans County, there has been only two level F2 tornado in the last fifty years. Twenty-five percent of tornadoes have been at the F0 level, 37.5% F1, 25% F2, and 1 event (12.5%) that was not rated. The probable level of impact of tornadoes in Perquimans County can be categorized as "negligible" due to the relatively small extent of the areas affected. Nevertheless, tornadoes have been the cause of deaths and injuries, as well as cost, an estimated 10 thousand dollars a year, over the course of the past 55 years.

Perquimans County Hazard Index for Tornadoes

The hazard index for tornadoes in Perquimans 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 Perquimans County
Since there is no recorded history of tsunamis impacting North Carolina, this natural hazard was not analyzed for potential impact on Perquimans 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 Perquimans County

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

Perquimans County Hazard Index for Volcanic Eruptions

There are no known instances of volcanic eruptions in Perquimans 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 Perquimans 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 North Carolina Division of Forestry Resources, the frequency of wildfires in Perquimans County is relatively moderate (Table A-23).

Table A-23: Perquimans County Wildfires

Year	Lightning	Campfire / Smoking	Incendiary / Debris	Machine Use	Railroad	Children / Misc.	Total Fires
2000	0	0	6	0	0	1	7
Avg # / 5 Yrs.	0.4	0.4	6.4	0.2	0	1.6	9

Source: NCDFR, North Carolina Division of Forestry Resources: http://www.dfr.state.nc.us/contacts/perquimans.htm

Likelihood of Occurrence of Wildfires in Perquimans County

Over the last five years, there has been an average of 9 recorded wildfire events for Perquimans County, debris fires account for the majority of the recorded wildfire events, thus they are considered "likely."

Likely Range of Impact for Wildfires in Perquimans 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 Perquimans County

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

Perquimans County Hazard Index for Wildfires

The hazard index for wildfires in Perquimans 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: www.hertfordonline.com)*

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 Perquimans

The NCDC has not recorded any incidences of nor'easter storm events affecting Perquimans County. The North Carolina Division of Emergency Management has rated Perquimans 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, Perquimans 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 Perquimans County

The North Carolina Division of Emergency Management has rated Perquimans County as a "low" risk for severe winter storms (Local Hazard Mitigation Planning Manual, p. 83).

Table A-25: Snow and Ice Storm Data for Perquimans County 1960 - 2004

Location	Date	Time	Type	Property Damage
Perquimans County	3/2/1960	N/A	Winter Weather	$ 500
Perquimans County	3/9/1960	N/A	Winter Weather	$ 500
Perquimans County	1/21/1961	N/A	Winter Weather	$ 500
Perquimans County	1/26/1961	N/A	Winter Weather	$ 500
Perquimans County	12/12/1962	N/A	Winter Weather	$ 500
Perquimans County	2/26/1963	N/A	Winter Weather	$ 500
Perquimans County	5/2/1963	N/A	Winter Weather	$ -
Perquimans County	1/13/1964	N/A	Winter Weather	$ 500
Perquimans County	3/30/1964	N/A	Winter Weather	$ 500
Perquimans County	1/25/1966	N/A	Winter Weather	$ 5,000
Perquimans County	1/29/1966	N/A	Winter Weather	$ 500
Perquimans County	2/17/1967	N/A	Winter Weather	$ 500
Perquimans County	3/18/1967	N/A	Winter Weather	$ -
Perquimans County	1/9/1968	N/A	Winter Weather	$ 5,000
Perquimans County	1/24/1968	N/A	Winter Weather	$ 500
Perquimans County	2/15/1969	N/A	Winter Weather	$ 50,000
Perquimans County	1/7/1970	N/A	Winter Weather	$ 500
Perquimans County	1/20/1970	N/A	Winter Weather	$ 500
Perquimans County	12/1/1970	N/A	Winter Weather	$ 5,000
Perquimans County	1/8/1971	N/A	Winter Weather	$ 500
Perquimans County	2/13/1971	N/A	Winter Weather	$ 500
Perquimans County	12/3/1971	N/A	Winter Weather	$ 500

Location	Date	Time	Type	Property Damage
Perquimans County	1/16/1972	N/A	Winter Weather	$ 649
Perquimans County	1/7/1973	N/A	Winter Weather	$ 5,000
Perquimans County	2/9/1973	N/A	Winter Weather	$ 11,364
Perquimans County	2/17/1979	N/A	Winter Weather	$ 5,000
Perquimans County	4/18/1983	N/A	Winter Weather	$ 50
Perquimans County	1/20/1985	N/A	Winter Weather	$500,000
Perquimans County	4/9/1985	N/A	Winter Weather	$ -
Perquimans County	3/12/1993	N/A	Winter Weather	$ 50,000
Perquimans County	1/15/1994	N/A	Winter Weather	$ 500
Northern and Central NC	1/3/1994	6:00 PM	Heavy Snow	$ -
Northeastern NC	2/10/1994	10:00 AM	Ice Storm	$ -
Countywide	2/8/1995	2:00 AM	Heavy Snow	$ -
Countywide	1/6/1996	1:00 PM	Winter Storm	$ -
Countywide	2/2/1996	2:00 AM	Winter Storm	$ -
Countywide	2/3/1996	5:00 PM	Winter Storm	$ -
Countywide	2/5/1996	3:00 AM	Extreme Cold	$ -
Countywide	2/16/1996	3:00 AM	Winter Storm	$ -
Countywide	1/25/2000	12:00 PM	Winter Storm	$ -
Countywide	12/3/2000	10:00 AM	Winter Storm	$ 25,000
Countywide	12/3/2000	9:00 PM	Winter Storm	$ -
Countywide	1/2/2002	1:00 AM	Winter Storm	$ -
Countywide	1/23/2003	3:00 AM	Frost/freeze	$ -
Countywide	11/30/2003	12:00 AM	Winter Storm	$ -
Countywide	1/9/2004	2:00 PM	Winter Storm	$ -
Countywide	1/25/2004	6:00 PM	Winter Storm	$ -
Countywide	2/15/2004	4:00 AM	Frost/freeze	$ -
Countywide	4/6/2004	6:00 PM	Heavy Snow	$ -
Total				**$670,563**

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html
SHELDUS, http://go2.cla.sc.edu/hazard/db_registration

Additional information provide by the Perquimans County Emergency Management Coordinator make available more detailed description of hazard events associated with winter storms. In 1980, Perquimans County received 3 feet of snow and was forced to shut down municipal operations for 2 days. A winter storm deposited heavy amounts of snow within the county in January of 1994. Also in February of 1994, an ice storm occurred, however, no damage was reported. Heavy amounts of snow resulted in Perquimans County loosing power for 26 hours. In 1996, extreme cold temperatures resulting from winter storms occurred in Perquimans County, however, no reports of damage was reported. Winter storm events in 2000 resulted in $25,000 in property damages.

Likelihood of Occurrence of Severe Winter Storms in Perquimans County
Perquimans County is located in the coastal plain of North Carolina as the likelihood of occurrence of severe winter storms can be ranted as “likely”.

Likely Range of Impact for Severe Winter Storms in Perquimans 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 Perquimans 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.

Perquimans County Hazard Index for Severe Winter Storms
The hazard index for severe winter storms in Perquimans County is categorized as “moderate” based on a “likely” occurrence, “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 Perquimans 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 Perquimans County for the nine natural hazards identified in the Local Hazard Mitigation Planning Manual.

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

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

Source: Local Hazard Mitigation Planning Manual, NCDEM, 1998, p. 81-83.

[a] The "Local Hazard Mitigation Planning Manual" does not rate the following hazards for Perquimans 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 Perquimans 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 Perquimans 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 Perquimans County

Natural Hazard	Range	Perquimans 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	6
Frequency of Minor Hurricanes, 1900-96	Saffir-Simpson Class 1-2	5
Frequency of Major Hurricanes, 1900-96	Saffir-Simpson Class 3-5	1
Nor'easter Vulnerability	1 = some direct vulnerability	1
Frequency of Tornadoes, 1953-1995	Number of tornadoes	4
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. 85-88.

E. Perquimans County Composite Hazard Index

Certain parts of the County, such as floodplains 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 Perquimans County

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

Seven hazards received a "moderate" rating as these hazards pose the greatest potential risk to persons and property. These six hazards pose the same risks for Perquimans County and for the towns located in the County with the exception that persons located in the northern portion of the County are not subject to coastal erosion.

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 Perquimans 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 four hazards – coastal/riverine erosion, floods, severe and storms/tornadoes and wildfires– typically have a more limited area of impact. Exposure to coastal/riverine erosion, and floods is estimated to be no greater than 10%, i.e., 10% or less of all structures within the County could potentially be impacted by coastal/riverine erosion, flooding or severe storms/tornadoes. For severe storms/tornadoes and wildfires, exposure is estimated at 5%, i.e., 5% or less of all structures within the County could potential be impacted by severe storms/tornadoes and wildfires.

During the development of the Perquimans County Multi-Jurisdictional Hazard Mitigation Plan, team members including representatives from the County and the participating Towns of Hertford and Winfall met and identified natural hazards that could affect Perquimans County and each of the participating jurisdictions.

During this process these officials determined the natural hazards that would have a potential impact on Perquimans County and each of the participating jurisdictions are addressed in this plan. Those natural hazards that will not be addressed in the composite hazard analysis are dam/levee failure, earthquakes, landslides/sinkholes, tsunamis, and volcanoes. These hazards are not addressed in the composite hazard analysis due to the history of past occurrence and the unlikelihood of these hazards occurring in the Towns of Hertford and Winfall, and the potential impact would be negligible.

Perquimans County, NC

Map A-2: Critical Facilities & Multi - Hazards

Critical Facilities

- Fire & Police
- Fire
- Electric Sub-station
- NCDOT
- Municipal Buildings
- Court
- EMS
- Emergency Management
- Health Department
- Library
- Senior Center
- Central Communications
- Beacon Academy
- Public Schools

Critical Sewer Facilites

- Sewer Pump
- Sewer Discharge
- WWTP

Critical Water Facilities

- Water Department
- Water Tower w/ Communications
- Water Tower or Elevated Tank
- Water Well
- Minor Water Treatment
- Water Tank
- Water Pump
- WTP

Multi - Hazards

Floodplain

- 100 Year Floodplain
- 500 Year Floodplain
- Hurricanes 1851-present
- Hurricane Evacuation Routes
- Tornadoes

Features & Boundaries

- Rivers & Sounds
- Corporate Limits

Areas of Wildfire Potential

Municipal Maps Provide Detail of This Area.

Bethel Community Inset

HURRICANE ALLISON 2001
HURRICANE DORIA 1971
HURRICANE ISBELL 1964
HURRICANE HELENE 2000
HURRICANE FLOYD 1999
HURRICANE EARL 1998

Perquimans River

ALBEMARLE SOUND

Bethel

August 1, 2005

THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE

Appendix B: Assessment of Vulnerability

A. Introduction

The Perquimans County Composite Hazard Index (Table A-28 in Appendix A) outlines the six hazards rated "moderate" 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 Perquimans 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.

Coastal/riverine erosion and floods, severe storms/tornadoes and wildfires – typically have a more limited area of impact. Exposure to coastal/riverine erosion and floods is estimated to be no greater than 10%, i.e., 10% or less of all structures within the County could potentially be impacted by coastal/riverine erosion or flooding. For severe storms/tornadoes and wildfires, exposure is estimated at 5%, i.e., 5% or less of all structures within the County could potential be impacted by severe storms/tornadoes and wildfires.

B. Community Description (see Map A-1)

Perquimans County is located in northeastern coastal plain of North Carolina, bordered to the west by Chowan County, to the north by Gates County, to the east by Pasquotank County, and to the south by Albemarle Sound. The county seat of Perquimans County is the Town of Hertford, located along the western border of the Perquimans River. The only other incorporated town within the County is the Town of Winfall located on the east side of Perquimans River across from the Town of Hertford.

Major waterways within Perquimans County include the Albemarle Sound and the Perquimans, Little, and Yeopim Rivers, as well as Mill and Sutton Creeks which all flow through Perquimans County into the Albemarle Sound. Perquimans County encompasses over 283 square miles (approximately 181,718 acres). The total population of the County as of the 2000 Census was 11,368. Average population growth year has been fairly consistent at approximately 100 persons per year over the last thirty years.

Perquimans County is served by a limited network of roadways including US-17, NC-37, Center Hill Highway and other associated thoroughfares within the incorporated towns. The County also serves as a corridor for coastal evacuation routes exiting the Outer Banks; specifically the Currituck County recommended evacuation route of US-158 to US-17 passing though Perquimans County. The Norfolk-Southern Railroad provides rail accommodations linking the County to northeastern port locations in Virginia. Rail traffic is limited to freight and express cargo services only. Commercial air transportation is provided by the Norfolk International Airport located 65 miles northeast.

Demographics and Employment

The largest manufacturers within Perquimans County include Mariner Health Central Inc., Apricot Inc., Food Lion, Skills Inc., Captain Bobs, Whitehurst Sand Company, Tandem Inc. (McDonalds), Eckerd Corporation, Pioneer College Caterers Inc., and Albemarle Electric Membership Corporation. Other employers include Brian Center Nursing Care of Hertford, the Perquimans County Public School System and Perquimans County government.

The economy of Perquimans County depends largely on educational and health and social services related occupations with over 20% of the total job industry in these two categories. Other notable occupations include manufacturing (10.9%) and retail trade (11.8%). More than 71% of Perquimans County residents have a high school diploma or higher education, with 12.3% having a bachelor's degree or higher. However, more than 28% of the population has less than a high school education. The median age of residents in 2000 was 42.2 years of age with 73.8% of the population above the age of 21.

Table B-1: Perquimans County Demographics

Economic		
Median Household Income		$29,538
Average Household Size		2.42
Percent of Individuals Below Poverty Level		17.9%
Occupation	**People**	**Percent**
Management, professional, etc.	1,047	23.6 %
Service related	855	19.3 %
Sales and office	999	22.5 %
Farming, fishing, and forestry	96	2.2 %
Construction, extraction, and maintenance	672	15.2 %
Production, transportation, material moving	763	17.2 %
Employment	**People**	**Percent**
Employed	4,432	48.9 %
Unemployed	279	3.1 %
Not in labor force	4,304	47.5 %
Social		
Level of Educational Attainment	**People**	**Percent**
Less than 9^{th} grade	754	9.5 %
9^{th} – 12^{th} (no diploma)	1,482	18.6 %
High School Diploma (includes GED)	2,631	33.0 %
Some college, no degree	1,697	21.3 %
Associate degree	423	5.3 %
Bachelor's degree	685	8.6 %
Graduate or professional degree	298	3.7 %
Housing		
Selected Characteristics	**People**	**Percent**
Lacking complete plumbing facilities	51	1.1 %
Lacking complete kitchen facilities	14	0.3 %
No phone service	102	2.2 %

Source: US Census, 2000

Developed and Undeveloped Areas (see Map A-2)

Land within the unincorporated area of the County is composed primarily of larger parcels designated for agricultural activities with scattered residential development. Residential subdivisions have consumed waterfront access properties to create resort style communities for mostly higher end housing. As the result of the development of these resort communities, the County's median household income increased 171% between 1980 and 2000. Commercial development typically occurs within the corporate limits or extraterritorial jurisdictions (ETJs) of the two municipalities.

In 2004 the Perquimans County real estate tax base exceeded $670 million (Table B-2). The State Data Center projects a consistent increase in population for Perquimans County through 2010 (8.0%) and 2020 (6.0%). Such a population increase will add to the overall community vulnerability as future homes and businesses are constructed and new residents move to Perquimans County.

Table B-2: Estimated Value of Developed Facilities within Perquimans County

Type of Use	Building Value	Land Value	Total Tax Value
Residential	$533,211,688	$133,302,922	$666,514,610
Commercial	$3,585,194	$896,299	$4,481,493
Total	**$536,796,882**	**$134,199,221**	**$670,996,103**

Source: Total tax value, Perquimans County, January 2004.
**Note: Estimations based on building and land value multiplied by an assumed value ratio of 80% structure and 20% land.*

The 2000 Census (Table B-3) found 6,043 housing units located in Perquimans County. According to the Census, 46.5% of the homes within the County were constructed between 1980 and 2000.

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

Types of Housing Units		
Type of Unit	**Number of Units**	**Percent of Total Units**
Single Family	3,784	62.6 %
Multi-family	229	3.8 %
Mobile homes	1,741	28.8 %
Boat, RV, Van	289	4.8 %
Total Units	**6,043**	**100.0 %**

Housing Units by Year Built		
Year Built	**Number of Units**	**Percent of Total Units**
1959 or earlier	1,439	23.8 %
1960 - 1979	1,796	29.7 %
1980 - 1989	1,394	23.1 %
1990-March 2000	1,414	23.4 %
Total	**6,043**	**100.0 %**

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

C. Critical Public Facilities (see Map A-2)

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 natural disaster. 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 Map A-2. The ability to protect these facilities from damage from a future natural hazard event is critical to the welfare of the citizens of Perquimans 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 Perquimans 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 Perquimans 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 Perquimans 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 Perquimans County[1]

Type of Facility	Location/Site	Function	Estimated Replacement Value
County Administration			
Perquimans County Courthouse	128 N. Church Street	Administrative	$1,383,960
Government Annex*	128 N. Church Street	Administrative	$629,801
Perquimans County Administrative**	104 Dobbs Street	Administrative	$260,000
Health Center			
Perquimans County Health Center	103 Charles Street	Health Services	$165,957
Fire Departments			
Bethel Community Fire Protection Assoc. Inc.	462 Snug Harbor Road	Fire Protection	$300,000
Durants Neck Volunteer Fire Department	279 Cove Road	Fire Protection	$400,000
Hertford Fire Department	324 Grubb Street	Fire Protection	$150,000
Inter-County Volunteer Fire Department Inc.	412 Woodville Road	Fire Protection	$185,000
Belvidere - Chappell Hill Volunteer Dire Department Inc	143 Drinking Hole Road	Fire Protection	$150,000
Winfall Fire Department	341 Wiggins Road	Fire Protection	$125,000
Emergency Medical Services			
Perquimans County EMS	Edenton Road	Emergency Medical	$199,600
Emergency Shelter			
Perquimans County Middle School	312 W Main Street	Emergency Shelter	$8,008,715
County Facilities			
Communications Tower	Lake Road	Emergency Communications	$3,167
Perquimans County Water System (3)	Various Locations	Public Water	$163,659
Perquimans County Water Treatment Plant (WTP)	458 Snug Harbor Road	Public Water	$301,017
Wells (2)	Various Locations	Public Water	$487,200

Source: Perquimans County and NCDOI.

[1] Note: Some of the facilities listed are not owned or operated by Perquimans County, however in the event of a disaster, facilities listed would be utilized.

*Note: This facility houses the Magistrate's office, County Commissioner's office, Sheriff's office, and the Probation office.

**Note: This facility houses the Building Inspector, Emergency Management, and Albemarle Commission Nutrition Program.

Other-Owned Critical Facilities
State/Federally-Owned Critical Facilities
• US 17
• NC 37
Essential Facilities
None
County-Owned Facilities
• Bus Garage

Supportive Facilities
Publicly-Owned
• Perquimans County Central School
• Hertford Grammar School
• Perquimans County Middle School
Private Schools
• Beacon Academy
Community Centers
• Library
• Missing Mill Park

D. Description of All-Hazards Exposure (see Map A-1)

As detailed in Appendix A - Hazard Identification and Analysis, the entire area within Perquimans County is exposed to general hazards such as hurricanes/coastal storms, droughts/heat waves, winter storms/freezes, etc. Severe storms/tornadoes and wildfires are another common threats but their exact location of a future event can not be predicted. Only coastal/riverine erosion and flood hazards have known hazard locations.

Vulnerable Populations

Vulnerable populations have been identified as special needs populations (senior citizen centers/retirement homes and child care centers) and manufactured home parks. Special needs populations are those persons residing in senior living centers that may need special assistance during a natural hazard event or those facilities caring for children. The following facilities are located within the Perquimans County study area, which includes the towns of Hertford and Winfall as well as the unincorporated areas of the County:

Child Care Centers

There are 4 child care centers within Perquimans County that are registered through the North Carolina Division of Child Development (http://ncchildcare.dhhs.state.nc.us/general/home.asp). The four centers are:

Hertford
- Beacon Academy
- Mama Nae's Child Care Center
- Stepping Stones of the Albemarle, Inc.

