

## Introduction

The City of Rocky Mount undertook development of the first *Hazard Mitigation Plan* in 2001 because of increasing awareness that natural and man-made hazards may affect many people in the area. In addition, the Plan was a requirement associated with the receipt of federal Hazard Mitigation Grant Program funds and state funds administered by the North Carolina Division of Emergency Management. The funds support the City's extensive Floodplain Buyout Program that was prompted by widespread damage left in the wake of Hurricane Floyd. Since the original plan's adoption, changing conditions, including new state and federal requirements, floodplain property acquisition, and achievement of many of the original goals, prompted a revisit of the 2001 plan. This document will build on the success and achievements of the original plan and continue to chart a course for continued improvements in the City's hazard mitigation policies and practices.

## Authority

On February 12, 2001, The City Council adopted "A Resolution Establishing a Process to Develop a Hazard Mitigation Plan." The resolution recognizes that:

Natural hazards pose a continual threat to public health and safety and could result in significant property damage;

A Hazard Mitigation Plan is required by several grant agreements; and

The planning process encouraged by the State of North Carolina and the Federal Emergency Management Agency offers the opportunity to consider hazards and identify mitigation actions to reduce future risk.

The Department of Planning & Development is charged with coordinating with other appropriate departments and agencies to facilitate the plan in conformance with state and federal guidelines.

## Planning Committee Membership

The following departments and offices of the City are members of the Mitigation Planning Committee:

Planning & Development	Public Works
Public Information	Utilities
Water Resources	Budget
Engineering	Fire
Police	Hazard Mitigation Team

The following agencies were notified, invited to participate, and asked to review and comment on the 2001 *Hazard Mitigation Plan*:

North Carolina Department of Emergency Management

Federal Emergency Management Agency – Region IV

U.S. Army Corps of Engineers – Wilmington District

Natural Resources Conservation Service – State Conservationist

Agencies included in invitations for this plan update included neighboring jurisdictions, both municipal and county, local community colleges, local utility providers, the North Carolina Department of Transportation, and various non-profits including the Red Cross.

### Acknowledgments

The City of Rocky Mount appreciates the advice and encouragement of the North Carolina Emergency Management Division.

The 2001 Plan was facilitated by RCQuinn Consulting, Inc., Annapolis, MD ([www.rcquinnconsulting.com](http://www.rcquinnconsulting.com)). This update was done as part of the Edgecombe County Multi-jurisdictional Plan by the Upper Coastal Plain Council of Governments' Planning and Development Services Department ([www.ucpcog.org/pds](http://www.ucpcog.org/pds)).

# 1. INTRODUCTION TO HAZARD MITIGATION PLANNING

Since the beginning of recorded history, the built environment and the natural environment had a less-than-harmonious relationship. Volcanoes, floods, and other perceived disasters are recorded since the advent of civilization. These events are a perfectly natural and inevitable phenomenon, so why are they called “disasters?”

The natural environment adapts to the conditions that exist, such as pines whose seeds only germinate after being exposed to fire. The human environment with its buildings, crops, and relatively short view of time do not always reconcile with their environment over the long term. When hurricanes, tornadoes, floods, and winter storms occur where there are no people, they are not “disasters.” It is not until these events intersect with our homes and businesses, our crops and livestock that they become disasters.

## 1.1. The July 2001 City of Rocky Mount Hazard Mitigation Plan

The City of Rocky Mount went through an exhaustive hazard mitigation planning process in the aftermath of Hurricane Floyd. City Council adopted the plan in July 2001. References from the 2001 plan included in this update are italicized throughout this document.

This plan update seeks to build on the good work that was done in that plan and expand specific facets of the plan to address new state and federal requirements. More attention was given in this plan to documenting the involvement of the public, neighboring jurisdictions and institutions, and other private and non-profit stakeholders. More attention was also given to hazard ranking, and the scope of mitigation measures and goals is expanded to include hazards beyond flooding and flooding-related hazard types. The other key area to update was to add additional descriptions of how various goals will be implemented in terms of funding and staffing, and how the plan will be monitored and updated.

## 1.2. What is Hazard Mitigation?

Hazard mitigation planning seeks to reduce the instances where the worlds of violent natural phenomenon and the human environment intersect. By reducing the risk of personal injury and property damage, a community can lessen the effects of a “disaster” when one of these events crosses paths with people.

## 1.3. Purpose of the Plan

Planning is the cornerstone to successful hazard mitigation efforts. Citizens, local government, and private interests with proactive policies can reduce the man-made environment in harms way. Benefits realized by implementing hazard mitigation measures include:

- Saving lives by removing people from hazard prone situations
- Limiting property damage by regulating development in hazard areas
- Saving money for taxpayers by reducing the need for services during a disaster
- Speeding disaster recovery and post-disaster relief funds
- Demonstrating a strong commitment to the health and safety of the community.

Relocating people, institutions, and businesses from hazard prone areas saves property and lives. Removal of the structures means that there is less to pay for disaster recovery or for services during an event. Post-event, recovery crews will have less to do because there will be less damage. This speeds the recovery process.

Both state and federal governments made the development of a hazard mitigation plan a requirement for any local government requesting mitigation grant funding.

#### 1.4. Scope of the Plan

This plan assesses the likelihood of all natural hazards possible in the City of Rocky Mount and its Extra-Territorial Jurisdiction (ETJ). It addresses mitigation measures for those hazards that pose a “high” or “moderate” risk where mitigation measures are possible and easily identifiable. In most of Rocky Mount this will be flood risk. Other hazards, including man-made hazards are considered but not fully addressed within this plan. Man-made hazards must be tied to some natural phenomenon to be considered, such as a dam; otherwise HAZMIT sites such as chemical manufacturing or petroleum distribution were noted during the critical facilities and vulnerability analysis only if they were also in a hazard area.

The geographic area covered for vulnerability and critical facilities includes the incorporated areas of the City and any City owned or maintained facilities outside of the City Limits.

#### 1.5. Authority

This Edgecombe County Multi Jurisdictional Hazard Mitigation plan was adopted by the City of Rocky Mount under the authority and police powers granted to municipalities in the North Carolina General Statutes (NCGS), Chapter 160A, Article 8.