Winfall
- RCDEI Enrichment Center

Manufactured Home Parks (MHP)

There are a number of mobile home parks scattered throughout Perquimans County. Mobile home parks include:

- Miller and Meads MHP
- Dogwood MHP
- Winn Fork MHP
- Hallowell MHP
- Sawyers MHP

Senior Care Facilities

There are five senior/adult care facilities within Perquimans County that are registered through the North Carolina Division of Aging and Adult Services (http://www.dhhs.state.nc.us/aging). These facilities include:

- Brian Center Health and Rehabilitation
- Russell's Rest Home
- Winfall Manor
- Country Oaks
- South Haven Manor Inc.

Table B-5 is a summary of building permits issued within the Perquimans County planning jurisdiction from 2000 through 2004. During this period, 362 permits (42% of total permits) were issued for single-family home construction, 51% for mobile homes, and 3% for commercial construction.

Table B-5: Building Permits
Perquimans County Planning Jurisdiction 2000–2004

Type of Structure	Year					Total Permits
	2000	2001	2002	2003	2004	
Dwelling	64	81	66	60	91	362
Mobile Home	96	79	84	76	107	442
Modular	1	4	4	8	21	38
Commercial	3	3	5	2	9	22
Total	**164**	**167**	**159**	**146**	**228**	**864**

Source: Perquimans County Building Inspector.

Flood Hazard Areas (see Maps A-1 and A-2)

The flood hazard areas within Perquimans County are predominantly located along the Perquimans River and associated tributaries, with other flood areas scattered throughout the County. Other notable areas of concern include the areas located within the 500-year floodplain designation in the northern portions of the County just east of NC 37, paralleling Bethany Church Road. The highest point in the County is located in the northwest corner of the County just southeast of the Joppa community in the Hobbsville quadrangle. This point is approximately 52' above sea level (NCGS).

National Flood Insurance Program

Perquimans 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 Perquimans County are shown in Table B-6.

Table B-6: National Flood Insurance Program (NFIP) Statistics
Perquimans County

Category	Number or Value
Total Insured Value	**$84,367,700**
Number of Policies	489
Total Premiums	**$153,526**
Average Premium	$313.96
NFIP Claims Since 1978	88
NFIP Claim Amounts Paid Since 1978	$394,816

Source: NFIP/ FEMA Policy Statistics as of September 2004.

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 Perquimans County has had six repetitive loss payments totaling over $85,000.

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-7). County tax and building permit records do not specify the age of individual mobile/manufactured home units, nonetheless, in the 2000 Census, 1,741 (28.8%), of all residential units within Perquimans County were mobile/manufactured home units. All of these units regardless of age are more susceptible to wind damage than are site-built dwelling units.

Table B-7: 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-8), the population of Perquimans County increased from 10,447 persons in 1990 to 11,368 persons in 2000 – an increase of 921 people. The NC State Data Center estimates the 2004 Perquimans County population to be 11,806. The Office of State Planning population projections for Perquimans County are also shown in Table B-8.

Table B-8: Projected Population Figures for Perquimans County

Year	Perquimans County	
	Population Estimate	Ten-Year Growth Rate
1990	10,447	-
2000	11,368	8.8%
2010	12,280	8.0%
2020	13,011	6.0%

Source: NC Office of State Planning; local population estimates, http://demog.state.nc.us.

Using the 2000 Census, average household population size of 2.42 persons/household, Perquimans County can be expected to gain approximately 377 additional dwelling units by 2010 and another 302 units between 2010 and 2020 for a total of 679 total additional housing units by 2020. This future growth and development must be encouraged in areas of low vulnerability. Strict enforcement of mitigation measures, such as hurricane building codes and flood damage prevention regulations, will, over time, decrease the County's vulnerability to hazards.

F. Summary Conclusions

Current Vulnerability

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

Table B-9: Potential Hazard Exposure

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

Source: Appendix A Table A-28.

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-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. (At this time the County/towns do not have a current land use map 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 Perquimans 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-10 Current Conditions (Year 2000).

Current Vulnerability to Coastal/Riverine Erosion and Flooding

Perquimans County has limited exposure to coastal/riverine erosion and flood hazards. The County estimates that a maximum of 10% 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-11 Current Conditions (Year 2000). (Note: Major roads, highways, and bridges within Perquimans 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 Perquimans County area has a maximum 5% exposure, i.e., 5% 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 (see Map A-2)
Perquimans County population is projected to increase by 14.5% between 2000 and 2020 (Table B-8). To estimate the number of housing units that will be required in 2020 (right side of Tables B-10, B-11, and B-12), 2020 population estimates were divided by the 2000 Census average household size (2.42 persons). The number of commercial/ industrial and other structures was then estimated to increase a comparable amount. Year 2020 values were predicted using the average per property values of 2000 times the number of projected units (constant Year 2000 dollars were assumed – no factor was used for inflation).

(At this time, the Perquimans County and the towns of Hertford and Winfall 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.)

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-10 – 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/Riverine Erosion and Flooding
Future exposure to coastal/riverine erosion and to flooding (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 types of hazards.

Future Vulnerability to Severe Storms/Tornadoes and Wildfires
Future exposure to severe storms/tornadoes and wildfires (right side of Table B-12 – Potential Future Conditions (Year 2020)) was estimated using the methodology described above. A 5% exposure of all development – both public and private – was assumed for these hazards.

Table B-10: Perquimans 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	3,784	$635,768	7,116	5,267	$884,934	8,144
Multi-Family Residential	229	$3,117	432	351	$4,778	494
Mobile Homes (Boat RV, Van)	2,030	$27,630	3,820	2,323	$31,618	4,373
Subtotal Residential	**6,043**	**$666,515**	**11,368**	**7,022**	**$921,330**	**13,011**
Commercial/Industrial	300	$4,481	0	350	$5,228	0
Subtotal Private	**6,343**	**$670,996**	**11,368**	**7,372**	**$926,558**	**13,011**

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
County Administration	3	$2,274	0	3	$2,274	0
Health Center	1	$166	0	1	$166	0
Fire Departments	6	$1,310	0	7	$1,528	0
Emergency Medical Services	1	$200	0	1	$200	0
Emergency Shelter	1	$8,009	0	1	$8,009	0
County Facilities	8	$955	0	9	$1,074	0
Subtotal Public	**20**	**$12,914**	**0**	**22**	**$13,251**	**0**
Total Community Vulnerability	**6,363**	**$683,910**	**11,368**	**7,394**	**$939,809**	**13,011**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*

Table B-11: Perquimans County Vulnerability Assessment for Coastal/Riverine Erosion and Floods – 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	378	$63,577	712	527	$88,493	814
Multi-Family Residential	23	$312	43	35	$478	49
Mobile Homes (Boat RV, Van)	203	$2,763	382	232	$3,162	437
Subtotal Residential	**604**	**$66,652**	**1,137**	**702**	**$92,133**	**1,301**
Commercial/Industrial	30	$448	0	35	$523	0
Subtotal Private	**634**	**$67,100**	**1,137**	**737**	**$92,656**	**1,301**

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
County Administration	0.3	$227	0	0.3	$227	0
Health Center	0.1	$17	0	0.1	$17	0
Fire Departments	0.6	$131	0	0.7	$153	0
Emergency Medical Services	0.1	$20	0	0.1	$20	0
Emergency Shelter	0.1	$801	0	0.1	$801	0
County Facilities	0.8	$96	0	0.9	$107	0
Subtotal Public	**2**	**$1,292**	**0**	**2.2**	**$1,325**	**0**
Total Community Vulnerability	**636**	**$68,392**	**1,137**	**739**	**$93,981**	**1,301**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*

Table B-12: Perquimans County Vulnerability Assessment for Severe Storms/Tornadoes and Wildfires – 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	189	$31,788	356	263	$44,247	407
Multi-Family Residential	11	$156	22	18	$239	25
Mobile Homes (Boat RV, Van)	102	$1,382	191	116	$1,581	219
Subtotal Residential	**302**	**$33,326**	**568**	**351**	**$46,067**	**651**
Commercial/Industrial	15	$224	0	18	$261	0
Subtotal Private	**317**	**$33,550**	**568**	**369**	**$46,328**	**651**

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
County Administration	0.15	$114	0	0.15	$114	0
Health Center	0.05	$8	0	0.05	$8	0
Fire Departments	0.3	$65	0	0.35	$76	0
Emergency Medical Services	0.05	$10	0	0.05	$10	0
Emergency Shelter	0.05	$400	0	0.05	$400	0
County Facilities	0.4	$48	0	0.45	$54	0
Subtotal Public	**1**	**$645**	**0**	**1.1**	**$662**	**0**
Total Community Vulnerability	**318**	**$34,195**	**568**	**370**	**$46,990**	**651**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties*

Appendix C: Community Capability Assessment

A. Introduction

This section of the Plan is a detailed assessment of Perquimans County's capacity as a local governmental unit to mitigate the impacts of the natural hazards that were identified and analyzed in Appendix A. This assessment includes an examination of the following local government capabilities:

1. Institutional – A review of County departments that have direct and indirect responsibility for hazard mitigation activities.
2. Policies, Programs and Ordinances - An examination and evaluation of existing plans, policies, and ordinances that either increase or decrease local vulnerability to natural hazards.
3. Legal – A review of State granted powers – regulation, acquisition, taxation and spending - that can be employed by local governments to further hazard mitigation efforts.
4. Fiscal – An examination of the County use of local operating budget and capital improvement program funds to mitigate the effects of hazards.
5. Technical – A review of the County's ability to use employ technical equipment and software programs to enhance mitigation activities.
6. Political Climate – A description of local political will and commitment to implementing hazard mitigation activities.

B. Departments and Agencies Impacting Hazard Mitigation

Perquimans 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 departments with direct impacts on hazard mitigation can be found under Technical Capabilities – Staff Resources need the end of Appendix C.)

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

Department / Agency	Direct/Indirect Impact	Function
Administration Department	Direct	The Administrative Department consists of the county manager and the clerk to the board. The county manager is charged with handling the day-to-day operations of county government.
Emergency Management	Direct	Emergency Management serves as the coordinating agency for emergency response in the event of a disaster.
Emergency Medical Services	Direct	Emergency Medical Services provides response to emergency health needs in the community.
Health Department	Direct	The mission of the Health Department is to protect, promote, and assure the health of County citizens.
Management Information Systems	Direct	Management Information Systems is responsible for directing County information and data integrity.
Planning Department	Direct	The Planning Department guides long-range development and enforces land use regulations.
Sheriff's Department	Direct	The Sheriff's Department is responsible for enforcing criminal and civil law.
Cooperative Extension Service	Indirect	The Cooperative Extension Service provides information and education on subjects such as agriculture, home economics, youth programs and community and rural development.
Finance Department	Indirect	The Finance Department is responsible for county revenues, paying county bills, issuing debt for construction projects and investing idle funds.
Mental Health Department	Indirect	The Mental Health Department is responsible for providing services to individuals and families facing the challenges of mental illness, emotional stress, mental retardation, developmental disabilities, and/or chemical dependence.
Recreation Department	Indirect	The Recreation Department provides a comprehensive program of both structured and non-structured recreation opportunities and services to meet both active and passive needs of citizens.
Register of Deeds	Indirect	The Register of Deeds Office records land documents including deeds of trusts, subdivision maps, leases, easements, assignments, agreements, deeds of trust cancellations, corporate documents, assumed names, and files uniform commercial code financing statements on personal property.
Social Services	Indirect	The Social Services Department works to enable individuals to become self-sufficient, to improve their standard of living, to learn to cope adequately with their problems, and to provide preventive services that will avoid family breakup and enable individuals to remain in their own homes.
Tax Administration	Indirect	The Tax Administration office's primary responsibility is to list and assess all taxable and personal property each year and to furnish tax base figures to the County and municipalities.

Source: Perquimans County

Other Agencies/ Departments

Perquimans County Public School System
The Perquimans 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
Perquimans 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, Perquimans County is charged with developing and keeping current a land use plan that establishes County policies on growth and development. The Perquimans County CAMA Land Use plan was last updated in 1998. The County also has in effect a flood damage prevention ordinance 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 Update
- Hurricane Evacuation Plan
- Zoning Ordinance
- Building Code Enforcement
- Junk Vehicle Ordinance
- Junkyard Ordinance
- Manufactured Home Park Ordinance
- Subdivision Regulations
- Addressing Ordinance
- Water Shortage Response Ordinance
- Flood Damage Prevention Ordinance
- Soil Erosion and Sedimentation Control

Coastal Area Management Act (CAMA)

One of the basic purposes of the CAMA was to establish a state management plan to ensure 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 Perquimans County Building Inspections or the NC Division of Coastal Management.

1998 Perquimans County CAMA Land Use Plan Update

The growing population brought about an evaluation of policy goals and procedures first incorporated into the 1993 plan and updated in 1998 to meet the challenges of increased development within the County. The 1998 Plan executive summary recommended changes to achieve the following:

- define and refine local policies and issues;
- examine and refine the land classification system and map;
- assess the effectiveness of the existing land use plan and its implementation;
- explore implementation procedures; and,
- promote better understanding of land use planning.

In an effort to involve the public, public meetings and forums were held to collect ideas and formulate a direction on how citizens felt the County should develop within a 5-10 year range. The following objectives were included in the 1998 plan:

- Encourage job creation and desirable economic growth;
- Control and effectively manage development growth;
- Encourage and promote environmentally sensitive residential development;
- Protect water quality of rivers, sound and creeks;
- Improve drainage and sedimentation and erosion control;
- Promote historic assets to bring about more economic growth;
- Examine zoning as possible development control strategy.

1998 CAMA Plan Land Classification System

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 solely depends on subdivision regulations for land control. 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." Note: Perquimans County has since adopted a Zoning Ordinance (2002).

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 six land use classifications which apply to Perquimans County and the Town of Winfall:

1. Developed
2. Urban Transition
3. Limited Transition
4. Community
5. Rural
6. Conservation

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 meeting the intent of the Developed 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. In some instances an area may not have all the traditional urban services in place, but if it otherwise has a developed character and is scheduled for the timely provision of these services, it still meets the intent of the developed classification. Areas developed for predominantly residential purposes meet the intent of this classification if they exhibit:

- A density of three or more dwellings units per acre; or
- A majority of lots of 15,000 square feet or less, which are provided or scheduled to be provided with the traditional urban services; or
- Permanent population densities that are high and seasonal populations that may swell significantly. The developed classifications have been used for the Town of Hertford, Winfall and the Albemarle Plantation planned unit development.

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. Areas meeting the intent of the Urban Transition classification are being developed for urban purposes or will be developed in the next five to ten years to accommodate anticipated population and urban growth.

These areas are in, or will be in "transition" state of development going from lower intensity uses to higher intensity uses and as such will eventually require urban services. Examples of areas meeting the intent of this class are lands within municipal extra territorial planning boundaries and areas being considered for annexation.

- Areas classified as Urban Transition will provide land for insensitive urban growth when lands in the Developed class are not available. Urban Transition lands must be able to support urban development by being generally free of physical limitations and be served or readily served by urban services. Urban development includes mixed land use such as residential, commercial, institutional, industrial and other uses at or approaching high to moderate densities. Urban services include water, sewer, streets, and roads, police and fire protection that will be made available at the time development occurs or soon thereafter. Permanent population densities in this class will be high and the seasonal population may swell significantly.

- In choosing land for Urban Transition class, such land should not include: areas with serve physical limitations which would make the provision of urban services difficult or impossible, lands which meet the definition or 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 tourists 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.

- Even though AEC standards occasionally permit Urban Transition type development on a lot-by-lot basis within the various AEC's, this classification should not be applied to any AEC.

- Areas that are predominantly residential meet the intent of this class if:

    - They are approaching three dwelling units per acre, or
    - A majority of the lots are 15,000 square feet or less and will be provided with essential urban services to support this high density development, or
    - Are contiguous to existing developed municipal areas

Urban Transition areas include undeveloped land along US-17 Bypass and the Commerce Center south of Hertford. Two small areas north and west or Winfall have been designated as Urban Transition areas.

Limited Transition

The purpose of the Limited Transition class is to provide for development in areas that will have some limitations, but are suitable for lower densities than those associated with the Urban Transition class, or are geographically remote from existing towns and municipalities. Areas meeting the intent of this class will experience increased development during the planning period. These areas will be in a state of development necessitating some municipal type of service. These areas are of modest densities and often suitable for the provision of closed water systems rather than individualized wells.

- Areas classified Limited Transition will provide controlled development with services, but may not be on lands that are suitable for traditional high intensity urban development normally associated with public sewer or other services. These may be lands with physical limitations or areas near valuable estuarine waters or other fragile natural systems. Public sewer and other services may be provided because such services are already in the area or are readily available nearby, because the lands are unsuitable for septic tanks or the cumulative impact of septic tanks may negatively impact significant public resources. Self-contained, large, retirement/vacation developments in otherwise rural areas would meet the intent of this class.

- The Limited Transition class is intended for predominantly residential development with densities of three units per acre or less, or where the majority of lots are 15,000 square feet for greater. In many areas, lower densities may be necessary and should be discussed. Clustering or development associated with Planned Unit Development may be appropriate in the Limited Transition class.

- Areas which meet the definition of the Conservation class should be classified Limited Transition.

- Due to its very nature, the Limited Transition land classification may be controversial. As such, if a local government chooses to use this class, it shall describe the circumstances making this classification necessary and shall also describe how this class will help the local government achieve both its economic development and natural resources protection policies. This discussion shall include statements as to why lands included in this classification are appropriate for development which necessitates the provision of services.

The County has designated Snug Harbor and Holiday Island, which each have densities over three units per acre, as Limited Transition areas.

Community

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

Areas meeting the intent of the Community class are developed at low densities which are suitable for private septic tank use. These areas are clustered residential or commercial land uses which provide both low intensity shopping and housing opportunities and provide a local social sense of "community." These communities are generally small and some are not incorporated. Very limited municipal type services such as fire protection and community water may be available, but municipal type sewer systems are not to be provided as a catalyst for future development. In some unusual cases, sewer systems may be possible, but only to correct an existing or projected public health hazard. Areas developed in a low density fashion in small, dispersed clusters in a larger rural county landscape with very limited or no water and sewer services meet the intent of this class.

In Perquimans County, the areas designated as community are all existing crossroads communities that exhibit clustering and mixed land uses. This is essentially all land areas within more than three adjacent minimum-sized lots of record and historical communities associated with remote county stores or churches and residential uses that exhibit the appearance of clustering. The minimum lot size in the County is 15,000 square feet if served by public water and 25,000 square feet if an on-site water supply is used. Specific communities include Belvidere, Woodville, New Hope and Bethel.

Rural

The purpose of the Rural class is to provide for very low density land uses including residential use where limited water services are provided in order to avert an existing or projected health problem. Development within this class should be low intensity in order to maintain a rural character. Rural water systems, such as those funded by Farmers Home Administration, are or may be available in these areas due to the need to avert poor water quality problems. These systems, however, should be designed to serve a limited number of customers and should not serve as a catalyst for future higher intensity developments.

Areas meeting the intent of this class are appropriate for very 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. Private wells and septic tank services may exist, but most development is supported by a closed water system. Other services such as sheriff protection, and rural or volunteer fire protection and emergency services, etc., may also be available.

All County lands not designated as Conservation, Urban Transition, Limited Transition or Community are designed as Rural with Services. The County has generally provided public water services to all areas of the County. Perquimans County will extend its water lines along State Roads into areas of the County which meet the County 50/50 Water Line Extension Policy.

Conservation

The purpose of the Conservation class is to provide for the effective long-term management and protection of significant, limited, or irreplaceable areas. Management is needed due to the natural, cultural, recreational, scenic or natural productive values of both local and more than local concern.

Areas meeting the intent of this classification that should be considered for inclusion include:

- Areas of Environmental Concern (AECs), including but not limited to public trust waters, estuarine waters, coastal wetlands, etc., as identified in 15A NCAC 7H;

- Other similar lands, environmentally significant because of their natural role in the integrity of the coastal region, including but not limited to wetlands identified on Division of Coastal Management wetland maps, other wetlands, areas that provide or have a high probability of providing wildlife habitat, forest lands that are essential undeveloped and lands which otherwise contain significant productive, natural, scenic, cultural or recreational resources.

In Perquimans County, Conservation areas include all areas of environmental concern designated by CAMA, which include estuarine waters, estuarine shorelines, coastal wetlands and public trust waters; not all 404 wetlands, and all areas below the 100-year flood elevation.

Hurricane Evacuation Plan

Perquimans County has adopted a Hurricane Evacuation Plan in case of emergency. This plan proposes guidelines for the dissemination of information and resources. The plan formulates control groups consisting of the Perquimans County Commission Chairman, Perquimans County manager, Perquimans County EMC, the mayors of Hertford and Winfall, and the Perquimans County Sheriff. The following duties and responsibilities are spelled out in case of a disaster:

Control Group

- Act in accordance with appropriate provisions of the North Carolina General Statutes and local ordinances that relate to emergencies.
- Declare State of Emergency if necessary.
- Coordinate actions with other affected jurisdictions.

Sheriff

- Develop and maintain guidelines for the operations of the Sheriff's department during emergency.
- Identify law enforcement needs.
- Coordinate security for critical facilities and damaged areas.
- Assist in warning public of dangers associated with emergency.
- Coordinate traffic control in the county.
- Help in the distribution of information to the public.
- Send a representative to the Emergency Operations Center.

Public Information Officer

- Develop operating guidelines for public information that include a directory of media outlets.
- Coordinate all county media releases.
- Provide for rumor control for all phases of the emergency.
- Serve as the official spokesman for the county.
- Clear information with the county manager prior to release.

In addition to these individuals, the county identifies and assigns roles to other organizations operating in the county including: Fire Department, Emergency Medical Service/Rescue Squad, Law Enforcement Agencies, Social Services Agencies, Inter-County Transportation Authority, American Red Cross, Salvation Army, Finance Officers, Amateur Radio Associations, and Mental Health.

The Emergency Operations Control Center is located in the courthouse. The Emergency Operations Center serves as the control point for the county-wide emergency response activities.

Zoning Ordinance (2002)

The purpose of the zoning ordinance is to provide for the public health, safety, and general welfare, encourage orderly development, protect the quality of the environment, and regulate the location and use of structures and land for commerce, industry, and residences in accordance with the 1993 Land Use Plan. A short description of each zoning district is included in Table C-2.

Table C-2: Perquimans County Zoning Districts

District	Description
RA Rural Agriculture District	The Rural Agriculture District is designed to reflect the pattern of development in rural Perquimans County. The intent of this district is to preserve and protect current uses and way of life and also to protect property rights. The District imposes no minimum lot size since countywide subdivision regulations provide for this. Home occupations of all types, even those of a commercial or industrial nature are permitted on lots greater than 20,000 square feet. A secondary temporary dwelling for family hardship circumstances is allowed, and additional dwellings may be added for every ten (10) acres of land.
HA Historic Agriculture District	The Historic Agriculture District is designed to reflect the historic patterns of development that have occurred in rural Perquimans County. The intent of this district is to preserve and protect historic properties and landscapes and also to protect property rights.
RA-43 Residential and Agricultural Zoning District	This Residential and Agricultural District is established as a district in which principal use of the land is for low-density residential and agricultural purposes. In promoting the purposes of this Ordinance, the specific intent of this district is to: 1) Insure that residential development not having access to public water supplies and dependent upon private means of sewage disposal, will occur at sufficiently low densities to insure a healthful environment; 2) Prohibit commercial and industrial use of the land and to prohibit any other use which would substantially interfere with the development or continuation of dwellings and agriculture; 3) Discourage any use that would generate traffic on minor streets other than normal traffic to serve the residences and farms on those streets.
RA-25 and RA-12 Residential and Agricultural Districts	These districts are established as districts in which the principal use of the land is for single-family dwellings, duplexes, and agricultural uses. In promoting the purposes of this Ordinance, the specific intent of these districts is to: 1) Encourage the construction of and the continued use of the land for single family; 2) Prohibit commercial and industrial use of land and other uses which would substantially interfere with the development of single family dwellings in these districts; 3) Discourage any use which would generate traffic on minor streets other than normal traffic to serve residences on those streets; 4) Discourage any use which, because of its character or size, would create requirements and costs for public services, such as police and fire protection, water supply and sewerage, substantially in excess of such requirements and costs if the district were developed solely for single family dwellings. The RA-25 district is established to allow a variety of single-family residential agricultural land uses, at a low density of one dwelling unit per acre, which are interspersed with large, undeveloped open areas. The RA-12 district is established to allow principally single-family and two-family residences and other compatible uses permitted by conditional use permit on lots 12,000 feet or larger.
CR Rural Commercial District	The Rural Commercial District is established to reflect the wide array of businesses existing in rural areas of the County. The District permits virtually all traditional small business uses and conditionally permits more intrusive uses. No minimum setback requirements apply.
CN Neighborhood Commercial District	The Neighborhood Commercial District is established as a district in which the principal use of land is for commercial and service uses to serve the nearby, predominantly residential districts. It is also the intent to reduce traffic and parking congestion to a minimum in order to preserve residential values and promote the general welfare of the surrounding residential districts. This district is intended to encourage the construction of and continued use of the land for neighborhood commercial and service purposes and to discourage

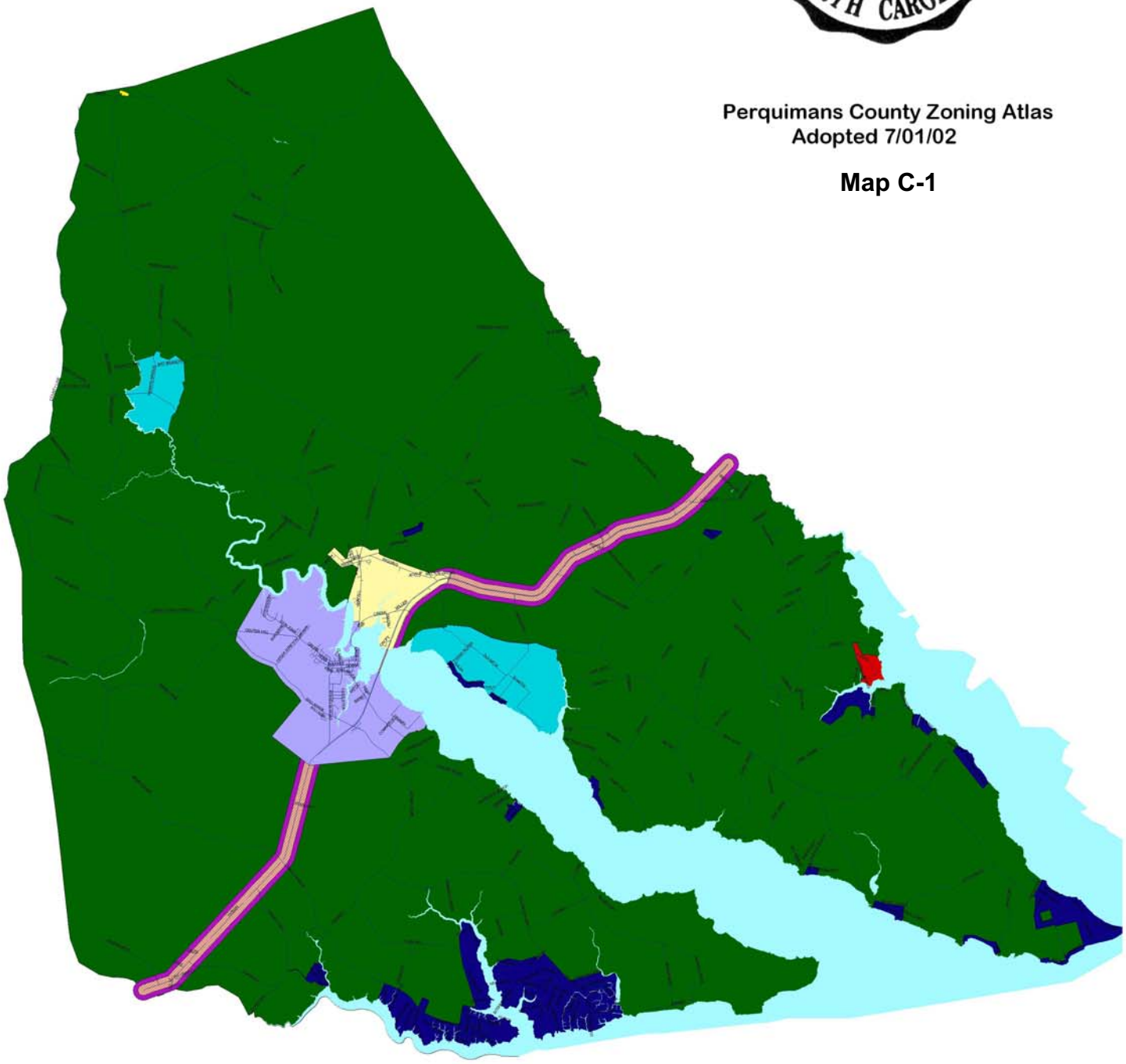
District	Description
	uses that would substantially interfere with the development or continuation of the business structures in the district.
CH Highway Commercial District	This district is established as a district in which the principal use of the land is for the retailing of both perishable and durable goods, provision of commercial services to adjacent urban areas, and the provision of services to travelers. It is intended that this district will be located throughout the county at areas considered to be commercial nodes. These nodes will occur where traffic and population densities are greatest and where highway business uses already exist.
IL Light Industrial District	This district is established as a district in which the principal use of land is for planned industrial development for light manufacturing operations, research and development firms, and similar operations that do not require water beyond the amount necessary for sanitation and health. This district is designed to accommodate industrial uses that will not create a nuisance or present a health or safety hazard to neighboring properties.
IH Heavy Industrial District	The IH Heavy Industrial District is established as a district in which the principal use of land is for warehousing and mixes of industrial uses which will not consume water in amounts beyond the capabilities of existing water resources in the County. It is also the intention of this district to allow use that will not generate health and safety hazards to county residents. In promoting the general purposes of this Ordinance, the specific intent of this district is to encourage the continued use of land for industrial purposes and discourage any other use that would substantially interfere with the continuance of permitted uses in this district.

Source: Perquimans County Zoning Ordinance.

PERQUIMANS COUNTY
FORMED
1668
NORTH CAROLINA

Perquimans County Zoning Atlas
Adopted 7/01/02

Map C-1



Legend
- Parcels
- HA
- Town of Hertford ETJ
- RA 43
- Winfall Town Limits
- Wireless
- RA 25
- CR
- RA
- CH

3500 0 3500 7000 10500 14000 17500 21000 24500 Feet

N
W E
S

Overlay Districts

Highway Corridor Overlay Districts

Highway Corridor Overlay Districts are created in order to protect the rural character and natural environment of the area and to provide attractive highway corridors and community gateways. Highway Corridor Overlay Districts are districts which overlay the zoning in every district along and on either side of US 17 Highway (from the Winfall extraterritorial jurisdiction line north to the Pasquotank County line and from the Hertford extraterritorial jurisdiction line south to the Chowan County line). All uses with the exception of single family residential in Rural Highway Corridor Overlay Districts are subject to overlay standards.

(a) Rural Highway Corridor Overlay (500' either side of highway right-of-way)
Rural Highway Corridor Overlay Districts shall minimize commercial, industrial, and/or dense development patterns. These highways provide visual images of the natural character of the area as well as agriculture and rural land uses. Commercial and Industrial elements along these corridors shall be intermittent and clustering of these elements is encouraged at appropriate centralized locations.

(b) Urban Transition Corridor Overlay (400' either side of highway right-of-way)
Urban Transition Highway Corridor Overlay Districts shall be developed with a balance of agricultural and commercial uses. These highway sections are best suited for showcasing naturalized and manmade conditions. The visual quality of these highway sections depends on quality site planning, landscaping, and preservation of natural features.

Wireless Telecommunications Overlay District (1,000' either side of highway right-of-way)
The Wireless Telecommunications Overlay District was created to enhance the attractiveness of the area and overlays the zoning in the district along and on either side of US 17 (from the Winfall extraterritorial jurisdiction line north to the Pasquotank County line and from the Hertford extraterritorial jurisdiction line south to the Chowan County line). The District does not allow any telecommunications facilities located within it.

Wireless Telecommunications Facilities

Perquimans County regulates the placement, construction, modification, maintenance, and removal of wireless telecommunication facilities. The Perquimans County Board of Commissioners finds that the construction of wireless telecommunication facilities may cause unusual problems and hazards to the public, including: (1) potential injury to citizens from falling towers and falling ice; (2) potential injury to children while playing in, around, or on towers and their appurtenant compounds; (3) potential damage to property from falling towers and falling ice; (4) potential injury and damage to low-flying law-enforcement and medical helicopters; (5) potential injury and damage to low-flying public and private aircraft; (6) potential aesthetic harm to residential communities; and (7) potential negative economic impacts on the heritage tourism industry.

The goal of this regulation is to: (1) avoid potential injury to persons and properties from tower failure and ice hazards through structural standards and setback requirements; (2) preserve the scenic and visual character of Perquimans County by encouraging the location, design and architectural treatment of wireless telecommunication facilities to avoid the disruption of the natural and built environment, and to insure harmony and compatibility with

surrounding land use patterns; (3) facilitate the provision of wireless telecommunication services to residents, businesses, and visitors in Perquimans County; (4) provide a uniform and comprehensive framework for evaluating proposals for wireless telecommunication facilities; (5) encourage the use of existing and approved structures to accommodate wireless telecommunication infrastructure prior to approving additional structures; (6) encourage users of towers and antennas to locate them, to the extent possible, in areas where the adverse impact on the community is minimal.

Building Code Enforcement Ordinance

Perquimans County has adopted an ordinance to cover enforcement of the North Carolina State Building Code within the County. The ordinance provides for enforcement of the current edition of the State building code including any revisions and amendments. The County enforces the ordinance throughout all unincorporated and incorporated parts of the County, including within the towns of Hertford and Winfall.

Junk Vehicle Ordinance

Perquimans County has adopted a Junk Vehicle Ordinance that regulates the removal and disposition of "abandoned," "nuisance," or "junked" vehicles. The County defines these vehicles as:

(a) An abandoned vehicle is defined as a motor vehicle that:
  (1) is left upon the right-of-way of a public street or highway in violation of a law or ordinance prohibiting parking; or
  (2) is left on the right of way of a public street or highway for longer than seven (7) days; or
  (3) is left on property owned or operated by the county for longer than twenty-four (24) hours; or
  (4) is left on private property without the written consent of the owner occupant or lessee thereof, for longer than two (2) hours.

(b) A junked motor vehicle is defined as a motor vehicle that does not display a current license plate lawfully upon that vehicle and:
  (1) is partially damaged or wrecked; or
  (2) cannot be self-propelled or moved in the manner in which it originally was intended to move; or
  (3) is more than five (5) years old and appears to be worth less than one hundred dollars ($100).

(c) A nuisance vehicle is defined as a motor vehicle on public or private property that is determined and declared to be a health or safety hazard, a public nuisance, and unlawful, including a vehicle found to be:
  (1) A breeding ground or harbor for mosquitoes, other insects, rats, or other pests; or
  (2) A point of heavy growth of weeds or other noxious vegetation over eight (8) inches in height; or
  (3) A point of collection of pools or ponds of water; or
  (4) A point of concentration of quantities of gasoline, oil, or other flammable or explosive materials as evidenced by odor; or
  (5) A source of danger for children through entrapment in areas of confinement that cannot be opened from the inside or from exposed surfaces of metal, glass, or other rigid materials; or
  (6) So situated or located that there is a danger of it falling or turning over; or
  (7) One which is a point of collection of garbage, food waste, animal waste, or any other rotten or putrefied matter of any kind; or

(8) One which has sharp parts thereof which are jagged or contain sharp edges of metal or glass; or
(9) Any other vehicle specifically declared a health and safety hazard by the Board of County Commissioners.

Junkyard Ordinance

Perquimans County has adopted a Junkyard Ordinance to regulate junkyards in order to protect the citizens and residents of the County from inherently dangerous automobile graveyards and junkyards; to preserve the dignity and aesthetic quality of the environment; to preserve the physical integrity of land in close proximity to churches, schools, and residential areas; to achieve responsible economic growth in areas of Perquimans County that are compatible with growth and development in nearby areas; and to protect the County's water quality and environment.

Manufactured Home Park Ordinance

Perquimans County has adopted an ordinance establishing regulations for manufactured home parks. The purpose of the ordinance is to provide for the orderly development of planned manufactured home and travel trailer parks and to abate any conditions detrimental to the public health, safety, and general welfare or any nuisances, real or imagined, associated with such parks.

Subdivision Regulations (adopted 1990/last amended 2004)

Perquimans County has adopted subdivision regulations for the purpose of supporting and guiding the proper subdivision of land within the jurisdiction of the County in order to promote the public health, safety and general welfare of the citizens. The ordinance is designed to promote the orderly development of the County; for the coordination of streets and highways within proposed subdivisions with existing or planned streets and highways with other public facilities; for the dedication or reservation of right-of-way or easements for street and utility purposes; and for the distribution of population and traffic, which shall avoid congestion and overcrowding and which will create conditions essential to public health, safety and the general welfare. This ordinance is designed to further facilitate adequate provisions for water, sewage, parks, schools and playgrounds, and also to facilitate the further resubdivision of large tracts into smaller parcels of land.

Minimum Design Standards

Land subject to flooding, improper drainage, erosion, or that is for topographical or other reasons unsuitable for residential use as determined by the County, shall not be platted for residential use nor for any other uses that will continue or increase the danger to health, safety, or property unless the hazards can be and are corrected. All development must comply with the requirements of the Perquimans County Flood Hazard Ordinance. Areas that have been used for the disposal of solid waste shall not be subdivided into commercial or residential building sites. This shall include those areas that have been used for the disposal of trash, demolition waste, and other waste materials.

Waterfront Subdivisions

Water Access Lots shall equal in area not less than 10% of the area (exclusive of streets) of all interior property, which lies within 500 feet of the waters edge. Where the 10% area requirement is less than 2,000 square feet, the subdivider shall not be required to provide any access lots. All Water Access Lots shall have a minimum frontage at the waters edge of at least 100 feet.

Addressing Ordinance (2000)

Perquimans County has adopted an addressing ordinance for the purpose of addressing and road naming to protect the safety and welfare of the general public. Orderly assignment of addresses facilitates the location of individual dwellings and businesses by emergency response personnel.

Water Shortage Response Ordinance (2003)

In 2003, Perquimans County adopted a Water Shortage Response Ordinance. The purpose of this ordinance is to provide for the declaration of official phases of water supply shortage situations and the implementation of voluntary and mandatory water conservation measures throughout the County in the event a shortage is declared. The ordinance outlines 3 classes of response criteria:

Class 1: Essential Water Uses

Domestic Use:

- Water necessary to sustain human life and the lives of domestic pets, and to maintain minimum standards of hygiene and sanitation.

Health Care Facilities:

- Patient care and rehabilitation, including swimming pools used for patient care and rehabilitation.

Public Use:

- Fire Hydrants
    1. Firefighting
    2. Certain testing and drills by the fire department if performed in the interest of public safety and if approved by the County Board.
- Flushing of Sewers and Hydrants: As needed to ensure public health and safety and if approved by the County Board.

Class 2: Socially or Economically Important Uses of Water

All Domestic Uses Other Than Those Included in Classes 1 and 3:

- Home water use including kitchen, bathroom and laundry use
- Minimal watering of vegetable gardens
- Watering of trees where necessary to preserve them

Commercial, Agricultural, Industrial and Institutional Uses:

- Outdoor commercial watering (public or private) using conservation measures and to the extent that sources of water other than fresh water are not available to use.
- Irrigation for commercial vegetable gardens and fruit orchards or the maintenance of livestock.
- Watering by commercial nurseries at a minimum level necessary to maintain stock.
- Water use by arboretums and public gardens of national, State, or regional significance where necessary to preserve specimens.
- Use of fresh water at a minimum rate necessary to implement vegetation following earth-moving, where such vegetation is required by law or regulation.
- Watering of golf course greens.
- Filling and operation of swimming pools:
    - Residential pools which serve more than 25 dwelling units
    - Pools used by health care facilities for patient care and rehabilitation
    - Municipal pools
- Commercial car and truck washes

- Commercial Laundromats
- Restaurants, clubs, and eating places
- Air Conditioning:
  - Refilling for start up at the beginning of the cooling season
  - Make-up of water during the cooling season
  - Refilling specifically approved by health officials and the County Board, where the system has been drained for health protection or repair purposes.
- Schools, churches, motels/hotels and similar commercial establishments

Class 3: Non-Essential Uses of Water

Ornamental Purposes:

- Fountains, reflecting pools, and artificial waterfalls

Outdoor non-commercial watering (public or private):

- Gardens, lawns, parks, golf courses (except greens), playing fields and other recreational areas.
- Filling and operation of recreational swimming pools which serve fewer than 25 dwellings
- Non-commercial washing of motor vehicles
- Serving water in restaurants, clubs, or eating places except by specific request
- Air Conditioning: refilling cooling towers after draining except as specified in Class 1

Public Use:

- Fire Hydrants: any purpose, including use of sprinkler caps and testing fire apparatus and for fire department drills, except as listed in Class 1
- Flushing of Sewers and Hydrants except as listed in Class 1

Flood Damage Prevention Ordinance

Perquimans County's Flood Damage Prevention Ordinance, adopted in 1985, and readopted in October 2004, 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 within flood prone areas by provisions designed to:

1. Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards that 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 that 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 include:

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, cable and sewer lines, street and bridges located in flood prone areas;
6. To help maintain a stable tax base by providing for the sound use and development of flood prone areas; and
7. To insure that potential homebuyers are aware that property is in a Special Flood Hazard Area.