This plan was developed in accordance with current rules and regulations governing local hazard mitigation plans. The plan shall be routinely revisited to insure compliance with the following laws:

NCGS Chapter 166A: North Carolina Emergency Management Act as amended by Senate Bill 300: An Act to Amend the Laws Regarding Emergency Management as Recommended by the Legislative Disaster Response and Recovery Commission (2001) and the Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390, October 30, 2000).

#### 1.6. Participants in the Planning Process

The City of Rocky Mount participated in the county-wide, multi-jurisdictional hazard mitigation planning process. In this process, there are three forms of participation: the advisory committee for the County, their counterparts from each municipality, and the public. The City undertook a broad, inclusive hazard mitigation planning initiative in the wake of Hurricane Floyd; this plan builds on the 2001 Plan by incorporating new requirements and expanding how this plan compliments other plans that affect the City. The members of the City’s Advisory Committee in 2001 included representatives from a number of City Departments known as the Emergency Management Coordinating Committee (EMCC). This Committee worked on City-specific appendix to this plan with sessions at the City in 2001, and included the following departments:

- Planning and Development
- Public Information
- Water Resources
- Engineering
- Police
- Public Works
- Utilities

- Budget
- Fire
- Hazard Mitigation

In 2004, the City participated in the multi-jurisdictional process with Edgecombe County and 8 other municipalities. The county-wide Committee had representation from each of the jurisdictions, and a representative from the Planning Department acting as the representative and liaison for the City. The EMCC also met at the City separately to revisit the 2001 Plan, review hazard rankings, and add new goals and policies.

### 1.7. Description of Planning Process and Citizen Participation

There are six steps in the overall planning process; the first three phases involve background research that becomes the foundation for defining a strategy to diminish the damage done when a hazard strikes. The last three steps involve drawing conclusions from your research and planning and implementing improvements for the future.

The first step, hazard identification and analysis, looks at past events in Edgecombe and Nash Counties. These historic occurrences help determine the risk posed by a particular kind of threat based on frequency, magnitude, and impact on the community. The first meeting of the Advisory Committee meeting was the forum to go over what happened in the past and use Worksheet 1 (See end of Chapter 3) to determine risk. The City EMCC also reviewed the risks in a separate meeting on August 30, 2004 and made one adjustment to the Dams/Levees category.

The second step identifies specific facilities or neighborhoods that are in risk-prone areas. This “vulnerability assessment” is done through the use of geographic data and geographic information systems to graphically show where these risk areas are. It will also assess demographics and development trends that may exacerbate a particular hazard. These maps were presented to the Advisory Committee for each municipality in the multi-jurisdictional plan then reviewed and final critical facilities that were vulnerable were identified.

The third and final part of the background research is the capabilities assessment, which reviews the ability of emergency services providers and local governments to respond to disaster. The capabilities reviewed in this plan include staffing, organizational capacity, fiscal and technical capability, policies and programs, and the legal and political environment.

Other plans and studies were also reviewed for applicability to hazard mitigation potential, notably the City’s 2001 Comprehensive Plan (more in §5.7.1.4), and the Region L Comprehensive Economic Development Strategy (CEDS) for future growth and employment trends. The City also adopted a Hazard Mitigation Plan in 2001 that was used to craft the new plan. The City houses the Rocky Mount Metropolitan Planning Organization, and this plan was reviewed with impacts from the State Department of Transportation’s Thoroughfare Improvement Program, or TIP which programs all large road projects and more notably for hazard mitigation, bridge repair and replacement outside the City Limits and state-maintained roads within the City. The City’s Capital Improvement Program (CIP) for 2005-2009 and Emergency Response Plan were also used where applicable. The City also has a draft document, the Tar River Dam Emergency Action Plan that should be implemented by the adoption date of this Plan.

Ultimately, this capability assessment will identify any gaps, conflicts, or shortcomings in local programs that might hamper mitigation efforts; it will also note successful efforts already in the community that can be built upon to establish a successful hazard mitigation program.

Once the background studies are done, the staff of the planning agency assisted the County and the respective municipalities with analysis of the background data, the 4<sup>th</sup> step. Paul E. Black, AICP, GISP, Chris Lukasina, and Dennis Patton of the Upper Coastal Plain Council of Governments reviewed the data gathered and helped the County, City, and Towns develop Community Goals Statements, the 5<sup>th</sup> step. These become the guiding principals for the final step, the Hazard Mitigation Strategy. The strategy becomes the action phase of the plan, with both general and specific measures to implement.

A process for prioritization of identified hazard mitigation strategies was performed. The Emergency Management Coordinating Committee, which is designated as the advisory committee, used the following criteria for prioritization of hazard mitigation strategies:

- 1) cost-benefit review
- 2) results of Hazard Identification and Analysis
- 3) results of Vulnerability Assessment
- 4) results of Community Capability Assessment
- 5) effectiveness in meeting hazard mitigation goals and comprehensive plan goals

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. Given the tight budgets of recent years, most goals are based in existing programs or will be dependent on grants or other outside funds.

The public and other appropriate agencies such as neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties that could be identified were invited by letter to attend Advisory Committee Meetings. The public was notified through newspaper advertising for a public kickoff meeting in April and Committee approval and public review of the preliminary draft plan on 1 September 2004 just prior to submittal to the State.

The City formalized a process by which the requirements of this hazard mitigation plan will be incorporated into other local plans. During the planning process for new and/or updates to existing plans, the planning department will make copies of the current hazard mitigation plan available to decision makers and the public either in paper copy or using the internet. Decision makers will also be briefed on the goals of the hazard mitigation plan and how hazard mitigation can be incorporated into their decision making process.

The City has created a process by which the requirements of this hazard mitigation plan will be incorporated into other local plans. During the planning process for new and updated local planning documents, such as the comprehensive plan, capital improvements plan, or emergency management plan, to name a few examples, the Planning Department will provide a copy of the hazard mitigation plan to each respective advisory committee member. The Planning Department will also educate advisory committee members to ensure that all goals and strategies of new and updated local planning documents are consistent with the hazard mitigation plan and will not contribute to increased hazards in the jurisdiction.