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. Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding. These include but are not limited to HVAC equipment, water softener units, bath/kitchen fixtures, ductwork, electric meter panels/boxes, utility/cable boxes, appliances (i.e., washers, dryers, refrigerator, etc.), hot water heaters, electric outlets/switches.
5. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
6. 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;
7. On site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding;
8. 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;
9. Non-conforming structures or other development may not be enlarged, replaced, or rebuilt unless such enlargement or reconstruction is accomplished in conformance with the provisions of this ordinance. Nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the floodway, non-encroachment area, or stream setback, provided that the bulk of the building or structure below the regulatory flood protection elevation in the floodway, non-encroachment area, or stream setback is not increased and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance;
10. New solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted in Special Flood Hazard Areas. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in a Special Flood Hazard Area only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to Article 4, Section B(3) of this code;

11. All development proposals shall be consistent with the need to minimize flood damage.
12. All development proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage;
13. All development proposals shall have adequate drainage provided to reduce exposure to flood hazards.

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 (including manufactured homes) shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation.

Non-Residential Construction

New construction or substantial improvement of any commercial, industrial, or other non-residential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation. Structures located in A, AO, AE and A1-30 Zones may be floodproofed to the regulatory flood protection elevation in lieu of elevation provided that all areas of the structure below the required flood protection elevation are watertight with walls substantially impermeable to the passage of water, using 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 official as set forth in Article 4, Section B(3).

Mobile Homes

a) New or replacement manufactured homes shall be elevated so that the reference level of the manufactured home is no lower than the regulatory flood protection elevation.

b) Manufactured homes shall be securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement in accordance with the State of North Carolina Regulations for Manufactured/Mobile Homes, 1995 Edition, and any revision thereto adopted by the Commissioner of Insurance pursuant to NCGS §143-143.15 or a certified engineered foundation. Additionally, when the elevation would be met by an elevation of the chassis thirty-six (36) inches or less above the grade at the site, the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength. When the elevation of the chassis is above thirty-six (36) inches in height, an engineering certification is required.

c) All foundation enclosures or skirting shall be in accordance with Article 5, Section B(4).

d) An evacuation plan must be developed for evacuation of all residents of all new, substantially improved or substantially damaged manufactured home parks or subdivisions located within flood prone areas. This plan shall be filed with and approved by the floodplain administrator and the local Emergency Management coordinator.

Elevated Buildings

For new construction or substantial improvements of elevated buildings that include enclosed areas that are below the regulatory flood protection elevation shall not be designed to be used for human habitation, but shall be designed to be used only for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises, be constructed entirely of flood resistant materials below the regulatory flood protection level in A, AO, AE, and A1-30 zones and meet the following design criteria:

(a) Include measures to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. To meet this requirement, the foundation must either be certified by a professional engineer or architect or meet the following minimum design criteria:

i) Provide a minimum of two openings on different sides of each enclosed area subject to flooding.

ii) The total net area of all openings must be at least one (1) square inch for each square foot of each enclosed area subject to flooding.

iii) If a building has more than one enclosed area, each area must have openings on exterior walls to allow floodwater to directly enter;

iv) The bottom of all required openings shall be no higher than one (1) foot above the adjacent grade; and,

v) Openings may be equipped with screens, louvers, or other opening coverings or devices provided they permit the automatic flow of floodwaters in both directions.

vi) Foundation enclosures:

1) Vinyl or other flexible skirting is not considered an enclosure for regulatory purposes. Therefore such skirting does not require openings as outlined above.

2) Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires openings as outlined above to comply with this ordinance.

(b) Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment used in connection with the premises (standard exterior door) or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be partitioned or finished into separate rooms, except to enclose storage areas.

Additions/Improvements

(a) Additions and/or improvements to pre-FIRM structures whereas the addition and/or improvements in combination with any interior modifications to the existing structure

i) are not a substantial improvement, the addition and/or improvements must be designed to minimize flood damages and must not be any more non-conforming than the existing structure.

ii) are a substantial improvement, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

(b) Additions to post-FIRM structures with no modifications to the existing structure shall require only the addition to comply with the standards for new construction.

(c) Additions and/or improvements to post-FIRM structures whereas the addition and/or improvements in combination with any interior modifications to the existing structure

i) are not a substantial improvement, the addition and/or improvements only must comply with the standards for new construction.

ii) are a substantial improvement, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

(d) Where a fire wall or independent perimeter load-bearing wall is provided between the addition and the existing building, the addition(s) shall be considered a separate building and only the addition must comply with the standards for new construction.

Recreational Vehicles

Recreational vehicles placed on sites within a Special Flood Hazard Area shall either:

(a) be on site for fewer than 180 consecutive days and be fully licensed and ready for highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and has no permanently attached additions); or

(b) meet all the requirements for new construction, including anchoring and elevation requirements of Article 4, Section B and Article 5, Sections A and B(3).

Temporary Non-Residential Structures

Prior to the issuance of a floodplain development permit for a temporary structure, the following requirements must be met:

(a) Applicants must submit to the floodplain administrator a plan for the removal of such structure(s) in the event of a hurricane, flash flood or other type of flood warning notification. The plan must include the following information:

i) a specified time period for which the temporary use will be permitted. Time specified should be minimal with total time on site not to exceed one year;

ii) the name, address, and phone number of the individual responsible for the removal of the temporary structure;

iii) the time frame prior to the event at which a structure will be removed (i.e. minimum of 72 hours before landfall of a hurricane or immediately upon flood warning notification);

iv) a copy of the contract or other suitable instrument with a trucking company to insure the availability of removal equipment when needed; and

v) designation, accompanied by documentation, of a location outside the Special Flood Hazard Area to which the temporary structure will be moved.

(b) The above information shall be submitted in writing to the floodplain administrator for review and written approval.

Accessory Structures

When accessory structures (sheds, detached garages, etc.) are to be placed within a Special Flood Hazard Area, the following criteria shall be met:

(a) Accessory structures shall not be used for human habitation (including work, sleeping, living, cooking or restroom areas);

(b) Accessory structures shall be designed to have low flood damage potential;

(c) Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters;

(d) Accessory structures shall be firmly anchored in accordance with Article 5, Section A(1);

(e) All service facilities such as electrical and heating equipment shall be installed in accordance with Article 5, Section A(4); and

(f) Openings to relieve hydrostatic pressure during a flood shall be provided below regulatory flood protection elevation in conformance with Article 5 Section B(4)(a).

(g) An accessory structure with a footprint less than 150 square feet that satisfies the criteria outlined above does not require an elevation or floodproofing certificate. Elevation or floodproofing certifications are required for all other accessory structures in accordance with Article 4, Section B(3).

Soil Erosion and Sedimentation Control

Another ordinance that affects hazard mitigation in Perquimans 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)).

Community Capability Assessment Summary

Perquimans County and the towns within the County have implemented a number of the regulatory powers conferred upon local governments by the State of North Carolina. The towns depend upon the County and/or the State of North Carolina for enforcement of land use regulations involving flood damage prevention and building inspections (County); and soil erosion and sedimentation control (State). A summary of Perquimans County's community capability to address hazard mitigation through existing policies and ordinances is summarized in Table C-3.

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 County will create a process to incorporate requirements in the Hazard Mitigation Plan into existing community plans and ordinances. The Planning Director will be responsible for providing a copy of the Hazard Mitigation Plan to each County department and for ensuring that the responsible department (see Table C-3) 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-3, 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-3: Perquimans 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 Update	Existing	Moderate	The CAMA Land Use Plan is used to plan for future growth while respecting significant environmental features worthy of protection. This is a policy document not a regulatory document, thus effectiveness for mitigation is moderate.	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 responsibility for overseeing the update process.
Hurricane Evacuation Plan	Existing	High	The Hurricane Evacuation Plan was designed to coordinate structured dissemination of information and resources in the event of a natural hazard.	Continue investigating ways to improve communication between resources in the event of a natural hazard. The County Manager is responsible for overseeing or delegating responsibility for overseeing the update process.
Zoning Ordinance	Existing	High	The Zoning Ordinance regulates and restricts the height, number of stories, and size of buildings and other structures, the percentage of lots that may be occupied, the size of yards, courts and other open spaces, the density of population, and the location and use of buildings, structures, and land.	Continue to investigate ways to improve zoning standards to address issues that are identified through countywide plans and studies. In particular, explore ways to protect sensitive environmental lands from inappropriate development. The Planning Department is responsible for ordinance enforcement and for recommending revisions to the Planning Board and County Board of Commissioners.
Building Code	Existing	High	The Building Code establishes minimum standards for building construction.	These regulations affect hazard mitigation by ensuring adherence to statewide minimum building standards. The State of NC is responsible for code requirements and the County building inspection department is responsible for code enforcement.
Junk Vehicle Ordinance	Existing	Low	The Junk Vehicle Ordinance was established to rid the county of vehicles that are a public nuisance and that pose a health risk.	Continue to enforce the ordinance and seek ways to prioritize removal as it applies to vehicles within areas that pose a risk of natural hazards, such as flood prone areas. The Planning Department is responsible for enforcement and for recommending ordinance revisions.
Junkyard Ordinance	Existing	Low	The Junkyard Ordinance regulates the location and appearance of junkyards.	Continue to enforce the ordinance to improve aesthetics and to protect the general safety of citizens. The Planning Department is responsible for enforcement and for recommending ordinance revisions.

Policies and Programs	Program Status	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
Manufactured Home Park Ordinance	Existing	Moderate	The MHP Ordinance sets minimum standards for space size requirements, review fees, improved design and construction standards, and construction plan submittal requirements.	Continue to monitor/enforce the provisions of the ordinance to ensure to the maximum extent possible the health and safety of manufactured home park residents. The Planning Department is responsible for ordinance enforcement and for recommending ordinance revisions.
Subdivision Regulations	Existing	High	The Subdivision Ordinance provides for orderly growth and development by setting standards for street construction, interconnecting street systems, and for other improvements that ensure the appropriate design and layout of new development.	Continue to enforce and enhance subdivision standards, particularly in regards to stormwater management. The Planning Department is responsible for ordinance enforcement and for recommending ordinance revisions.
Addressing Ordinance	Existing	Moderate	The Perquimans County Addressing Ordinance ensures that emergency services can be dispatched quickly and accurately when needed.	Continue to ensure accurate and unique addressing that is visible from road rights-of-way to help in the delivery of emergency services. The Planning Department is responsible for ordinance enforcement and for recommending ordinance revisions.
Water Shortage Response Ordinance	Existing	Moderate	This ordinance provides for the preservation and execution of a water shortage plan in the event that such a conservation measure is needed.	Continue to investigate ways to prepare and formulate measures to conserve water in case of water shortage. The County Manager, through delegation of authority, is responsible for enforcement and ordinance revisions.
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.
Soil Erosion and Sedimentation Control	Existing	High	This ordinance regulates 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. Perquimans 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.

Perquimans County

Perquimans County enforces building codes within County planning jurisdiction and within the corporate limits and extraterritorial jurisdiction of the municipalities within the County. Perquimans County enforces 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. (Perquimans 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.

Perquimans County

The current Perquimans 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.

Perquimans County

Perquimans County currently enforces zoning regulations throughout the unincorporated areas of the County.

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)).

Perquimans County

Perquimans County currently enforces subdivision regulations throughout the County's planning jurisdiction.

Floodplain Regulation

Perquimans currently has a Flood Damage Prevention Ordinance in place; adopted October 5 2004.

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.

Perquimans County

Perquimans County has in place a flood damage prevention ordinance that establishes development standards for FEMA identified flood hazard areas.

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).

Perquimans County

Although Perquimans County has suffered the effects of high winds and flooding from recent hurricanes passing through North Carolina, the County has had very limited flood damages. The County has not applied for Hazard Mitigation Grant Program (HMGP) buyout grants to acquire and/or elevate flood loss properties. The County has also 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.

Perquimans County
Perquimans 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.

Perquimans County
Perquimans 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 2005 ranking places Perquimans County in Tier 1.

Technical Capability

Effective hazard mitigation initiatives depend largely on a community's technical capability. Local governments such as Perquimans 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 with Direct Impact on Hazard Mitigation

Administrative Department

The County Administrative Department, consisting of the county manager and the clerk to the board, is charged with handling the day-to-day operations of county government. The county manager is responsible for managing and coordinating the implementation of Board of Commissioner policies and directives and ensures that services are provided in a positive and timely manner. This department has a direct impact on hazard mitigation activities.

Emergency Management
Emergency Management serves as the coordinating agency for emergency response in the event of a disaster. Emergency services maintain plans for coping with emergencies such as tornadoes, hurricanes, floods, and nuclear accidents. This department oversees County volunteer rescue and fire services.

Emergency Medical Services
Emergency Medical Services provides for organized response to emergency health needs of the community, including but not limited to, health education and rescue coordination.

Health Department
The Health Department's mission is to protect, promote, and assure the health of all County citizens, applying sound health principles through enforcement and education.

Management and Information Systems (MIS)
Management and Information Systems is responsible for directing the information and data integrity of the County and all its departments and for all information service functions of the organization.

Planning Department
The Planning Department guides long-range development and addresses land use issues in the County including the preparation of land use plans as well as the administration of land use regulations including zoning, subdivision, manufactured home parks, junkyard, and junk vehicle ordinances. Planning staff is also involved with other projects such as transportation planning, population studies, and computerized mapping (GIS).

Sheriff's Department
The Sheriff's Office is responsible for enforcing criminal and civil law in the County.

F. Political Climate

The elected officials of Perquimans County and the towns of Hertford and Winfall are in agreement that implementation of the Hazard Mitigation Plan will help 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.

Town of Hertford
Appendix B: Assessment of Vulnerability

A. Introduction

The Perquimans County Composite Hazard Index (Table A-28 in Appendix A) outlines the six hazards rated "moderate" for potential threat to persons and property. Of the six hazards, the Town of Hertford is exposed to hurricanes/coastal storms and winter storms/freezes (100%); coastal/riverine erosion and floods (10%) and severe storms/tornadoes and wildfires (5%). A more detailed analysis of financial vulnerability to hazards can be found at the end of this section.

B. Community Description

The Town of Hertford, with a 2000 Census population of 2,070, is located in central Perquimans County in the Coastal Plain area of North Carolina. There was a 7% increase in population from the 1980 Census of 1,942 to the 2000 Census of 2,070.

Located approximately 16 miles southwest of the Town of Elizabeth City and 16 miles northeast of Edenton, the Town of Hertford incorporates 2.20 square miles of land or approximately 1,408 acres. US Highway 17 and NC 37 provide access for the Town. The Town is bordered on the eastern boundary of its corporate limits by the Perquimans River. The Town of Hertford and surrounding terrain are characterized by mostly flat land surfaces with most variations in elevation occurring adjacent to streams, creeks, and the Perquimans River.

Major Employers and Demographics

Major employers within the Town of Hertford include: Gateway Insurance Services, Reed Oil Company, Inteliport, RBC Centura Bank, East Carolina Bank, Perquimans County Farm Bureau, Perquimans County (government and schools), Winslow Oil Company, Albemarle Commission, Food Lion, Family Dollar, Red Apple, Trade Mart, Captain Bob's Restaurant, McDonald's, Apricot, Brian Center, Southern States, Dollar General, Popeye's, Coastal Carolina Family Practice, Albemarle Mental Health, Jackson Wholesale, Dozier's Florist, Gregory's CPA, Woodard's Pharmacy, Family Care Pharmacy, FedEx, US Post Office, Hertford Hardware, Jack Boone, DDS, Little Mint, Hertford Supply, and Town of Hertford.

The economy of the Town of Hertford depends largely on educational, health and social services, as in the 2000 Census (Table B-1) those sectors accounted for 25.6% of the total work force. Other notable industries include the arts, entertainment, recreation, accommodation and food services which together accounted for 16.2% of the work force in 2000. In 2000, the average travel time to work in the Town of Hertford was 27.5 minutes.

In the 2000 Census, over 71% of town residents had a high school education or higher, with over 10.8% having a bachelor's degree or higher. The median age of residents in 2000 was 27 years of age with 24% of the population above the age of 62.

Table B-1: Town of Hertford Demographics

Economic		
Total Population		2,070
Median Household Income		$24,524
Average Household Size		2.29
Percent of Individuals Below Poverty Level		39.9 %
Occupation	**People**	**Percent**
Management, professional, etc.	140	21.0 %
Service related	190	28.5 %
Sales and office	127	19.0 %
Farming, fishing, and forestry	6	0.9 %
Construction, extraction, and maintenance	11	16.6 %
Production, transportation, material moving	93	13.9 %
Employment	**People**	**Percent**
Employed	667	45.7 %
Unemployed	63	4.3 %
Not in labor force	712	48.8 %
Social		
Level of Educational Attainment	**People**	**Percent**
Less than 9th grade	89	7.4 %
9th – 12th (no diploma)	259	21.6 %
High School Diploma (includes GED)	424	35.3 %
Some college, no degree	238	19.8 %
Associate degree	61	5.1 %
Bachelor's degree	91	7.6 %
Graduate or professional degree	39	3.2 %
Housing		
Selected Characteristics	**People**	**Percent**
Lacking complete plumbing facilities	13	1.5 %
Lacking complete kitchen facilities	5	0.6 %
No phone service	65	7.5 %

Source: US Census, 2000. Corporate limits only.

Developed and Undeveloped Areas

The majority of development within the Town of Hertford consists of single family residential located along existing roadways and other areas of concentrated development. Concentrations of commercial development are located in the downtown area and along US 17 Bypass, Church Street and Harvey Point Road (SR 1336). Perquimans County owns approximately 400 acres within the Town on Harvey Point Road which is being developed as a commercial park. Notable areas with concentrations of mobile/manufactured homes are on Don Juan Road (SR 1109) and Wynne Fork Road (SR 1338). The Town of Hertford provides water, wastewater and electric services for the Town.

Table B-2 shows that property improvements (buildings) accounted for over $50 million in tax value in 2004. The total value of land, buildings, and other improvements within the corporate limits exceeded $63 million in tax value.

Table B-2: Estimated Value of Developed Facilities within Town of Hertford

Type of Use	Building Value	Land Value	Total Tax Value
Residential	$42,963,642	$10,740,911	$53,704,553
Commercial	$7,743,158	$1,935,789	$9,678,947
Total	**$50,706,800**	**$12,676,700**	**$63,383,500**

Source: Perquimans County, January 2004. Taxes vales were estimated using 80% structure and 20% land.
**Note: Parcel data includes only parcels ≥50% within the corporate limits.*

Housing Growth

As shown in Table B-3, the 2000 Census found that the Town of Hertford had 1,017 total housing units; 178 units (17.5%) were mobile/manufactured homes, which are more susceptible to damage by natural hazards. It should be noted that over 45% of all homes constructed in the Town of Hertford were built before 1959.

Table B-3: 2000 Census of Housing Units/Year Built – Town of Hertford

Types of Housing Units		
Type of Unit	**Number of Units**	**Percent of Total Units**
Single-family	658	64.7 %
Multi-family	181	17.8 %
Mobile homes	178	17.5 %
Total Units	**1,017**	**100.0 %**

Housing Units by Year Built		
Year Built	**Number of Units**	**Percent of Total Units**
1959 or earlier	462	45.4 %
1960 - 1979	268	26.4 %
1980 – March 2000	287	28.2 %
Total Units	**1,017**	**100.0 %**

Source: US Census, 2000. Corporate limits only.

C. Critical Facilities (Map B-1)

Critical public facilities are those facilities that are essential to the health, safety, and viability of the community. Critical facilities include buildings, services and 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 critical facilities are critical to the 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 Town-owned critical public facilities is shown in Table B-4 and the locations are shown on Map B-1. The ability to protect these facilities from damage from a future natural hazard event is essential for the welfare of the citizens of the Town.