## 2. COMMUNITY PROFILE

### 2.1. History

Rocky Mount was incorporated in 1867 and became a city in 1907. The Fall Line described in section 2.4 below and the Tar River were the impetus for what would become a city of over 50,000 people in 2000. Named for a granite outcropping on the north side of the falls on the Tar River, a Post Office opened in 1816, and a cotton mill was built in 1818 to take advantage of the falling water to turn its machinery. When the railroad came in 1840, businesses that were not dependent on water power migrated east from the falls. In the late 19<sup>th</sup> Century, a tobacco market and the railroad were the major economic players in the town. In 1874, the fledgling town became a relay station for the Wilmington and Weldon railroad, and this led to a significant population increase. In the early 20<sup>th</sup> Century, the town became a city, and there was continued growth and expansion until the 1940s, when the double blow of agricultural mechanization and the decline of the railroads took a toll on the City. Highways would replace rail, and manufacturing would become the major employment type as the City moved back toward its mill town roots. The opening of Interstate 95 in 1978 just west of the City capped a rebound from those initial losses of the postwar years. The current national decline in domestic manufacturing jobs, particularly textiles hit the region hard in the late 1980 and early 1990s. Continued diversification and education of the labor force continue to be a top priority in the region.

### 2.2. General Geography and Location

The corporate limits of the City of Rocky Mount fall on both sides of the Nash-Edgecombe county line in northeastern North Carolina. The city is bisected north-south by US 301 and the CSX Railroad. The Tar River flows through the middle of the City from the southwest to the east, and several tributaries to the Tar River drain through the area. Interstate 95 passes just west of the downtown, and the City has grown to the west so that is now on both sides of the interstate. U.S Highway 64 runs from east to west through the City just north of downtown and intersects Interstate 95. The City is located about 50 miles northeast of Raleigh and encompassed 35.57 square miles in 2001.

### 2.3. Climate

Rocky Mount, like the rest of Nash and Edgecombe Counties is hot and generally humid in summer because of the moist maritime air that is carried by the Gulf Stream just off the coast of North Carolina. Winter is moderately cold but of short duration due to latitude and low elevation. The average winter temperature is 42° F (6° C) with an average winter low right at the freezing mark (0°C). In summer the average temperature is 78°F (26°C) with an average maximum temperature of 89° Fahrenheit (32°C). Average rainfall is 46 inches annually, and it is evenly distributed across the seasons. Average annual snowfall is 6 inches, and the greatest snow depth at any one time during the period of record was 13 inches (all averages based on Edgecombe County for the sake of the multi-jurisdictional Edgecombe Plan).

## 2.4. Geology

The City lies astride the break between Piedmont and the Coastal Plain. This break is known colloquially as the “Fall Line” or “Fall Zone.” The Fall Zone was an old shore line during the Pliocene about three million years ago. The old shoreline is about 300 feet above present sea level. East of the Fall Line there are flat, sandy soils left by the retreating ocean. The majority of the County (82%) is relatively flat, with about 1% steep slopes adjacent to drainageways, and the remainder between the flat and the steep characterized by gentle slopes down toward the drainageways.

## 2.5. Soils

The soils of Edgecombe County mimic the underlying physiography, with relatively flat, hydric soils in the eastern Coastal Plain area. Nash County is in a more transitional zone between the Coastal Plain and the Piedmont. There are many soil types in Nash County owing to the differences in relief. These soils range from the residual clays of the Piedmont plateau through the friable fine sandy loams of the higher coastal plain to the somewhat heavier soils of the poorly drained lower coastal plain. The principal agricultural soils are Cecil fine sandy clay loam, Bradley sandy loam, Chesterfield sandy loam, Norfolk sandy loam, and Norfolk fine sandy loam.

## 2.6. Water Resources

### 2.6.1. Surface Waters

The City is in the Tar-Pamlico river basin, and the Tar River runs through the heart of the City. Upstream from Tarboro, it drains 2,183 square miles, and upstream from Greenville it drains 2,620 square miles. The river in Nash and Edgecombe Counties is generally a slow-moving, flat waterway.

### 2.6.2. Public Water and Sewer

The City of Rocky Mount draws its water from two intakes: one at the Tar River reservoir at the Tar River Water Treatment Plant, and the second at the Sunset Avenue Water Treatment Plant. The Tar River facility has a maximum treatment capacity of 12 MGD and Sunset Avenue has a capacity of 18 MGD. The average daily demand is around 14 MGD. There are roughly 300 miles of water mains, over 20,000 meters, and 7 elevated water tanks.

The City’s Wastewater Treatment Plant (WWTP) is located off NC Route 97 northeast of the City. It is permitted for 21 MGD with an average daily demand of around 15 MGD and more than 20,000 connections.

During Hurricane Floyd, the WWTP flooded for 5 days. Two sewer lines were washed away by rushing high water, one at Stony Creek near Nash General Hospital and one on US Highway 301 at Independence Boulevard. Out of 42 sewer pump stations, all lost power for at least one day; most were back on within 3 days. Fifteen of the stations were also under water during the peak flood.

## 2.7. Natural Resources

Commercial forests cover nearly 150,000 acres (46%) of Edgecombe County based on 1990 data. Dominant species of trees include loblolly pine, oak, sweetgum, cypress, and hickory. Nash County is just over 50% forested, with the bulk of the ownership in private hands.

The sandy, flat soil is ideal agricultural land, and the area is known as a tobacco and soybean growing region, though cotton is quickly replacing tobacco. Livestock operations including large hog farms have also emerged in the past decade as a major part of the agricultural sector.

## 2.8. Recreation

The Tar River and major tributaries are slated to have several paddle trails developed in the near future with 5 boat ramps in current plans. There are two State-owned fishing access areas downstream from Tarboro, and the County has a recreation department. There are no state parks or game lands in Edgecombe County.

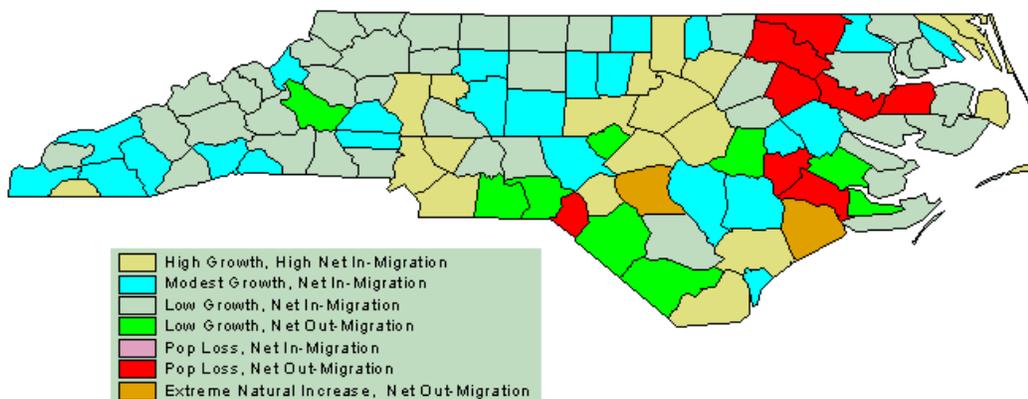
The City of Rocky Mount has a significant parks and greenway system.

## 2.9. Population

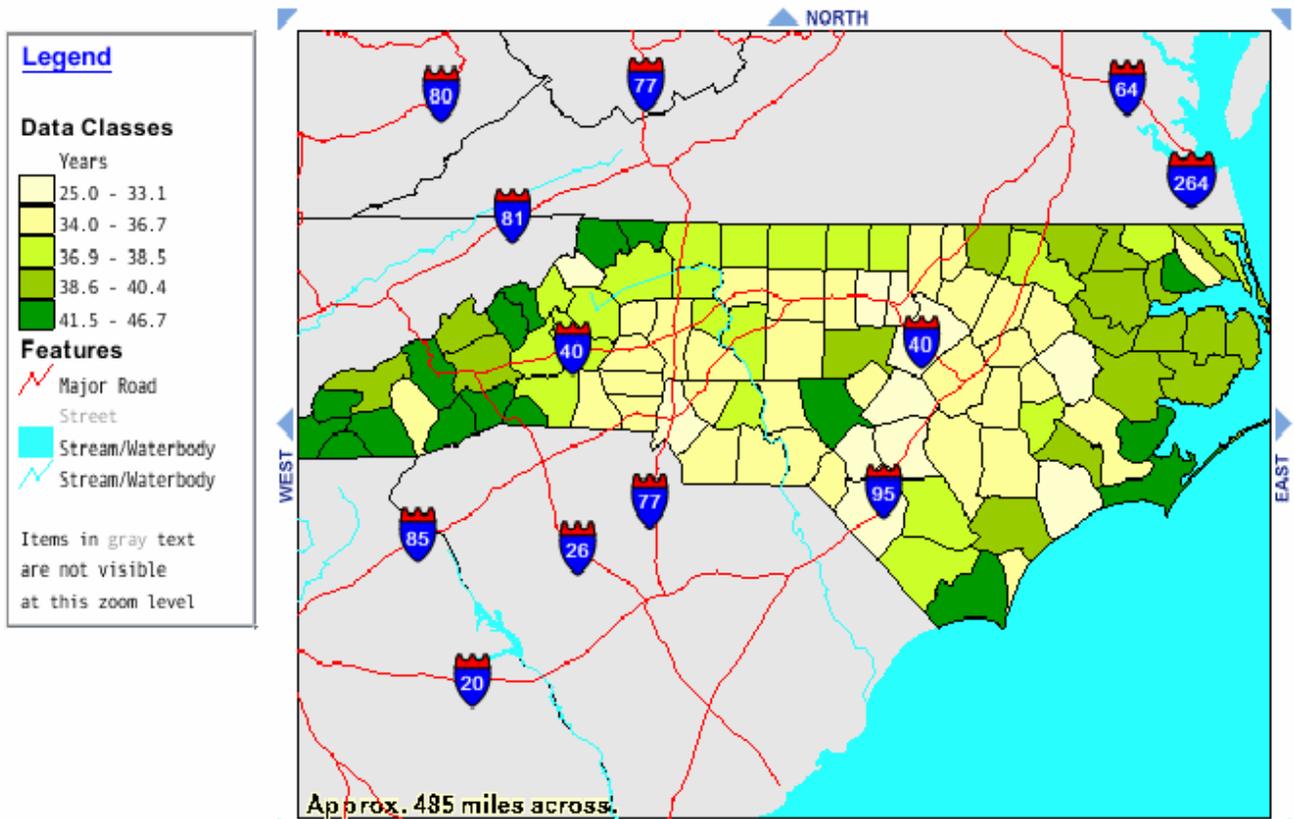
The 2000 Census lists the population of Edgecombe County at 55,606. According to the Office of State Planning, the County population decreased at a marginal rate between 2000 and 2002. State estimates show a decrease of a little over 1000 persons during the ten-year period between the 1990 and 2000 Census, or just under -1% which is relatively stable. However, with the State's overall growth average around 3.4%, Edgecombe County lags 4.4% behind the state average.

The City of Rocky Mount's 2000 Census population is 55,893, reflecting over 14% growth since 1990. During this same time, Nash County experienced nearly 15% growth in population while Edgecombe County lost about 2% of its residents (US Census Bureau). The 2000 Census is believed to have undercounted the City population, because of the hundreds of households displaced at the time of the Census due to Hurricane Floyd damages.

Figure 1: POPULATION GROWTH 2000 TO 2002 (Source: OSP).



The population is consistent with state averages with a lean toward youth in terms of age with nearly 30% of the population under 19 years of age. Another 42 % are younger than 49. The median age is 36.2 compared to the State median of 35.3. On a county by county basis, Edgecombe and Nash appear weighted to the young. This is particularly evident once coastal and mountain counties with large retiree populations are factored in.