Rationale for Designating a Facility as Critical

Facilities within the Town of Hertford have been divided into three categories of importance for hazard mitigation purposes:

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 town-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 the Town of Hertford 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 the Town of Hertford 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 Located within the Town of Hertford Planning Jurisdiction*

Type of Facility	Location/Site	Function	Importance	Replacement Value
Government Services				
Municipal Building	114 W. Grubb Street	Government Services	Critical	$200,000
Fire Department				
Hertford Fire Department	324 W. Grubb Street	Fire Services	Critical	$246,000
Public Utilities				
Public Works Building	326 W. Grubb Street	Public Works	Critical	$1,100,000
Sewer Pump Stations (9)	Various Locations	Public Sewer	Critical	$1,665,000
Wastewater Treatment Plant	142 Meads Circle	Public Sewer	Critical	$5,000,000
Public Wells (2)	Various Locations	Public Water	Critical	$250,000
Water Treatment Plant	324 W. Grubb Street	Public Water	Critical	$3,000,000
Electric Substation	324 W. Grubb Street	Public Electricity	Critical	$130,000
Emergency Shelter				
Perquimans County High School	305 S Edenton Road	Emergency Shelter	Critical	$11,033,648

Source: Town of Hertford, Perquimans County
**Note: Some of the facilities listed are not owned or operated by the Town of Hertford; however, in the event of a disaster these facilities listed would be utilized.*

The Town of Hertford is a member of the NC Eastern Municipal Power Agency (NCEMPA) and owns and operates electrical distribution within the Town.

State/Federally-Owned Critical Facilities

Transportation Facilities

- US 17
- NC 37
- NC 4
- NCDOT (Equipment Shop and Weight Station)

US Post Office

Privately-Owned Critical Facilities

Utilities

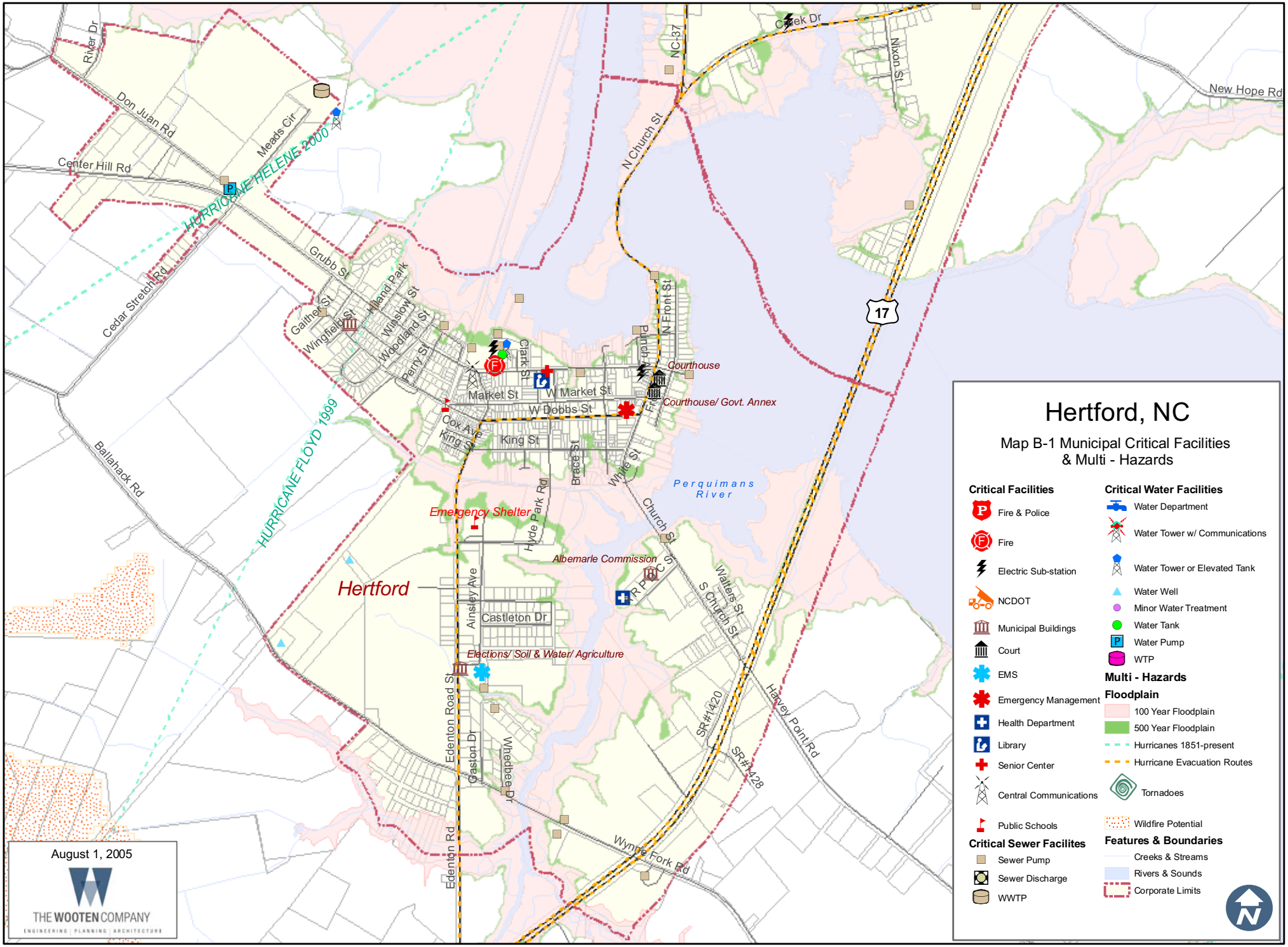
- Eastern NC Natural Gas (ENCNG)

Other Facilities

Supportive

Pubic Schools

- Hertford Grammar School (Grades 3-5)


Hertford, NC
Map B-1 Municipal Critical Facilities & Multi - Hazards
Critical Facilities
Fire & Police
Fire
Electric Sub-station
NCDOT
Municipal Buildings
Court
EMS
Emergency Management
Health Department
Library
Senior Center
Central Communications
Public Schools
Critical Sewer Facilites
Sewer Pump
Sewer Discharge
WWTP
Critical Water Facilities
Water Department
Water Tower w/ Communications
Water Tower or Elevated Tank
Water Well
Minor Water Treatment
Water Tank
Water Pump
WTP
Multi - Hazards
Floodplain
100 Year Floodplain
500 Year Floodplain
Hurricanes 1851-present
Hurricane Evacuation Routes
Tornadoes
Wildfire Potential
Features & Boundaries
Creeks & Streams
Rivers & Sounds
Corporate Limits
Hertford
Courthouse
Courthouse/ Govt. Annex
Emergency Shelter
Albemarle Commission
Elections/ Soil & Water/ Agriculture
Perquimans River
HURRICANE HELENE 2000
HURRICANE FLOYD 1999
August 1, 2005
THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
River Dr
Don Juan Rd
Meads Cir
Center Hill Rd
Cedar Stretch Rd
Ballahack Rd
Grubb St
Gaither St
Wingfield St
Kland Park
Winslow St
Woodland St
Perry St
Clark St
Market St
W Market St
W Dobbs St
Cox Ave
King St
Brace St
Hyde Park Rd
Ainsley Ave
Castleton Dr
Edenton Road St
Gaston Dr
Whedbee Dr
Edenton Rd
N Church St
NC-37
Creek Dr
Nixon St
New Hope Rd
N Front St
Punch Alley
Front St
White St
Church St
S Church St
Walters St
SR#1420
SR#1428
Harvey Point Rd
Wynns Fork Rd
17

D. Description of All-Hazards Exposure

Building Permits

As indicated in Table B-5, from 2000 – 2005, the Town of Hertford issued 12 building permits for construction.

Table B-5: Town of Hertford Building Permits - 2000-2005

Type	Total Permits	Location (within 100 year flood plain)
Single Family Detached	5	0
Mobile Homes	7	0
Non-Residential	0	0
Totals	**12**	**0**

Source: Town of Hertford.

Flood Hazard Areas (Map B-1)

Flood hazard areas within the Town of Hertford are primarily located along the Perquimans River and major tributaries to the river including Raccoon Creek, and Toms Creek.

National Flood Insurance Program

The Town of Hertford currently participates in the National Flood Insurance Program (NFIP). From 1978 through September 2004, the Town had 22 NFIP claim loss totaling almost $302,000. NFIP statistics also indicate that within the Town of Hertford there are 2 properties classified as repetitive loss properties, which received $18,000 in payments.

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 before 1993 when more stringent 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 indicate the age of individual manufactured home units, however, in the 2000 Census, 178 (17.5%) of all residential units were mobile/manufactured home units. These units, regardless of age, are generally 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	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 Population Projections

The population of the Town of Hertford decreased from 2,244 persons in 1990 to 2,070 persons by the 2000 Census – a decrease of 174 people (-7.8%). However, the estimated population for 2004 for the Town of Hertford is 2,080, an increase of 10 people (0.5%). The Office of State Planning projects populations for counties but not for municipalities, so the Town of Hertford population projections for 2010 and 2020 are based on projected growth rates for Perquimans County.

Table B-7: Population Figures

Year	Perquimans County	
	Population Estimate	Ten-Year Growth Rate
2000	11,368	8.8%
2010	12,280	8.0%
2020	13,011	6.0%

Year	Town of Hertford	
	Population Estimate	Ten-Year Growth Rate
2000	2,070	-7.8%
2010	2,236	8.0%
2020	2,370	6.0%

Source: NC State Data Center (http://demog.state.nc.us)

Using the 2000 Census average household population size of 2.42 persons/household for Perquimans County, an estimated 69 new residential units will be built in the Town of Hertford by 2010 and an additional 55 new residential units between 2010 and 2020, totaling 124 additional new residential units by 2020.

F. Summary Conclusions

The methodology for calculating current and future hazard exposure for the Town of Hertford is identical to that used for Perquimans County (see Perquimans County Appendix B). Financial exposure calculations for the Town of Hertford are shown in Tables B-8, B-9, and B-10.

Table B-8: Town of Hertford 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 (Year 2000 $) (000's)**	**Current Number of People**	**Projected Number of Private Buildings**	**Projected Value (Year 2000 $) (000's)**	**Projected Number of People**
Single Family Housing	658	$36,352	1,340	738	$40,772	1,534
Multi-Family Housing	181	$3,333	368	203	$3,738	421
Mobile/Manufactured Housing	178	$3,278	362	200	$3,683	415
Subtotal Residential	**1,017**	**$42,963**	**2,070**	**1,141**	**$48,193**	**2,370**
Commercial/Industrial	50	$7,744	0	56	$8,673	0
Total Private	**1,067**	**$50,707**	**2,070**	**1,197**	**$56,866**	**2,370**

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 (Year 2000 $) (000's)**	**Current of People Number**	**Projected Number of Public Buildings and Critical Facilities**	**Projected Replacement (Year 2000 $) (000's)**	**Projected Number of People**
Municipal Building	1	$200	0	1	$200	0
Fire Department	1	$246	0	1	$246	0
Public Utilities	15	$11,145	0	17	$12,631	0
Emergency Shelter	1	$11,034	0	1	$11,034	0
Total Public	**18**	**$22,625**	**0**	**20**	**$24,111**	**0**
Community Total	**1,085**	**$73,332**	**2,370**	**1,217**	**$80,977**	**2,370**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*

Table B-9: Town of Hertford Vulnerability Assessment for Coastal/Riverine Erosion and Floods - 10%

Private Development						
Current Conditions (Year 2000)				**Potential Future Conditions (Year 2020)[1]**		
Type of Development	**Number of Existing Private Buildings**	**Current Value (Year 2000 $) (000's)**	**Current Number of People**	**Projected Number of Private Buildings**	**Projected Value (Year 2000 $) (000's)**	**Projected Number of People**
Single Family Housing	66	$3,635	134	74	$4,077	153
Multi-Family Housing	18	$333	37	20	$374	42
Mobile/Manufactured Housing	18	$328	36	20	$368	41
Subtotal Residential	**102**	**$4,296**	**207**	**114**	**$4,819**	**237**
Commercial/Industrial	5	$774	0	6	$867	0
Total Private	**107**	**$5,071**	**207**	**120**	**5,687**	**237**

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 (Year 2000 $) (000's)**	**Current of People Number**	**Projected Number of Public Buildings and Critical Facilities**	**Projected Replacement (Year 2000 $) (000's)**	**Projected Number of People**
Municipal Building	0.1	$20	0	0.1	$20	0
Fire Department	0.1	$25	0	0.1	$25	0
Public Utilities	1.5	$1,114	0	1.7	$1,263	0
Emergency Shelter	0.1	$1,103	0	0.1	$1,103	0
Total Public	**2**	**$2,262**	**0**	**2**	**$2,411**	**0**
Community Total	**109**	**$7,333**	**237**	**122**	**$8,098**	**237**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*

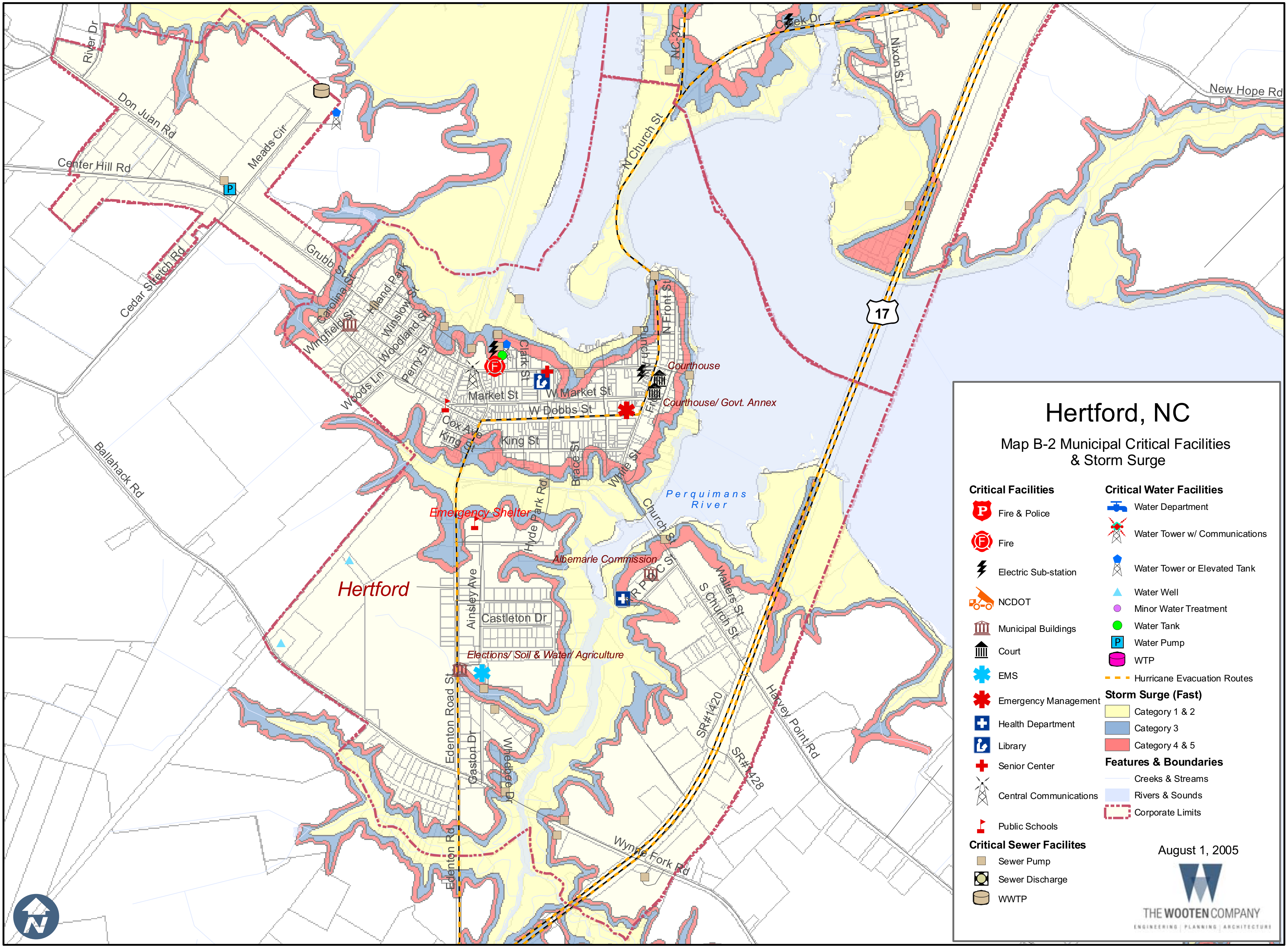
Table B-10: Town of Hertford Vulnerability Assessment for Severe Storms/Tornadoes and Wildfires- 5%

Private Development						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020)[1]		
Type of Development	Number of Existing Private Buildings	Current Value (Year 2000 $) (000's)	Current Number of People	Projected Number of Private Buildings	Projected Value (Year 2000 $) (000's)	Projected Number of People
Single Family Housing	33	$1,818	67	37	$2,039	77
Multi-Family Housing	9	$167	18	10	$187	21
Mobile/Manufactured Housing	9	$164	18	10	$184	21
Subtotal Residential	**51**	**$2,149**	**103**	**57**	**$2,410**	**119**
Commercial/Industrial	2	$387	0	3	$434	0
Total Private	**53**	**$2,536**	**103**	**60**	**$2,844**	**119**

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 (Year 2000 $) (000's)	Current of People Number	Projected Number of Public Buildings and Critical Facilities	Projected Replacement (Year 2000 $) (000's)	Projected Number of People
Municipal Building	0.05	$10	0	0.05	$10	0
Fire Department	0.05	$12	0	0.05	$12	0
Public Utilities	0.75	$557	0	0.85	$631	0
Emergency Shelter	0.05	$552	0	0.05	$552	0
Total Public	**1**	**$1,131**	**0**	**1**	**$1,205**	**0**
Community Total	**54**	**3,667**	**119**	**61**	**$4,049**	**119**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*


Hertford, NC
Map B-2 Municipal Critical Facilities
& Storm Surge
Critical Facilities
Fire & Police
Fire
Electric Sub-station
NCDOT
Municipal Buildings
Court
EMS
Emergency Management
Health Department
Library
Senior Center
Central Communications
Public Schools
Critical Sewer Facilites
Sewer Pump
Sewer Discharge
WWTP
Critical Water Facilities
Water Department
Water Tower w/ Communications
Water Tower or Elevated Tank
Water Well
Minor Water Treatment
Water Tank
Water Pump
WTP
Hurricane Evacuation Routes
Storm Surge (Fast)
Category 1 & 2
Category 3
Category 4 & 5
Features & Boundaries
Creeks & Streams
Rivers & Sounds
Corporate Limits
August 1, 2005
THE WOOTEN COMPANY
Hertford
Perquimans River
Courthouse
Courthouse/ Govt. Annex
Emergency Shelter
Albemarle Commission
Elections/ Soil & Water/ Agriculture
River Dr
Don Juan Rd
Center Hill Rd
Meads Cir
Grubb St
Cedar Stretch Rd
Ballahack Rd
Carolina St
Wingfield St
Hiland Park
Winslow St
Woodland St
Perry St
Woods Ln
Market St
W Market St
W Dobbs St
Cox Ave
King St
Clark St
Brace St
White St
Hyde Park Rd
Ainsley Ave
Castleton Dr
Edenton Road St
Edenton Rd
Gaston Dr
Whedbee Dr
Wynne Fork Rd
Harvey Point Rd
SR#1420
SR#1428
S Church St
Walters St
Church St
N Church St
N Front St
NC 37
Creek Dr
Nixon St
New Hope Rd
17

Town of Hertford
Appendix C: Community Capability Assessment

A. Introduction

This section of the Plan is a detailed assessment of the capacity of the Town of Hertford as a local governmental unit to mitigate the impacts of the natural hazards that were identified and analyzed in Perquimans County Appendix A. This assessment includes an examination of the following local government capabilities:

1. Institutional Capability – A review of Town departments that have direct and indirect responsibility for hazard mitigation activities.
2. Policies, Programs and Ordinances - An examination and evaluation of existing plans, policies, and ordinances that either increase or decrease local vulnerability to natural hazards.
3. Legal Capability – A review of State granted powers – regulation, acquisition, taxation and spending - that can be employed by local governments to further hazard mitigation efforts.
4. Fiscal Capability – An examination of the Town's use of local operating budget and capital improvement program funds to mitigate the effects of hazards.
5. Technical Capability – A review of the Town's ability to employ technical equipment and software programs to enhance mitigation activities.
6. Political Climate – A description of local political will and commitment to implementing hazard mitigation activities.