### 3. NATURAL HAZARD IDENTIFICATION AND ANALYSIS

Identifying past occurrences of natural hazards affecting the community is the first concrete step in mitigating their effects should they occur again. This section of the plan will identify what events affected Edgecombe County as a whole, with additional information for the City of Rocky Mount and Nash County where applicable. There are also breakouts for the localized areas within the City or City’s planning jurisdiction for localized phenomena if appropriate.

There are five facets to consider when looking at past events, according to the North Carolina Division of Emergency Management. These are:

The *types of natural hazards* that occurred in Edgecombe County and the City of Rocky Mount,

The *likelihood of occurrence* of each of the hazard types,

The *locations* of past events,

The *strength* or intensity of the hazards, and

The *impacts* of the hazard events on the area.

The City’s 2001 Plan notes that:

*“There is no definitive record of all losses – public and private – due to disasters. For the United States as a whole, estimates of the total public and private costs of natural hazards range from \$2 to over \$4 billion per year. Most of those costs can only be estimated.*

**Table 1: Federal Disasters Declared in Nash and Edgecombe Counties (1965-August 2004).**

Date	County Declared	Nature of Event
February, 1968 (DR 234)	Edgecombe & Nash	Severe Ice Storm
March 1984 (DR 699)	Nash	Severe Storms & Tornadoes
December 1988 (DR 818)	Nash	Severe Storms & Tornadoes
January 1996 (DR 1087)	Edgecombe & Nash	Blizzard of 1996
September 1996 (DR 1134)	Edgecombe & Nash	Hurricane Fran (flooding)
March 1998 (DR 1211)	Edgecombe & Nash	Severe Storms, Tornadoes & Flooding
September 1999 (DR 1292)	Edgecombe & Nash	Hurricane Floyd (flooding)
January 2000 (DR 1312)	Edgecombe & Nash	Winter Storm
December 2002 (DR 1448)	Edgecombe & Nash	Severe Ice Storm
September 2003 (DR 1490)	Edgecombe & Nash	Hurricane Isabel

*The Federal Emergency Management Agency’s total costs for flooding and hurricanes in the State of North Carolina exceeded \$580 million for the period of 1989 through 1998, which included Hurricanes Hugo, Emily, Bertha, Fran and Bonnie. These costs, which do not include many costs incurred by other federal agencies, include:*

Public assistance for debris removal, emergency works, roads and bridges, flood control facilities, public buildings and equipment, public utilities, and parks and recreational facilities exceeded \$298 million.

Assistance paid out for individual and family grants, emergency food and shelter, and other assistance to individuals totaled nearly \$71 million.

Funds set aside to support hazard mitigation grants exceeded \$31 million.

FEMA reimbursed other federal agencies for nearly \$151 million.

FEMA's own administrative costs, including personnel and contractors, totaled just over \$28 million.

*FEMA organizes damage and disaster-related costs into categories of work. In the majority of major disasters declared, the federal government reimburses 75% of the costs of cleanup and recovery, with the remaining 25% covered by the State and affected local jurisdictions."*

The 2001 Plan also addressed man-made hazards in the form of Hazardous Materials. Though possible HAZMAT sites were identified in the Critical Facilities portion of this Plan, they are only addressed beyond that if they are also in a flood or steep slope hazard area. It should be noted that the 2001 Plan said:

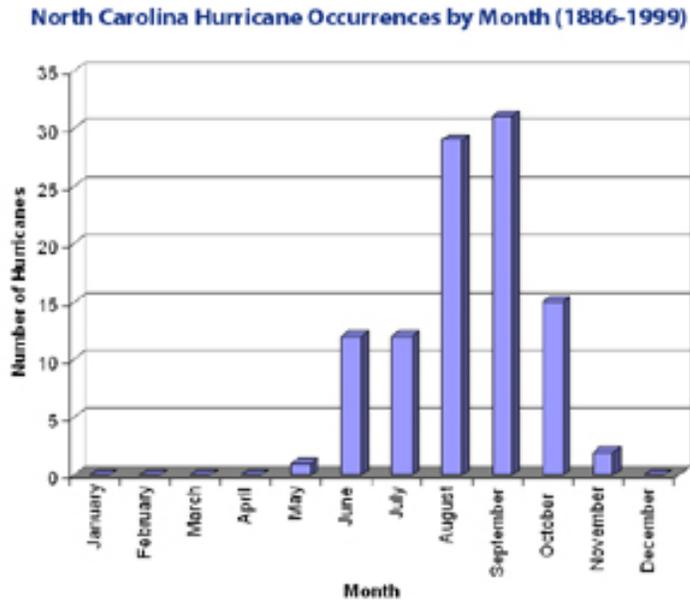
***"Hazardous Materials Incident History***

Incidents involving hazardous materials may occur at fixed facilities such as industrial plants and waste handlers, or during transport along highways and rail lines, and usually are not associated or triggered by a natural hazard event. With highways and rail lines crossing the City and surrounding area, the likelihood of transportation incidents is high. For the year 2000, Edgecombe County Emergency Management reported responding to 12 spills. Nash County Emergency Management responded to 18 spills in 2000 and the first half of 2001. Most involved gasoline and oil by-products."

### 3.1. Hurricanes/Tropical Storms

Hurricanes and tropical storms are low-pressure storm systems that originate over the warm waters of the tropics. As these storms move from their warm water birthplace into the mid-latitudes they pose a problem for North Carolina. When they come ashore and cross paths with our man-made environment, the results can be devastating to the lives and livelihoods of thousands of people.

Though they occur in all of the world’s tropical oceans, North Carolina is only affected by Atlantic basin hurricanes, which include those originating in the Caribbean Sea and the Gulf of Mexico. They can form from June to November, with storm probability peaking in early to mid-September.



The vectors of destruction include very high, sustained winds, heavy precipitation, and tornadoes. Coastal areas and inland areas with significant estuaries can also experience high surf, storm surge, and tidal flooding.