B. Institutional Capability

The Town of Hertford is a local government body with manager-board form of government. The elected Town Board of Commissioners is the decision making body for the Town. A planning board serves as an advisory panel to the elected Board on specific matters, including planning and land use.

The Town has a limited number of professional staff departments to serve the citizens of the Town and to conduct day-to-day administrative activities. Town departments are listed and described in Table C-1.

Another agency with responsibility for assisting with local hazard mitigation efforts is the North Carolina Department of Transportation (NCDOT). NCDOT is responsible for construction and maintenance of state-owned roads and highways, including the construction and placement 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, then upstream flooding will occur. Lack of maintenance especially due to insufficient resources, such as staff and equipment, can also increase the likelihood of system failure and stormwater damage to system elements, e.g., culverts, during flooding.

Table C-1*:* Town of Hertford - Departments with Direct Impact on Hazard Mitigation

Department/Agency	Function
Town Manager	The Town Manager is responsible for carrying out day-to-day administrative activities under the direction of the Town Board.
Town Clerk	The Town Clerk is responsible for giving proper notices of regular and special meetings of the governing board and for keeping an accurate record of the board's proceedings. The Town Clerk is the custodian of all Town records, and also is responsible for tax collection.
Town Attorney	The Town Attorney advises the Town with respect to matters connected with the affairs of the Town and provides legal counsel to the Town Board.
Public Works	The Public Works Department is responsible for operating and maintaining Town utility services including water and wastewater treatment, as well as the Town electric distribution service.
Police Department	The Police Department is responsible for preserving the public peace; preventing the commission of crimes, protecting the rights of persons and property; reporting nuisances in the streets, alleys and other public places; providing proper police personnel at fires and enforcing the criminal laws of the State of North Carolina and ordinances of the Town of Hertford.
Fire Department	The Fire Department is responsible for directing the extinguishment of fires, preserving property exposed to fire, preventing theft of any goods during the fire, and reporting all violations of any fire prevention ordinances.

C. Existing Polices, Programs and Ordinances

The Town of Hertford 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 Board has created and appointed 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 land use 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 Hertford has used its legislated regulatory power to adopt and implement policies, programs, and ordinances that regulate land use and development. These policies and regulations help mitigate potential harmful effects of natural hazards.

Each Town 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 Town policies and ordinances include:

- CAMA Land Use Plan (1991)
- Zoning Ordinance (1980)
- Subdivision Regulations (1967)
- Flood Damage Prevention Ordinance (1985/2005)
- Building Code Enforcement Ordinance (Perquimans County)

CAMA Land Use Plan (1991)
The Town of Hertford adopted the present CAMA Land Use Plan in 1991 for the purpose of establishing long-range growth and development policies for the Town. The Town plans to participate in the update of the Perquimans County core CAMA Land Use Plan. The new planning process will further define and refine community policies and issues, and will describe existing uses of land and future desired growth.

Zoning Ordinance
The Town of Hertford zoning ordinance was first adopted in 1980. The purpose of zoning regulations is to accomplish a coordinated, balanced, and harmonious development of the land within the corporate limits of the Town of Hertford and in the extraterritorial area, in a manner which will best promote the health, safety, morals, convenience, order, prosperity and general welfare of the people, as well as provide for efficiency and economy in the process of development; make adequate provisions for traffic; secure safety from fire, panic, and other hazards; provide for light and air; prevent the overcrowding of land; avoid undue concentration of population; facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements; promote desirable living conditions and the sustained stability of neighborhoods; protect the property against blight and depreciation; protect and enhance the visual character and quality of the built environment. The Town of Hertford's Zoning Ordinance establishes twelve zoning districts as outlined in Table C-2.

Subdivision Regulations
The Town of Hertford first adopted subdivision regulations in 1967. Subdivision regulations establish procedures and standards for the regulation and control of the subdivision of land within the jurisdiction of the Town of Hertford, North Carolina in order to promote the public health, safety, and general welfare of the community. 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 to avoid congestion and overcrowding; provide adequate light, air, and open space; ensure greater safety from fire, flood, and other dangers; and ensure proper legal description, identification, monumentation, and recording of subdivision properties.

Notable areas within this ordinance that directly pertain to hazard mitigation include the general provision of design standards, which state "any land area within the jurisdiction of this ordinance subject to flooding and other land deemed by the Planning Board to be uninhabitable shall be prohibited for residential occupancy, or for other use that may jeopardize the life, health, or property, or may increase the flood hazard. Lands of this nature shall be used only for such uses that will not be endangered by periodic or occasional flooding."

Flood Damage Prevention Ordinance
The Town of Hertford adopted a Flood Damage Prevention Ordinance effective July 3, 1985. An update of this ordinance was completed in 2005 when the new flood maps were released. Through an interlocal agreement, Perquimans County enforces the ordinance for the Town of Hertford.

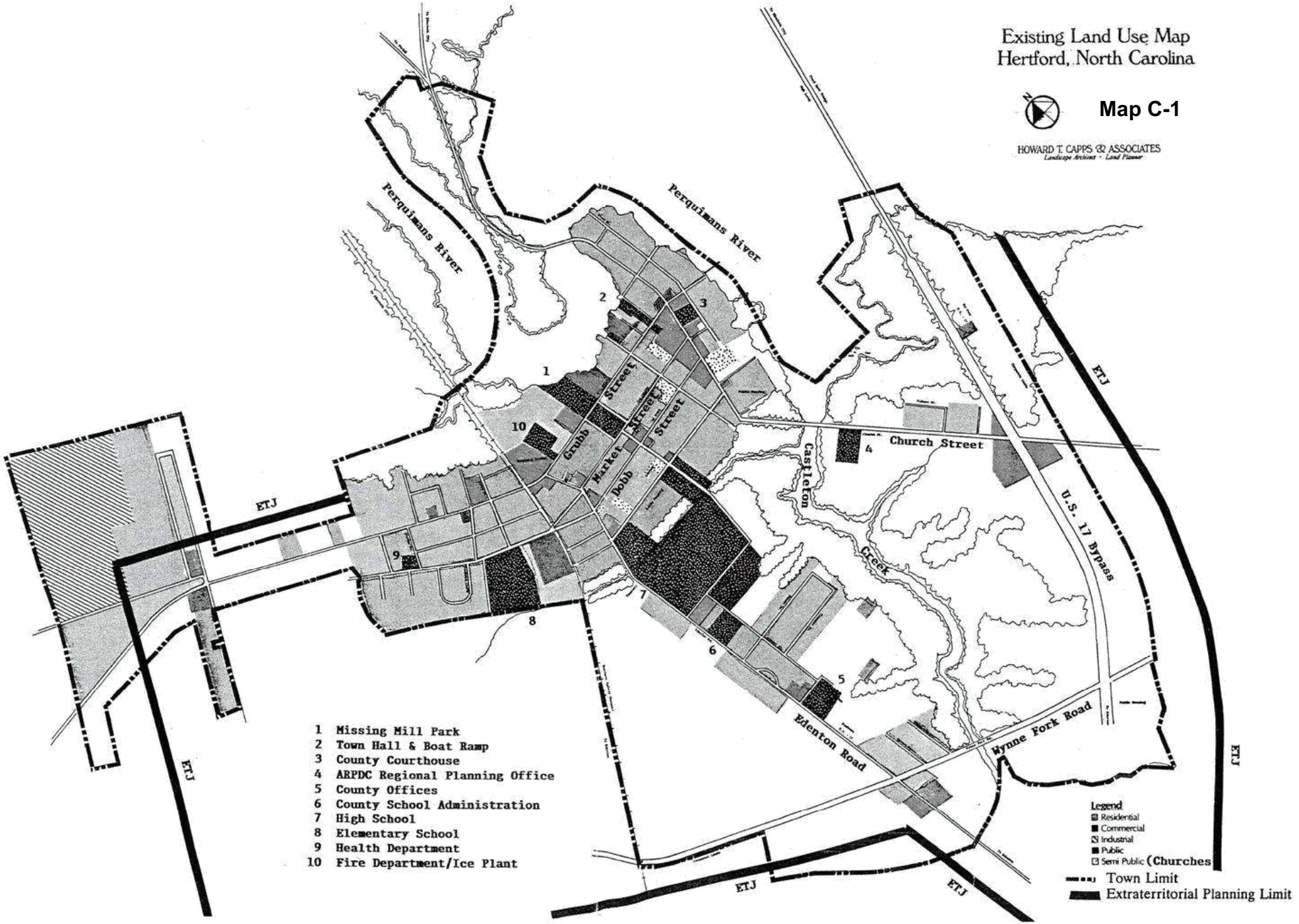

Existing Land Use Map
Hertford, North Carolina
Map C-1
HOWARD T. CAPPS & ASSOCIATES
Landscape Architect · Land Planner
Perquimans River
Perquimans River
Grubb Street
Market Street
Dobb Street
Church Street
Castleton Creek
U.S. 17 Bypass
Edenton Road
Wynne Fork Road
ETJ
ETJ
ETJ
ETJ
ETJ
1 Missing Mill Park
2 Town Hall & Boat Ramp
3 County Courthouse
4 ARPDC Regional Planning Office
5 County Offices
6 County School Administration
7 High School
8 Elementary School
9 Health Department
10 Fire Department/Ice Plant
Legend
Residential
Commercial
Industrial
Public
Semi Public (Churches
Town Limit
Extraterritorial Planning Limit

Table C-2: Town of Hertford Zoning Districts

Zoning District	Description
RA Residential Agricultural	The RA District creates a district in which single family residential and agricultural uses can be compatibility mixed where water and sewer are not available or where development of low density is desired. Minimum lot area is 20,000 square feet.
R-10 Single Family Residential	The R-10 District requires a minimum lot size of 10,000 square feet to allow for single family dwellings and other such uses which would not be detrimental to property values and the established character of the district.
R-8 Residential District	The R-8 District provides for a compatible mixture of single-family, two-family, and multi-family dwellings on minimum 8,000 square foot lots while using adequate controls to insure development will not be detrimental to the neighborhood environment.
R-6 Residential District	The R-6 District provides for a compatible mixture of single-family, two-family, and multi-family dwellings (including mobile homes) on minimum 6,000 square foot lots while using adequate controls to regulate open space and layout to insure enhanced neighborhood character and livability.
TR Transitional Residential District	The TR District provides for a compatible mixture of residential uses and other compatible uses where residential use is changing to more intensive uses, and where such areas may logically be expected to become less rather than more residentially oriented.
O/I Office, Institutional District	The O.I District provides for facilities to house general offices and institutions requiring extensive space for parking and expansion in an area highly accessible and visible to those demanding these services.
C-1 Commercial, Core Area	The C-1 District provides for, enhances, and protects shopping and office facilities in a focal nature characteristically associated with the central business district.
C-2 Commercial, General	The C-2 District provides for development of commercial activities and encourages the proper grouping and location of uses requiring ready accessibility by the public and space for expansion, parking, and storage so as to minimize any negative impacts upon adjacent or proximate non-compatible uses.
C-3 Commercial, Neighborhood	The C-3 District provides for shopping and service facilities utilized regularly by residents of neighboring residential districts, while utilizing such controls as necessary to protect the residential character of surrounding districts.
M-1 Manufacturing	The M-1 District creates and protects areas which may be utilized by those industrial or manufacturing uses which do not create excessive noise, odor, smoke or dust; and which do not possess other objectionable characteristics which might be detrimental to surrounding neighborhoods or the town as a whole.
C-4 Commercial, Light Industrial	The C-4 District provides for a mix of commercial and light industrial uses and encourages the proper grouping and location of uses requiring ready accessibility by the public and space for expansion, parking, and storage so as to minimize any negative impacts upon adjacent or proximate non-compatible uses.
C-5 Commercial, Riverfront	The C-5 District provides for commercial facilities adjacent to or in close proximity to rivers and waterways that require extensive space for uses relating to the water in a manner that will minimize any negative impact upon adjacent waterfront properties and water quality.

Source: Town of Hertford Zoning Ordinance.

Building Code Enforcement Ordinance (1985)
In 1985, Perquimans County adopted the North Carolina Uniform Residential Building Code. 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.

The County enforces the ordinance within the unincorporated areas of the County and also has the authority to enforce the code within the corporate limits of any municipality that requests by resolution that the County do so. By interlocal agreement, Perquimans County enforces the building code within the Town of Hertford.

Community Capability Assessment Summary
The overall assessment of Town of Hertford community capability to address hazard mitigation through existing policies and ordinances is summarized in Table C-3.

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 Manager will be responsible for providing a copy of the Hazard Mitigation Plan to each Town department and for ensuring each policy or program 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 Town Manager, under the direction of the Town Board, is responsible for implementation, enforcement, and updates to community plans and ordinances and 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-3: Community Capability Assessment – Town of Hertford

Policies and Programs	Policy/Program Status	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
CAMA Land Use Plan	Existing	Moderate	Establishes long-range growth and development policies.	With update of the Perquimans County CAMA Land Use Plan, the Town will consider strengthening the Plan to include regulations and restrictions for development in hazard prone areas. The Perquimans County Planning Department is the lead agency responsible for the Plan update.
Zoning Ordinance	Existing	Moderate	Establishes standards and regulations for land development.	Review the zoning ordinance and consider updates/revisions that will strengthen hazard mitigation efforts. The Town Manager is responsible for ordinance enforcement and for recommending revisions to the Town Board.
Subdivision Regulations	Existing	Moderate	Provides for orderly growth and development by setting standards for street construction, interconnecting street systems, and for other improvements that ensure the appropriate design and layout of new development.	Continue to enforce and enhance subdivision standards, particularly in regards to stormwater management. The Town Manager is responsible for ordinance enforcement and for recommending revisions to the Town Board.
Flood Damage Prevention Ordinance	Existing	High	Regulates building within floodplains by setting and enforcing standards for flood protection.	The Town will continue to review and enhance flood hazard control standards to reduce the exposure of the built environment and the population of the Town to the perils of natural hazards. The Perquimans County Building Inspections Department is responsible for ordinance enforcement.
Building Code Enforcement Ordinance	Existing	High	Provides for enforcement of minimum building code standards as set by the State of North Carolina.	Continue to incorporate and enforce any revisions to State Building Code standards. The Perquimans County Building Inspections Department is responsible for code enforcement.

Source: Town of Hertford.

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. The Town of Hertford has made limited use of these powers.

Regulation (General Police Power)

Local governments in North Carolina have been granted broad regulatory powers. 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), towns, cities and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard (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)). To date, the Town of Hertford has not used general police powers to enact any specific hazard mitigation strategies.

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 143-338(c)). However, municipalities and counties may adopt codes for their respective areas if approved by the state as providing "adequate minimum standards" (NCGS 143-338(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.

Town of Hertford

By interlocal agreement, Perquimans County enforces the building code within the Town of Hertford, after a zoning compliance permit is issued by the Town of Hertford.

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. All these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, 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 160A-3 87). 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 (NCGS 160A-361).

The importance of the planning powers of local governments is emphasized in NCGS 160A-383, 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.

The Town of Hertford has a Planning Board, as well as a Zoning Board of Adjustments that conducts studies, makes policy recommendations, develops ordinances, and makes zoning amendment and petition recommendations to the Town Board.

Town of Hertford

The Town of Hertford has a CAMA Land Use Plan that sets guidelines for future development within the Town. The Town of Hertford is participating with Perquimans County to develop a CAMA core land Use Plan, where the scope of the plan will be expanded to 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.

Town of Hertford

The Town of Hertford zoning ordinance establishes districts and development standards. The current ordinance could be updated to more fully address development standards that would reduce community vulnerability to natural hazards, especially vulnerability to flooding.

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)).

Town of Hertford

The Town of Hertford has adopted subdivision regulations that set standards for the division of property for the purposes of development. The current ordinance could be updated to more fully address development standards that would reduce community vulnerability to natural hazards, especially vulnerability to flooding.

Floodplain Regulation

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 143-314.51-214.61). 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 143-315.54).

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. 143-315.54(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.

Town of Hertford

The Town of Hertford has a flood damage prevention ordinance that is, through interlocal agreement, enforced by Perquimans County.

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 is to acquire the property (either in fee simple or a lesser interest, such as an easement). Public acquisition removes the property from the private market and eliminates or reduces the possibility of inappropriate development. North Carolina legislation empowers cities 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 Hertford has not used local police power to acquire land for hazard mitigation purposes. Taking of private property for public purposes can be both extensive and controversial as landowners are often uncooperative. Funds for acquisition would have to come from local revenues, which are almost always limited, or from federal or state grants.

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, and floodplains) to discourage development in hazardous areas.

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 city or county boundaries. In addition, they are useful in distributing to new property owners the costs of the infrastructure required by new development. The Town of Hertford uses general revenues from primarily local property taxes and sales tax refunds for annual operating funds.

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 city 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 public costs associated with degradation of the environment and damages to properties caused by natural hazards. The Town of Hertford has not designated capital improvement funds specifically for hazard mitigation activities.

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. Appendix D lists state and federal sources for information and funding of hazard mitigation initiatives. The NC Emergency Management website at http://www.ncem.org/Mitigation/additional_funding.htm includes a more exhaustive list of over 300 state and federal funding sources.

In North Carolina, property taxes provide the primary source of revenue for municipalities. These taxes are typically used primarily to finance services that must be available and delivered on a daily basis, such as police and fire emergency services, solid waste collection and disposal, street maintenance, etc. and, 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 2004 NC Department of Commerce ranking places Perquimans County in Tier 1.

F. Technical Capability – Staff Resources

Effective hazard mitigation initiatives depend largely on a community's technical capability. Many smaller governments in North Carolina have only limited technical capabilities due to size and budget restrictions and must depend on larger government units for technical assistance. However, the most valuable technological resource is the wealth of knowledge accumulated by the various staff members through their years of experience.

The Town of Hertford depends largely on the assistance of Perquimans County and the Albemarle Commission which provide assistance with planning, building inspections and code compliance, information management, emergency services, and geographic information systems mapping of hazard areas (primarily floodplains). Together these technical capabilities help build a more resilient community by better planning before the occurrence of a natural hazard, as well as by better response during the event and during the recovery period.

G. Political Climate

The elected officials of the Town of Hertford are in agreement that implementation of the Hazard Mitigation Plan will help minimize damages caused by natural hazards. The Town Board intends to vigorously support hazard mitigation efforts while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Board strives in their efforts to make the Town of Hertford a safer community, and sees implementation of the Hazard Mitigation Plan as a means to help achieve that goal.

Town of Winfall
Appendix B: Assessment of Vulnerability

A. Introduction

The Perquimans County Composite Hazard Index (Table A-28 in Appendix A) outlines the six hazards rated "moderate" for potential threat to persons and property. Of the six hazards, the Town of Winfall is exposed to hurricanes/coastal storms and winter storms/freezes (100%); coastal/riverine erosion and floods (10%), and severe storms/tornadoes and wildfires (5%). A more detailed analysis of financial vulnerability to hazards can be found at the end of this section.

B. Community Description

The Town of Winfall, with a 2000 Census population of 554, is located in central Perquimans County in the Coastal Plain area of North Carolina. The 1990 Census indicated that the Town of Winfall lost 126 residents between 1980 (633 residents) and 1990 (507 residents); however, the 2000 Census showed that the town's population had increased back to 554 persons and the State Data Center estimates 2004 population at 567 persons.

Located approximately 36 miles east of the Town of Windsor and 59 miles south of Chesapeake, Virginia; the Town of Winfall incorporates 2.22 square miles of land or approximately 1,423 acres. US Highway 17 and New Hope Road provide access heading east towards Durants Neck. Other notable roadways include NC 37 providing access northward towards Belvidere. The Town is bordered on the western boundary of its corporate limits by the Perquimans River.

The Town of Winfall and surrounding terrain are characterized by mostly flat land surfaces with most variations in elevation occurring adjacent to streams, creeks, and the Perquimans River. Topographic elevations range from mean sea level to about 17 feet above sea level.

Major Employers and Demographics

Major employers within the Town of Winfall include: Best Buy Meats, Chappell Accounting, Inc., Classic Hair Design, The Appliance Barn, Essential Water Storage, New Pride Products - Cleaning Products, Layden's Country Convenience Store, Hollowell Oil Co., A Godly Woman's Garment, Perquimans Medical Service, Poros Garage, Treasures Thrift, Etc. Thrift & Novelty, Ward & Nixon, Inc., NCDOT Maintenance Facility, Crossroads Fuel, NC State Juvenile Detention Center, Perquimans County Middle and Central Schools and Winfall Auto Tech.

The economy of the Town of Winfall depends largely on educational, health and social services, as in the 2000 Census (Table B-1) those sectors accounted for 18.7% of the total work force. Other notable industries include retail trade and professional, scientific, management, administrative and waste management services; which together accounted for 26.7% of the work force in 2000. In 2000 the average travel time to work in the Town of Winfall was 30.4 minutes.

In the 2000 Census, almost 64.7% of town residents had a high school education or higher, with more than 12% having a bachelor's degree or higher. The median age of residents in 2000 was 42.5 years of age with 60.7% of the population above the age of 35.

Table B-1: Town of Winfall Demographics

Economic		
Total Population		554
Median Household Income		$27,386
Average Household Size		2.37
Percent of Individuals Below Poverty Level		17.8 %
Occupation	**People**	**Percent**
Management, professional, etc.	37	17.3 %
Service related	64	29.9 %
Sales and office	43	20.1 %
Farming, fishing, and forestry	-	-
Construction, extraction, and maintenance	32	15.0 %
Production, transportation, material moving	38	17.8 %
Employment	**People**	**Percent**
Employed	214	48.1 %
Unemployed	23	5.2 %
Not in labor force	206	46.3 %
Social		
Level of Educational Attainment	**People**	**Percent**
Less than 9th grade	67	16.5 %
9th – 12th (no diploma)	76	18.8 %
High School Diploma (includes GED)	120	29.6 %
Some college, no degree	79	19.5 %
Associate degree	13	3.2 %
Bachelor's degree	37	9.1 %
Graduate or professional degree	13	3.2 %
Housing		
Selected Characteristics	**People**	**Percent**
Lacking complete plumbing facilities	4	1.7 %
Lacking complete kitchen facilities	6	2.6 %
No phone service	11	4.7 %

Source: US Census, 2000. Corporate limits only.

Developed and Undeveloped Areas

The majority of development within the Town of Winfall consists of single family residential dwellings along existing roadways and waterfront property. This includes two small subdivisions, less than 20 structures or lots each, referred to as Rivercroft Subdivision [Croft Street and River Drive] and Windemere Shores Subdivision [Windemere Drive]. Two mobile/manufactured home parks exist within the Town and are concentrated on Howell Street and at Hollowell Drive and Hollowell Lane.

Commercial/industrial development exists along Main Street [U.S. Post Office and Perquimans County Middle School]; River Street; Winfall Boulevard [NC-37] [Oil Company, small retail mall, Perquimans County Central School, a gas station/grocery store and the Town's water plant wells (7) and water tower]; Creek Drive [NC Business 17] [Albemarle Electric Membership Corporation, vehicle repair facility, marina, and restaurant/gas station]; Jessup Street [State Youth Detention Center]; [Wiggins Rd. N-37] Cotton Gin Road [Cotton Gin]; Ocean Highway [US 17] oil company and used cars sales; and Wiggins Road [NC-37] [Fire Department and Perquimans County Recreational Area].

The Town Municipal Building and Town Park are located on Parkview Lane. Most commercial development is mixed with residential development. One major subdivision, approximately 90 homes, is presently in the development process. This subdivision, located off Major Street and adjacent to the Town Municipal Building and Town Park, will have both single family dwellings and town homes. A smaller subdivision of town homes could be approved and would be accessed off Winfall Boulevard.

Table B-2 shows that property improvements (buildings) accounted for over $14 million in tax value in 2004. The total value of land, buildings, and other improvements within the town corporate limits exceeded $18 million in tax value.

Table B-2: Estimated Value of Developed Facilities within Town of Winfall

Type of Use	Building Value	Land Value	Total Tax Value
Residential	$13,979,840	$3,494,960	$17,474,800
Commercial	$966,800	$241,700	$1,208,500
Total	**$14,946,640**	**$3,736,660**	**$18,683,300**

Source: Perquimans County, January 2004.

Housing Growth

As shown in Table B-3, the 2000 Census found that the Town of Winfall had 273 total housing units; 50 units (18.3%) were mobile/manufactured homes, which are more susceptible to damage by natural hazards. It should be noted that almost 48% of all homes constructed in the Town of Winfall were built before 1959.

Table B-3: 2000 Census of Housing Units/Year Built – Town of Winfall

Types of Housing Units		
Type of Unit	**Number of Units**	**Percent of Total Units**
Single-family	223	81.7 %
Multi-family	-	-
Mobile homes	50	18.3 %
Total Units	**273**	**100.0 %**

Housing Units by Year Built		
Year Built	**Number of Units**	**Percent of Total Units**
1959 or earlier	130	47.6 %
1960 - 1979	96	35.2 %
1980 – March 2000	47	17.2 %
Total Units	**273**	**100.0 %**

Source: US Census, 2000. Corporate limits only.

C. Critical Facilities (Map B-1)

Critical public facilities are those facilities that are essential to the health, safety, and viability of the community. Critical facilities include buildings, services and 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 critical facilities are critical to the 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 Town-owned critical public facilities is shown in Table B-4 and the locations are shown on Map B-1. The ability to protect these facilities from damage from a future natural hazard event is essential for the welfare of the citizens of the Town.

Rationale for Designating a Facility as Critical

Facilities within the Town of Winfall have been divided into three categories of importance for hazard mitigation purposes:

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 town-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 the Town of Winfall 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 the Town of Winfall 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 Located within the Town of Winfall Planning Jurisdiction

Type of Facility	Location/Site	Function	Replacement Value
Government Services			
Municipal Building (Town Hall, Police)	102 Parkview Lane	Government Services	$580,000
Fire Department			
Winfall Fire Department	341 Wiggins Road	Fire Protection	$175,000
Public Facilities			
Water Treatment Plant	1 Yates Drive	Public Water	$375,000
Town Wells (7)	Various Locations	Public Water	$350,000
Wastewater Collection System (Main pump)	374 Winfall Boulevard	Public Sewer	$375,000
Pump Stations (5)[1]	Various Locations	Public Sewer	$950,000

Source: Town of Winfall, Perquimans County
**Note: Some of the facilities listed are not owned or operated by the Town of Winfall, however in the event of a disaster, facilities listed would be utilized.*
[1] Locations for the Pump Stations include:

216 W. Main St.
114 Wiggins Rd.
404 Wiggins Rd.
102 Croft Dr.
292 Creek Dr.

State/Federally-Owned Critical Facilities

Transportation Facilities

- US 17
- NC 4
- NC 37

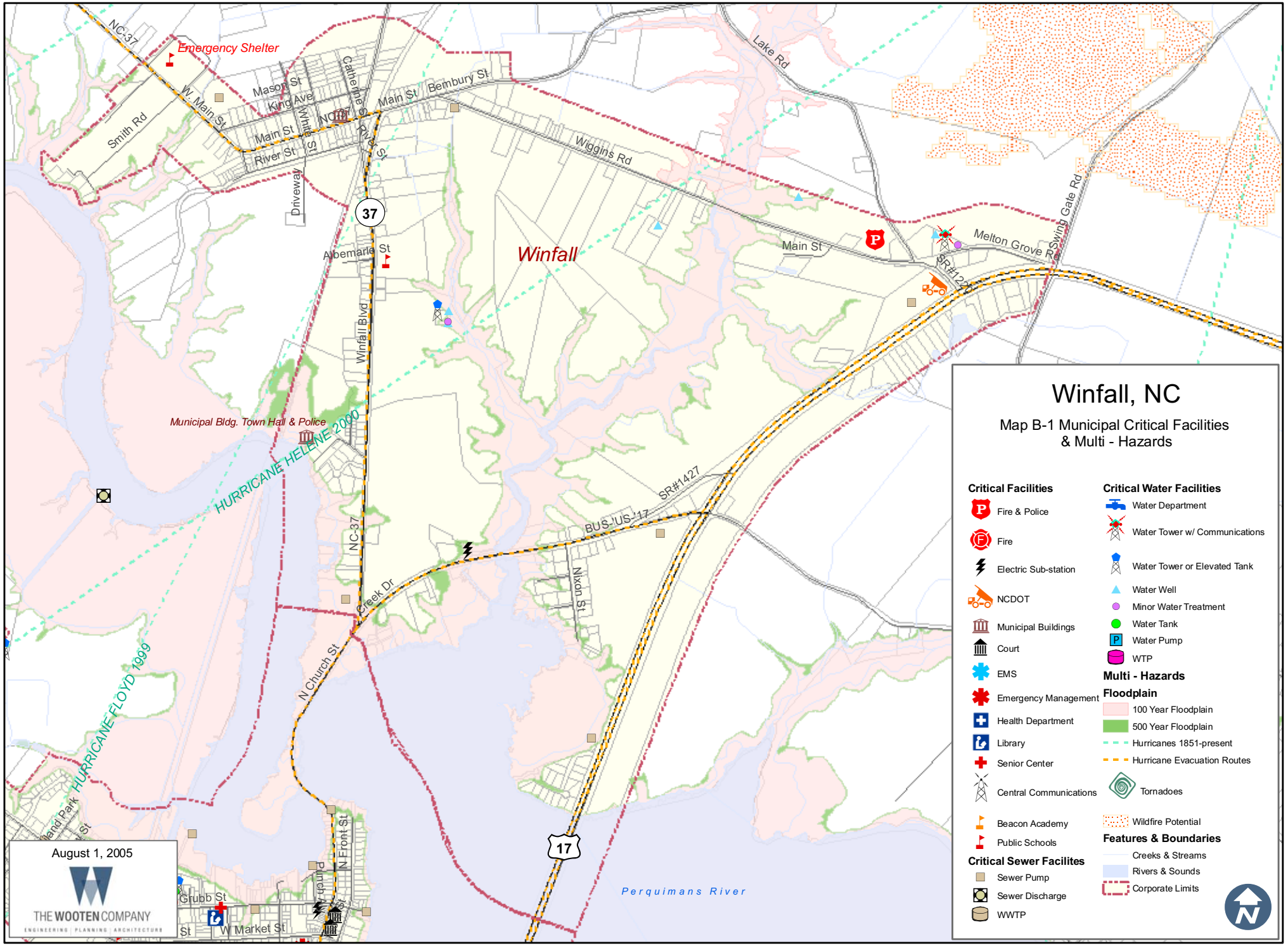
US Post Office

Other Facilities

Supportive

Pubic Schools

- Perquimans County Middle School
- Perquimans County Central School


Winfall, NC
Map B-1 Municipal Critical Facilities & Multi - Hazards
Critical Facilities
Fire & Police
Fire
Electric Sub-station
NCDOT
Municipal Buildings
Court
EMS
Emergency Management
Health Department
Library
Senior Center
Central Communications
Beacon Academy
Public Schools
Critical Sewer Facilites
Sewer Pump
Sewer Discharge
WWTP
Critical Water Facilities
Water Department
Water Tower w/ Communications
Water Tower or Elevated Tank
Water Well
Minor Water Treatment
Water Tank
Water Pump
WTP
Multi - Hazards
Floodplain
100 Year Floodplain
500 Year Floodplain
Hurricanes 1851-present
Hurricane Evacuation Routes
Tornadoes
Wildfire Potential
Features & Boundaries
Creeks & Streams
Rivers & Sounds
Corporate Limits
August 1, 2005
THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
Winfall
Emergency Shelter
Municipal Bldg. Town Hall & Police
HURRICANE HELENE 2000
HURRICANE FLOYD 1999
Perquimans River
NC-37
Main St
Bembury St
Lake Rd
Wiggins Rd
Swing Gate Rd
Melton Grove Rd
SR#1220
SR#1427
BUS-US-17
Albemarle St
Winfall Blvd
Creek Dr
Nixon St
N Church St
N Front St
W Market St
Grubb St
Smith Rd
W. Main St
Mason St
King Ave
White St
River St
Driveway
Catherine Creek
37
17

D. Description of All-Hazards Exposure

Zoning Permits

As indicated in Table B-5, from January 1, 2001 – April 30, 2005, the Town of Winfall issued 7 zoning permits for construction. The Perquimans County building inspector issues all building permits within the Town of Winfall based on the receipt of the Town's zoning permit.

Table B-5: Town of Winfall Zoning Permits – January 1, 2001- April 5, 2005

Type	Total Permits	Location (within 100 year flood plain)
Single Family Detached	5	0
Mobile Homes	2	0
Non-Residential	0	0
Totals	**7**	**0**

Source: Town of Winfall.

Flood Hazard Areas (Map B-1)

Flood hazard areas within the Town of Winfall are primarily located along the Perquimans River and Mill Creek, a major tributary to the river.

National Flood Insurance Program

The Town of Winfall currently participates in the National Flood Insurance Program (NFIP). From 1978 through September 2004, there was only one NFIP damage loss claim (almost $26,000) for insured properties within the Town.

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 before 1993 when more stringent 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 indicate the age of individual manufactured home units, however, in the 2000 Census, 50 (18.3%) of all residential units were mobile/manufactured home units. These units, regardless of age, are generally 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	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 Population Projections

The population of the Town of Winfall increased from 554 persons in 2000 to an estimated 567 persons in 2004 – an increase of 13 people (2.3%). The Office of State Planning projects populations for counties but not for municipalities, so the Town of Winfall population projections for 2010 and 2020 are based on projected growth rates for Perquimans County.

Table B-7: Population Figures

Year	Perquimans County	
	Population Estimate	Ten-Year Growth Rate
2000	11,368	8.8%
2010	12,280	8.0%
2020	13,011	6.0%

Year	Town of Winfall	
	Population Estimate	Ten-Year Growth Rate
2000	554	-
2010	612	8.00%
2020	649	6.00%

Source: NC State Data Center (http://sdc.state.nc.us/)

Using the 2000 Census average household population size of 2.42 persons/household for Perquimans County, an estimated 24 new residential units will be built in the Town of Winfall by 2010 and an additional 15 new residential units between 2010 and 2020, totaling 39 additional new residential units by 2020.

F. Summary Conclusions

The methodology for calculating current and future hazard exposure for the Town of Winfall is identical to that used for Perquimans County (see Perquimans County Appendix B). Financial exposure calculations for the Town of Winfall are shown in Tables B-8, B-9, and B-10.

Table B-8: Town of Winfall 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 (Year 2000 $) (000's)	Current Number of People	Projected Number of Private Buildings	Projected Value (Year 2000 $) (000's)	Projected Number of People
Single-Family	223	$13,008	463	255	$14,875	530
Mobile Homes	50	$972	104	57	$1,108	119
Total Residential	**273**	**$13,980**	**567**	**312**	**$15,983**	**649**
Commercial/Industrial	14	$967	0	16	$1,105	0
Total Private	**287**	**$14,947**	**567**	**328**	**$17,088**	**649**

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 (Year 2000 $) (000's)	Current of People Number	Projected Number of Public Buildings and Critical Facilities	Projected Replacement (Year 2000 $) (000's)	Projected Number of People
Municipal Building	1	$580	0	1	$580	0
Fire Department	1	$175	0	1	$175	0
Public Facilities	9	$2,050	0	9	$2,050	0
Total Public	**11**	**$2,805**	**0**	**11**	**$2,805**	**0**
Community Total	**298**	**$17,752**	**567**	**339**	**$19,893**	**649**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*

Table B-9: Town of Winfall Vulnerability Assessment for Coastal/Riverine Erosion and Floods – 10%

Private Development						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020)[1]		
Type of Development	Number of Existing Private Buildings	Current Value (Year 2000 $) (000's)	Current Number of People	Projected Number of Private Buildings	Projected Value (Year 2000 $) (000's)	Projected Number of People
Single-Family	22	$1,301	46	26	$1,488	53
Mobile Homes	5	$97	10	6	$111	12
Total Residential	**27**	**$1,398**	**56**	**32**	**$1,598**	**65**
Commercial/Industrial	1	$97	0	2	$111	0
Total Private	**28**	**$1,495**	**56**	**34**	**$1,709**	**65**

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 (Year 2000 $) (000's)	Current of People Number	Projected Number of Public Buildings and Critical Facilities	Projected Replacement (Year 2000 $) (000's)	Projected Number of People
Municipal Building	0.1	$58	0	0.1	$58	0
Fire Department	0.1	$18	0	0.1	$18	0
Public Facilities	0.9	$205	0	0.9	$205	0
Total Public	**1.1**	**$281**	**0**	**1.1**	**$281**	**0**
Community Total	**29.8**	**$1,776**	**56**	**33.9**	**$1,990**	**65**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*

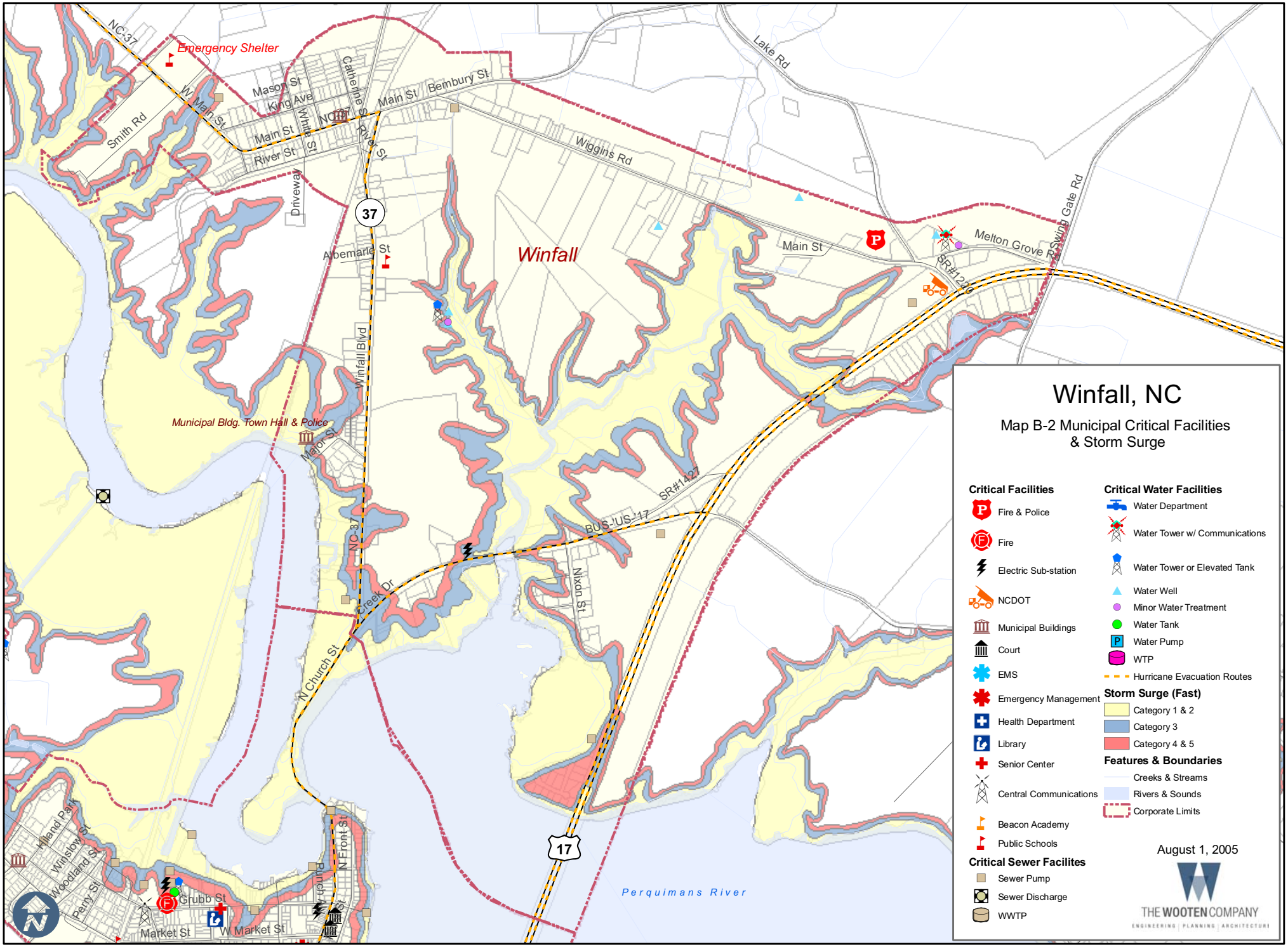
Table B-10: Town of Winfall Vulnerability Assessment for Severe Storms/Tornadoes and Wildfires – 5%