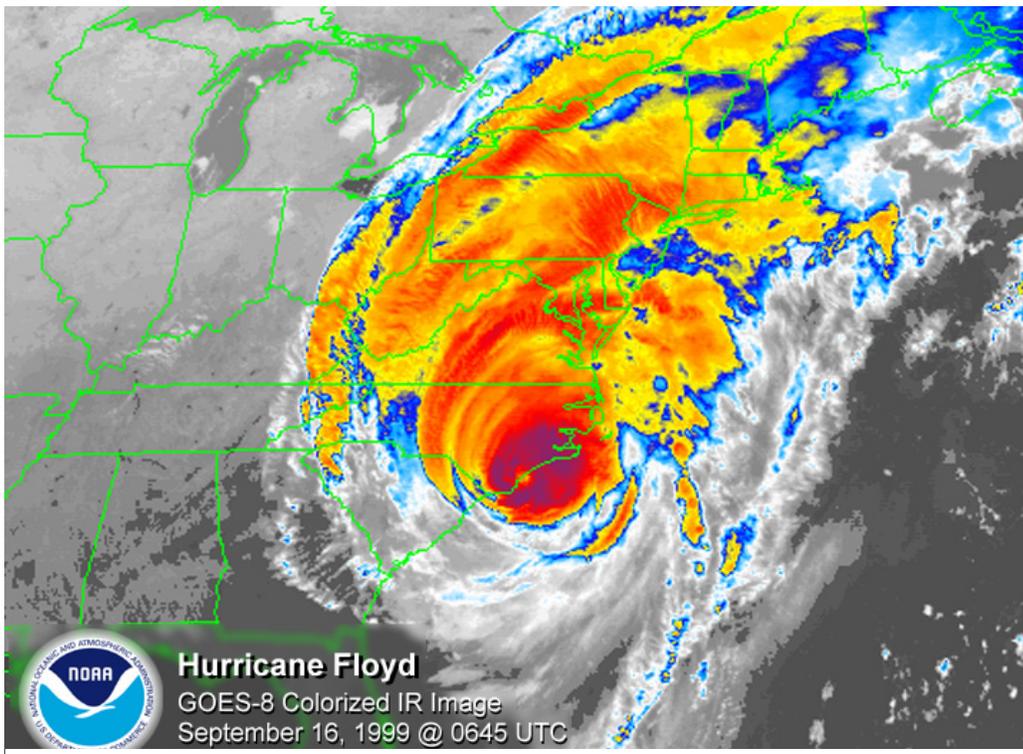
When the sustained wind speeds of one of these tropical low pressure systems reach 39 miles per hour, it becomes an official tropical storm and is given a name determined by the World Meteorological Organization. When the sustained winds reach 74 miles per hour, it becomes a hurricane. There are degrees of intensity based on maximum sustained winds, and these fall into 5 categories on the Saffir-Simpson Scale.

Figure 2: North Carolina Hurricanes by Month: *Source: State Climate Office of North Carolina*

Table 2: The Saffir-Simpson Scale.

Category	<a href="#">Barometric Pressure</a>	Wind Speed	<a href="#">Storm Surge</a>	Damage Potential
1 weak	28.94" or more 980.2mb or more	65 - 82kt 75 - 95mph	4 - 5ft 1.2 - 1.5m	Minimal damage to vegetation
2 moderate	28.50" - 28.93" 965.12 - 979.68mb	83 - 95kt 96 - 110mph	6 - 8ft 1.8 - 2.4m	Moderate damage to houses
3 strong	27.91"-28.49" 945.14 - 964.78mb	96 - 113kt 111 - 130mph	9 - 12ft 2.7 - 3.7m	Extensive damage to small buildings
4 very strong	27.17"-27.90" 920.08 - 944.80mb	114 - 135kt 131 - 155mph	13 - 18ft 3.9 - 5.5m	Extreme structural damage
5 devastating	< 27.17" < 920.08mb	> 135kt > 155mph	> 18ft > 5.5m	Catastrophic building failures possible

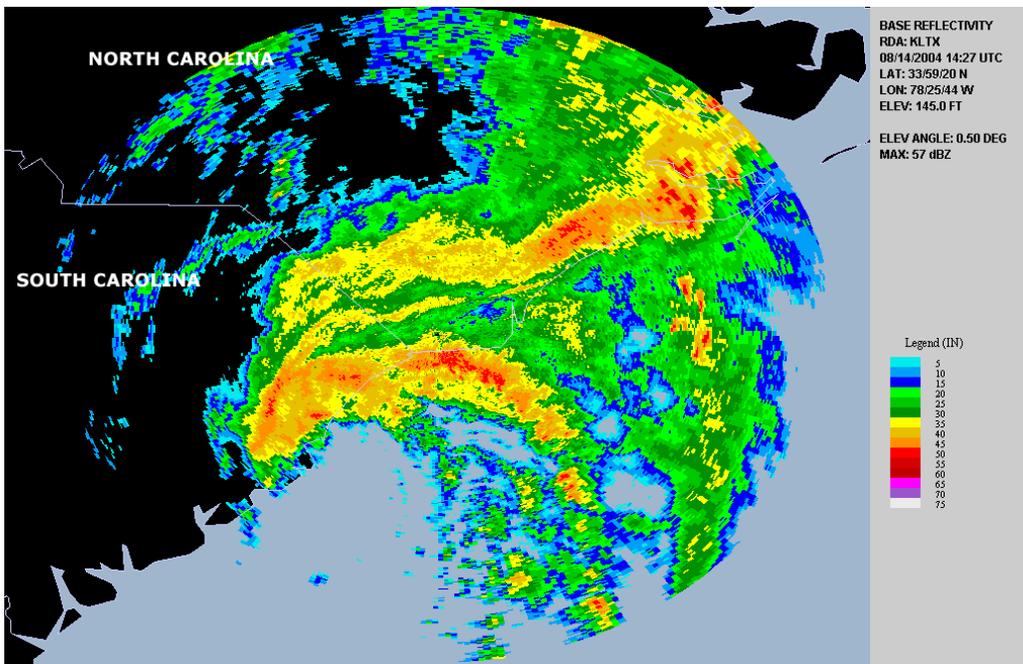
*Source: State Climate Office of North Carolina.*



North Carolina's protruding coastline puts it in the path of many Atlantic storms. Since 1900, it is behind only Texas, Florida, and Louisiana in landfalling hurricanes.