Private Development						
Current Conditions (Year 2000)				Potential Future Conditions (Year 2020)[1]		
Type of Development	Number of Existing Private Buildings	Current Value (Year 2000 $) (000's)	Current Number of People	Projected Number of Private Buildings	Projected Value (Year 2000 $) (000's)	Projected Number of People
Single-Family	11	$651	23	13	$744	27
Mobile Homes	3	$49	5	3	$56	6
Total Residential	**14**	**$700**	**28**	**16**	**$800**	**33**
Commercial/Industrial	1	$49	0	1	$56	0
Total Private	**15**	**$749**	**28**	**17**	**$856**	**33**

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 (Year 2000 $) (000's)	Current of People Number	Projected Number of Public Buildings and Critical Facilities	Projected Replacement (Year 2000 $) (000's)	Projected Number of People
Municipal Building	0.05	$29	0	0.05	$29	0
Fire Department	0.05	$9	0	0.05	$9	0
Public Facilities	0.45	$102	0	0.45	$102	0
Total Public	**0.55**	**$140**	**0**	**0.55**	**$140**	**0**
Community Total	**14.9**	**$889**	**28**	**16.95**	**$996**	**33**

[1] *2000 Data based on 2000 Census data and local tax revenue data. Site-built home values estimated at 3 times the value of multi-family units and manufactured/mobile homes; # of commercial properties estimated at 5% of residential unit count.*

[2] *2020 Projections based on population projections with comparable increase in commercial/industrial properties.*


Winfall, NC
Map B-2 Municipal Critical Facilities & Storm Surge
Critical Facilities
Fire & Police
Fire
Electric Sub-station
NCDOT
Municipal Buildings
Court
EMS
Emergency Management
Health Department
Library
Senior Center
Central Communications
Beacon Academy
Public Schools
Critical Sewer Facilites
Sewer Pump
Sewer Discharge
WWTP
Critical Water Facilities
Water Department
Water Tower w/ Communications
Water Tower or Elevated Tank
Water Well
Minor Water Treatment
Water Tank
Water Pump
WTP
Hurricane Evacuation Routes
Storm Surge (Fast)
Category 1 & 2
Category 3
Category 4 & 5
Features & Boundaries
Creeks & Streams
Rivers & Sounds
Corporate Limits
August 1, 2005
THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
Winfall
Emergency Shelter
Municipal Bldg. Town Hall & Police
Perquimans River
NC 37
Smith Rd
W. Main St
Mason St
King Ave
White St
Catherine St
Main St
Bembury St
Lake Rd
River St
Driveway
Wiggins Rd
Swing Gate Rd
Melton Grove Rd
SR#1220
Abemarle St
Winfall Blvd
Major St
SR#1427
BUS-US-17
Creek Dr
Nixon St
N Church St
Hyland Park
Winslow St
Woodland St
Perry St
Grubb St
Market St
W Market St
N Front St
Church St
37
17

Town of Winfall
Appendix C: Community Capability Assessment

A. Introduction

This section of the Plan is a detailed assessment of the capacity of the Town of Winfall as a local governmental unit to mitigate the impacts of the natural hazards that were identified and analyzed in Perquimans County Appendix A. This assessment includes an examination of the following local government capabilities:

1. Institutional Capability – A review of Town departments that have direct and indirect responsibility for hazard mitigation activities.
2. Policies, Programs and Ordinances - An examination and evaluation of existing plans, policies, and ordinances that either increase or decrease local vulnerability to natural hazards.
3. Legal Capability – A review of State granted powers – regulation, acquisition, taxation and spending - that can be employed by local governments to further hazard mitigation efforts.
4. Fiscal Capability – An examination of the Town's use of local operating budget and capital improvement program funds to mitigate the effects of hazards.
5. Technical Capability – A review of the Town's ability to use employ technical equipment and software programs to enhance mitigation activities.
6. Political Climate – A description of local political will and commitment to implementing hazard mitigation activities.

B. Institutional Capability

The Town of Winfall is a local government body with a mayor-council form of government. The elected Town Council is the decision making body for the Town. A planning board serves as an advisory panel to the elected officials on specific matters, including planning and land use.

The Town has a limited number of professional staff departments to serve the citizens of the Town and to conduct day-to-day administrative activities. Town departments are listed and described in Table C-1.

Another agency with responsibility for assisting with local hazard mitigation efforts is the North Carolina Department of Transportation (NCDOT). NCDOT is responsible for construction and maintenance of state-owned roads and highways, including the construction and placement 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, then upstream flooding will occur. Lack of maintenance especially due to insufficient resources, such as staff and equipment, can also increase the likelihood of system failure and stormwater damage to system elements, e.g., culverts, during flooding.

Table C-1*:* Town of Winfall - Departments with Direct Impact on Hazard Mitigation

Department/Agency	Function
Town Mayor	The mayor is responsible for carrying out the day-to-day administrative activities under the direction of the Town Council.
Town Clerk	The town clerk is responsible for giving proper notices of regular and special meetings of the governing board, keeping an accurate record of the council's proceedings. The town clerk is the custodian of all town records.
Volunteer Fire Department	The fire department is volunteer based and provides the community with fire fighting and suppression activities during emergencies, and also provides public education in fire safety.
Police Department	The police department ensures public safety and enforces State and local laws.
Town Attorney	The town attorney serves as legal advisor to the Town Council.
Public Utilities	This department is responsible for the daily operation of the Town's Water Supply System and the Wastewater Collection System, as well as ensuring that all Federal and State regulations are met. Duties also include directing and accomplishing all maintenance and repairs.
Roads and Grounds	This department is responsible for the daily maintenance and general upkeep for the Town roads, grounds, and facilities, as well as, directing and accomplishing all maintenance and repairs.

C. Existing Polices, Programs and Ordinances

The Town of Winfall 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 Council has created and appointed 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 land use 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 Winfall has used its legislated regulatory power to adopt and implement policies, programs, and ordinances that regulate land use and development. These policies and regulations help mitigate potential harmful effects of natural hazards.

Each Town 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 Town policies and ordinances include:

- CAMA Land Use Plan (workbook)
- Zoning Ordinance
- Flood Damage Prevention Ordinance
- Minimum Housing Standards
- Building Code Enforcement Ordinance (Perquimans County)
- Sewer Use Ordinance
- Water Use Ordinance

CAMA Land Use Plan (workbook)
The Town of Winfall adopted the present CAMA Land Use Plan in 2002 for the purpose of establishing long-range growth and development policies for the Town. The Town plans to participate in the upcoming update of the Perquimans County CAMA Plan. The new planning process will further define and refine community policies and issues, and will describe existing uses of land and future desired growth.

The 2002 CAMA Land Use Plan addresses the following guidelines:

- Statement of community concerns, aspirations and vision;
- Existing land use map;
- Land suitability analysis;
- Local growth and development policies addressing each Management Topic and applicable Areas of Environmental Concern; and
- Future land use map

Zoning Ordinance (see Map C-1)
The Town of Winfall adopted a Zoning Ordinance in December of 1986 with amendments in 1987. As of 2005, the plan is under review for additional amendments. The ordinance was established to "lessen the congestion in the streets; to secure safety from fire, panic, and other dangers; to promote health and the general welfare; to provide adequate light and air; to prevent the overcrowding 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 to provide for its orderly growth and development. The ordinance establishes four zoning districts that regulate the use of land (Table C-2).

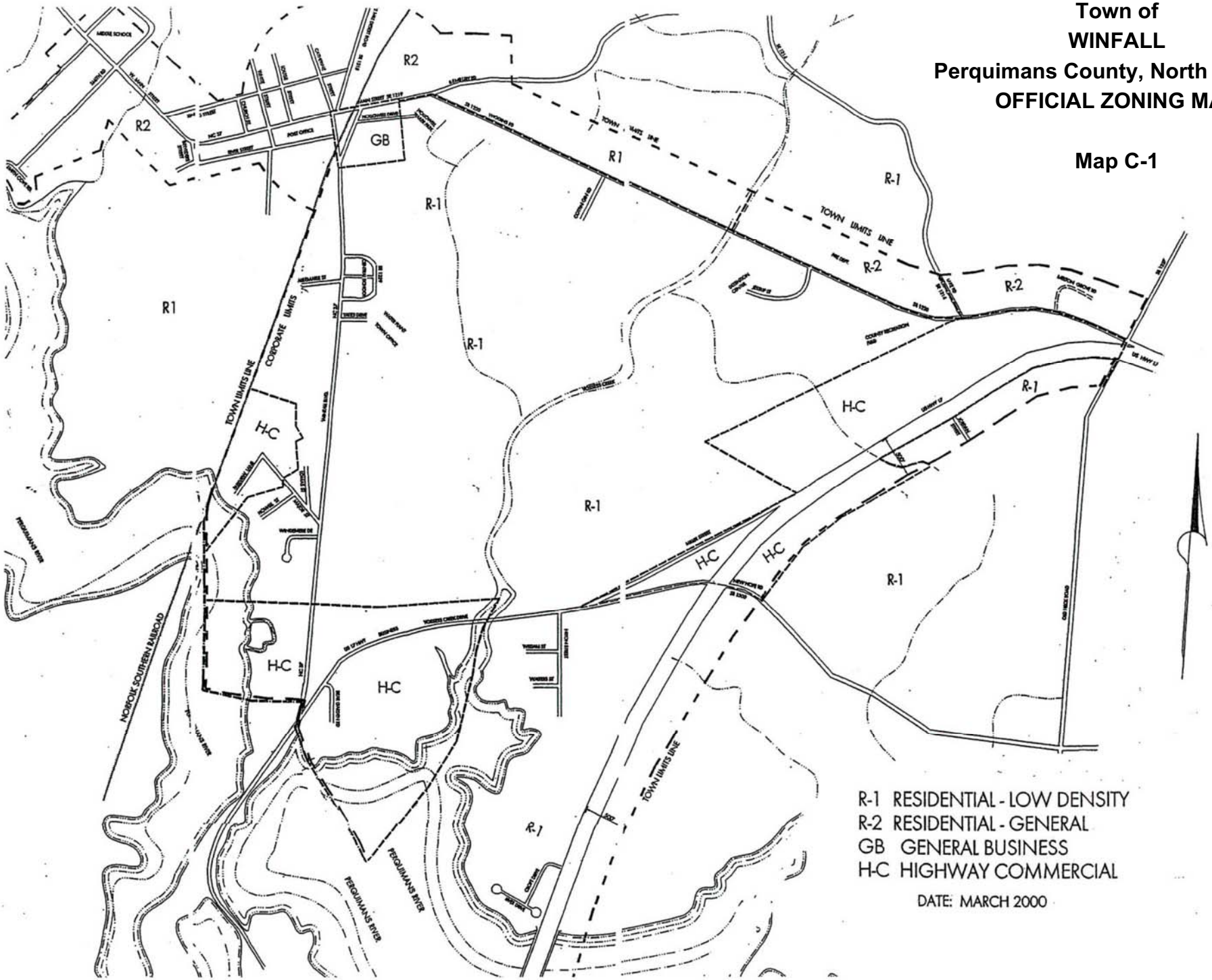
Table C-2: Town of Winfall Zoning Districts

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 in areas which are protected from more intensive uses. Each dwelling should be located on a lot with its own well and septic tank and population density shall be such that the provision of public water and sewer systems will not be required. This district requires a minimum lot size of 8,000 square feet.
R-2 General Residential District	The R-2 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 uses. This district requires a minimum lots size of 8,000 square feet.
GB General Business District	The GB district is intended to provide for centrally located commercial, trade, and services. Theses regulations are designed to encourage the continued use of the land for commercial purposes and to permit concentrated development while maintaining a substantial relationship between intensity of land use and the capacity of utilities and streets. This district requires a minimum lot size of 20,000 square feet.
HC Highway Commercial District	The HC District is intended to provide for and encourage the proper grouping and development of roadside uses which will best accommodate the needs of the motoring public. This district requires a minimum lot size of 20,000 square feet.

Source: Town of Winfall Zoning Ordinance.

Town of
WINFALL
Perquimans County, North Carolina
OFFICIAL ZONING MAP

Map C-1



Flood Damage Prevention Ordinance
The Town of Winfall adopted a Flood Damage Prevention Ordinance effective May 11, 1992. Through interlocal agreement, Perquimans County enforces the ordinance for the Town of Winfall.

Minimum Housing Standards
The Town of Winfall adopted Minimum Housing Standards in May 1994. The ordinance establishes minimum standards of fitness for the initial and continued occupancy of all buildings used for human habitation.

Building Code Enforcement Ordinance (1985)
In 1985, Perquimans County adopted the North Carolina Uniform Residential Building Code. 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.

Perquimans County enforces the ordinance within the unincorporated areas of the County and also has the authority to enforce the code within the corporate limits of any municipality that requests by resolution that the County do so. By interlocal agreement, Perquimans County enforces the building code within the Town of Winfall.

Sewer Use Ordinance
The Town of Winfall adopted a Sewer Use Ordinance in February of 1998. This ordinance applies to all users of the municipal wastewater system and was intended to provide for the regulation of direct and indirect contributors to the municipal wastewater system through the issuance of permits to certain non-domestic users and through the enforcement of general requirements for other users, authorizes monitoring and enforcing activities, requires user reporting and provides for the setting for fees for the equitable distribution of costs of the program. The objectives of this Ordinance include:

- To prevent the introduction of pollutants into the municipal wastewater system that will interfere with the operation of the system or contaminate the resulting sludge;
- To prevent the introduction of pollutants into the municipal wastewater system that will pass through the system, inadequately treated, into any waters of the State or otherwise be incompatible with the system;
- To promote reuse and recycling of industrial wastewater and sludge from the municipal system;
- To protect both municipal personnel who may be affected by sewage, sludge, and effluent in the course of their employment and the general public
- To provide for equitable distribution of the costs of operation, maintenance and improvement of the municipal wastewater system; and
- To ensure that the municipality complies with its NPDES or Non-discharge Permit conditions, sludge use and disposal requirements and any other Federal or State laws to which the municipal wastewater system is subject.

Water Use Ordinance
The Town of Winfall adopted a Water Use Ordinance in December of 1999. This Ordinance regulates the use of the municipal water system, as well as establishes standards for connections, maintenance, and the location of water meters.

Community Capability Assessment Summary

The overall assessment of Town of Winfall community capability to address hazard mitigation through existing policies and ordinances is summarized in Table C-3.

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 mayor will be responsible for providing a copy of the Hazard Mitigation Plan to each Town department and for ensuring each policy or program 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 town clerk is responsible for day-to-day implementation and enforcement of town ordinances. The mayor and town council are responsible for updating and amending community plans and ordinances and 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-3: Community Capability Assessment – Town of Winfall

Policies and Programs	Policy/Program Status	Effectiveness for Mitigation	Rationale for Effectiveness	Recommendations for Incorporating Hazard Mitigation into Existing Plans and Mechanisms
CAMA Land Use Plan (workbook)	Existing	Moderate	Establishes long-range growth and development policies.	With update of the Perquimans County CAMA Land Use Plan, the Town will consider strengthening the Plan to include regulations and restrictions for development in hazard prone areas. The Perquimans County Planning Department is the lead agency responsible for the Plan update.
Zoning Ordinance	Existing	Moderate	Establishes standards and regulations for land development.	Review the zoning ordinance and consider updates/revisions that will strengthen hazard mitigation efforts. The town clerk is responsible for ordinance enforcement and the mayor and town council are responsible for ordinance revisions.
Flood Damage Prevention Ordinance	Existing	High	Regulates building within floodplains by setting and enforcing standards for flood protection.	The Town will continue to review and enhance flood hazard control standards to reduce the exposure of the built environment and the population of the Town to the perils of natural hazards. The Perquimans County Building Inspections Department is responsible for ordinance enforcement.
Minimum Housing Standards	Existing	Moderate	Establishes minimum standards for habitable structures.	Continue to enforce minimum standards to ensure that public safety is maintained. The town clerk is responsible for code enforcement.
Building Code Enforcement Ordinance	Existing	High	Provides for enforcement of minimum building code standards as set by the State of North Carolina.	Continue to incorporate and enforce any revisions to State Building Code standards. The Perquimans County Building Inspections Department is responsible for code enforcement.
Sewer Use Ordinance	Existing	Moderate	Provides for the regulation of the municipal sewer system.	This ordinance should be reviewed and possibly amended to increase control over public sewer services in flood hazard areas. The town clerk is responsible for ordinance enforcement and the mayor and town council are responsible for ordinance revisions.
Water Use Ordinance	Existing	Moderate	Establishes usage and connection standards for access to the municipal water system	This ordinance should be reviewed and possibly amended to increase control over public water services in flood hazard areas. The town clerk is responsible for ordinance enforcement and the mayor and town council are responsible for ordinance revisions.

Source: Town of Winfall.

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. The Town of Winfall has made limited use of these powers.

Regulation (General Police Power)

Local governments in North Carolina have been granted broad regulatory powers. 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), towns, cities and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard (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)). To date, the Town of Winfall has not used general police powers to enact any specific hazard mitigation strategies.

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 143-338(c)). However, municipalities and counties may adopt codes for their respective areas if approved by the state as providing "adequate minimum standards" (NCGS 143-338(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.

Town of Winfall

By interlocal agreement, Perquimans County enforces the building code within the Town of Winfall.

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. All these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, 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 160A-3 87). 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 (NCGS 160A-361).

The importance of the planning powers of local governments is emphasized in NCGS 160A-383, 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.

The Town of Winfall has a Planning Board that conducts studies, makes policy recommendations, develops ordinances, and makes zoning amendment and petition recommendations to the Town Council.

Town of Winfall

The Town of Winfall has a CAMA Land Use Plan (workbook) that sets guidelines for the future development within the Town. At the next update, the scope of the plan will be expanded to 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.

Town of Winfall

The Town of Winfall zoning ordinance establishes districts and development standards. The current ordinance could be updated to more fully address development standards that would reduce community vulnerability to natural hazards, especially vulnerability to flooding.

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)).

Town of Winfall

The Town of Winfall currently has not adopted subdivision regulations; however, such regulations are under consideration pending completion of zoning ordinance amendments.

Floodplain Regulation

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 143-314.51-214.61). 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 143-315.54).

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. 143-315.54(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.

Town of Winfall

The Town of Winfall has a flood damage prevention ordinance that is, by interlocal agreement, enforced by Perquimans County.

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 is to acquire the property (either in fee simple or a lesser interest, such as an easement). Public acquisition removes the property from the private market and eliminates or reduces the possibility of inappropriate development. North Carolina legislation empowers cities 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 Winfall has not used local police power to acquire land for hazard mitigation purposes. Taking of private property for public purposes can be both extensive and controversial as landowners are often uncooperative. Funds for acquisition would have to come from local revenues, which are almost always limited, or from federal or state grants.

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, and floodplains) to discourage development in hazardous areas.

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 city or county boundaries. In addition, they are useful in distributing to new property owners the costs of the infrastructure required by new development. The Town of Winfall uses general revenues from primarily local property taxes and sales tax refunds for annual operating funds.

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 city 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 public costs associated with degradation of the environment and damages to properties caused by natural hazards. The Town of Winfall has not designated capital improvement funds specifically for hazard mitigation activities.

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. Appendix D lists state and federal sources for information and funding of hazard mitigation initiatives. The NC Emergency Management website at http://www.ncem.org/Mitigation/additional_funding.htm includes a more exhaustive list of over 300 state and federal funding sources.

In North Carolina, property taxes provide the primary source of revenue for municipalities. These taxes are typically used primarily to finance services that must be available and delivered on a daily basis, such as police and fire emergency services, solid waste collection and disposal, street maintenance, etc. and, 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 2005 NC Department of Commerce ranking places Perquimans County in Tier 1.

F. Technical Capability – Staff Resources

Effective hazard mitigation initiatives depend largely on a community's technical capability. Many smaller governments in North Carolina have only limited technical capabilities due to size and budget restrictions and must depend on larger government units for technical assistance. However, the most valuable technological resource is the wealth of knowledge accumulated by the various staff members through their years of experience. The Town of Winfall depends largely on the assistance of Perquimans County which provide assistance with planning, building inspections and code compliance, information management, emergency services, and geographic information systems mapping of hazard areas (primarily floodplains). Together these technical capabilities help build a more resilient community by better planning before the occurrence of a natural hazard, as well as by better response during the event and during the recovery period.

G. Political Climate

The mayor and town council of the Town of Winfall are in agreement that implementation of the Hazard Mitigation Plan will help minimize damages caused by natural hazards. The Town Council intends to vigorously support hazard mitigation efforts while acknowledging the limited resources both monetarily and physically at the Town's disposal. The Town Council strives in their efforts to make the Town of Winfall a safer community, and sees implementation of the Hazard Mitigation Plan as a means to help achieve that goal.