If tropical storms are also included, the number is much higher. Since reliable classification of storms began in 1886 through 1999, nine hundred and fifty-one tropical cyclones were recorded in the Atlantic Ocean and Gulf of Mexico.

Figure 3: Hurricane Floyd Satellite Image.



Thirty-eight tropical cyclones made direct landfall in North Carolina. Of these, 10 were tropical storms, 22 were minor hurricanes, and 6 were major hurricanes. (Source: State Climate Office of North Carolina)

Figure 4: Hurricane Charley.

Table 3: Hurricane Strikes by State.

AREA	Category Number					ALL 1,2,3,4,5	MAJOR 3,4,5
	1	2	3	4	5		
U.S. (Texas to Maine)	58	36	47	15	2	158	64
Texas	12	9	9	6	0	36	15
(North)	7	3	3	4	0	17	7
(Central)	2	2	1	1	0	6	2
(South)	3	4	5	1	0	13	6
Louisiana	8	5	8	3	1	25	12
Mississippi	1	1	5	0	1	8	6
Alabama	4	1	5	0	0	10	5
Florida	17	16	17	6	1	57	24
(Northwest)	9	8	7	0	0	24	7
(Northeast)	2	7	0	0	0	9	0
(Southwest)	6	3	6	2	1	18	9
(Southeast)	5	10	7	4	0	26	11
Georgia	1	4	0	0	0	5	0
South Carolina	6	4	2	2	0	14	4
North Carolina	10	4	10	1*	0	25	11
Virginia	2	1	1*	0	0	4	1*
Maryland	0	1*	0	0	0	1*	0
Delaware	0	0	0	0	0	0	0
New Jersey	1*	0	0	0	0	1*	0
New York	3	1*	5*	0	0	9	5*
Connecticut	2	3*	3*	0	0	8	3*
Rhode Island	0	2*	3*	0	0	5*	3*
Massachusetts	2	2*	2*	0	0	6	2*
New Hampshire	1*	1*	0	0	0	2*	0
Maine	5*	0	0	0	0	5*	0

Source: National Weather Service Tropical Prediction Center.

\* - Indicates all hurricanes in this group were moving faster than 30 mph.

The National Climatic Data Center (NCDC) lists 6 “Hurricane and Tropical Storm” events that affected Edgecombe and Nash Counties in the period from January 1, 1950 through April 2004. Just prior to this Plan going to the formal adoption process in August 2004 four named storms came through, Bonnie, Charley, Gaston, and Frances. Charley and Gaston were significant rain events, but official totals were not available for the Plan.

**Table 4: NCDC Hurricane Events for Edgecombe and Nash Counties 1950-2002,**

Storm	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Bertha	7/12/1996	0800	Hurricane	N/A	0	0	0	0
Fran	9/5/1996	1700	Hurricane	N/A	7	2	0	0
Bonnie	8/27/1998	2000	Hurricane	N/A	0	0	0	50.0M
Dennis	9/4/1999	2100	Hurricane	N/A	0	0	0	3.0M
Floyd	9/15/1999	1600	Hurricane	N/A	0	0	3.0B	500.0M
Isabel	9/18/2003	0900	Hurricane	N/A	1	0	7.3M	0
<b>TOTALS:</b>					<b>8</b>	<b>2</b>	<b>3.007B</b>	<b>553.000M</b>

Reviewing the NCDC table of events in its entirety, coverage of all types of hazard events in Edgecombe and Nash Counties is somewhat spotty prior to the mid-1980s. Additional hurricanes or tropical storms not listed in the NCDC tables but noted by the Advisory Committee include Hazel, Bonnie, and Gloria. Hazel was noted to be particularly destructive, with wind damage to structures and crop damage rather than flooding as the primary problems. Other hurricanes or storms with a track near the City but not included are Arthur, Charlie, Diana, Ginger, and Irene.

To further assess specific damages, a synopsis of damage applicable to the City of Rocky Mount from the 2001 Plan follows:

***Hurricane Fran (September 1996)***

*Hurricane Fran passed over Rocky Mount in September 1996, leaving behind damage that affected many private property owners as well as causing some damage to public property. Losses associated with damage to public utilities and other costs that were determined to be eligible for reimbursement from FEMA were:*

*Approximately \$1 million for debris removal and cleanup;*

*\$386,000 for electric utility repairs; and*

*\$90,000 for emergency protective measures.*

***Hurricane Floyd (September 1999)***

*Following directly on the heels of Hurricane Dennis in September 1999, Hurricane Floyd was an extraordinary event. For the purposes of disaster response, FEMA combined the two events. Due to its magnitude and severity, FEMA provided 90% of eligible costs and the State provided the remaining 10%. Appendix B is a summary of comments made by the Mitigation Planning Committee regarding damage and other impacts associated with Hurricane Floyd and other recent events. The following impacts characterize the scale of the event (Comprehensive Plan, 2001):*

*Nearly 3,000 dwellings were damaged, with about 470 properties (nearly 800 housing units) targeted for acquisition;*

*Nearly 22% of the City's total area was affected by flooding (3,632 acres in the City and 7,573 acres in the ETJ);*

*Areas inundated, by land use, included 684 acres of residential use, 400 acres of commercial, office and religious use, 315 acres of parkland, and 177 acres of industrial use.*

*Data from Hurricane Floyd can, in part, characterize the exposure of public property to flood risks. It is important to note that the losses sustained in Floyd are no longer reasonable measures of likely future flood damage because of the number and type of mitigation measures that were implemented in its aftermath:*

*Total losses reported to FEMA were just over \$23.92 million;*

*Insurance covered \$3.87 million; and*

*Reimbursement requests covered \$20.05 million.*

*The total losses reported to FEMA can be broken down into categories or types of damage (line item data are available in the City's Budget Office). The following summarizes losses eligible for reimbursement, but does not include ineligible expenditures that were covered entirely by the City:*

*Over \$3 million for debris clearance and handling;*

*Over \$150,000 emergency response and protective measures by the Police and Fire Departments;*

*Repairs to streets, bridges, culverts and other road-related costs totaled just over \$500,000;*

*Damage to public buildings (including the Arts Center, the Rocky Mount Children's Museum, and the Playhouse Theater) and equipment/contents totaled over \$8 million, of which nearly \$1.6 million was covered by insurance. Nearly \$6 million of the total was used for demolition activities; (2004 Note: This was demolition not associated with buyout program)*

*City-owned utilities, including buildings, lift stations, substations and related equipment and facilities totaled over \$6 million, of which \$1.73 million was covered by insurance; and*

*Damage in City parks exceeded \$2.5 million and affected buildings and contents, pools, and outside facilities; insurance covered nearly \$650,000.*

*FEMA's data on the costs of disasters do not capture the impacts on all private citizens, businesses and industries.*

*The following summarize reported impacts due to Hurricane Floyd:*

*Hardees moved its corporate headquarters out of Rocky Mount after sustaining flood damage;*

*Several major employers left the area in 2000, partly due to flood-related impacts.*

*For Edgecombe and Nash Counties, a total of 5,963 applications for disaster housing were approved for a total of \$20.6 million (data not available for incorporated cities and municipalities);*

*A total of 4,077 applications for Individual and Family grants were approved for a total of \$25.4 million;*

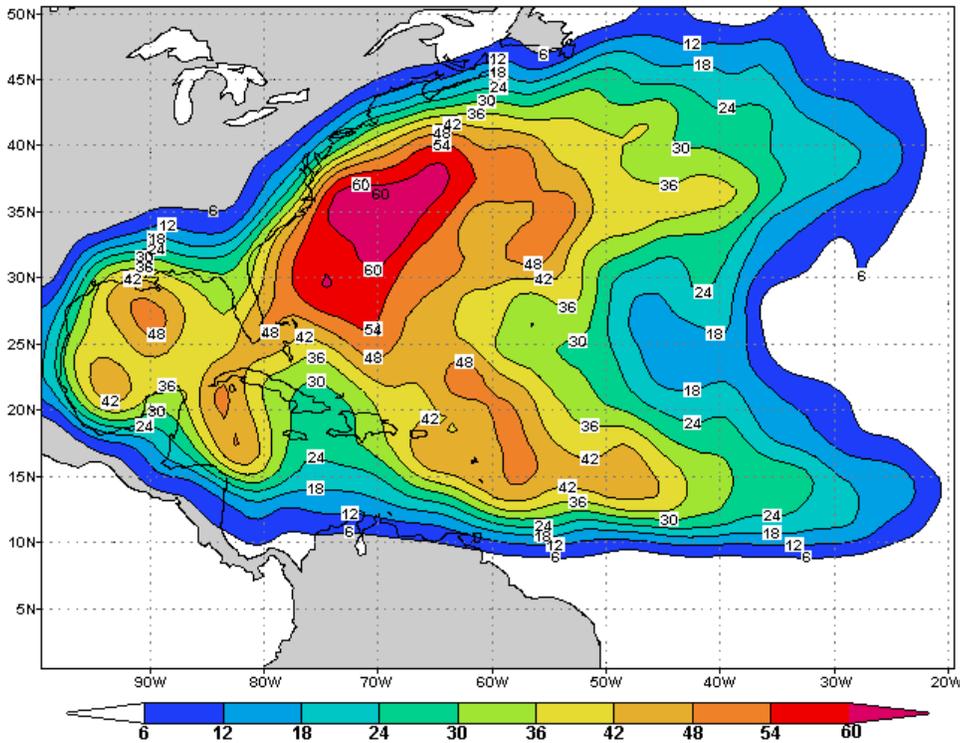
*A total of 2,181 applications for SBA home loans were approved for a total of \$101.8 million; and*

*A total of 806 applications for SBA business loans were approved for \$55.8 million.*

The data in Table 4: NCDRC Hurricane Events for Edgecombe and Nash Counties 1950-2002 would make the situation seem as though every 3 years roughly three hurricanes or tropical storms will affect the City, but this is misleading. Prior to 1996 only the 1955 hurricane season had three hurricanes making landfall in North Carolina in one year: Connie, Diane, and Ione. The additional storms added by the public create a more balanced view of past events with at least a few storms every decade.

Figure 5: Annual Probability of a Named Storm.

Source: National Weather Service

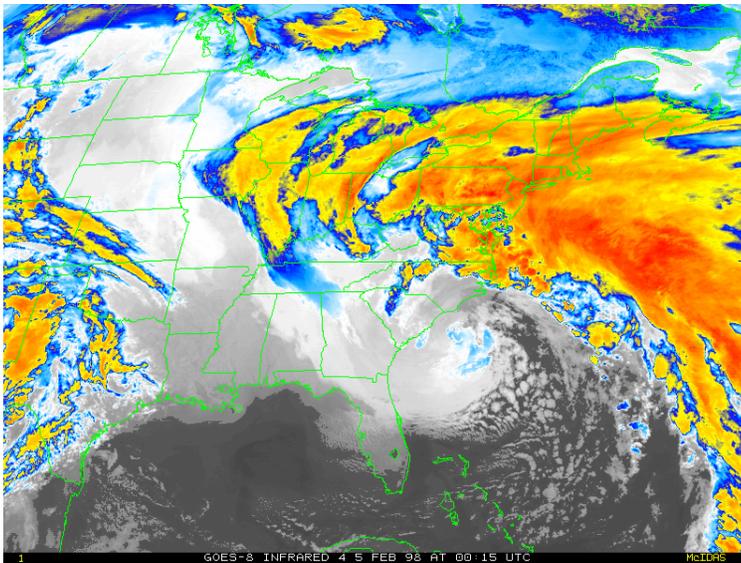


The National Ocean and Atmospheric Administration (NOAA) Hurricane Research Division estimates the probability of a named storm in the region between 18 and 24 percent annually. With the destructive Hazel in 1954 and Floyd in 1999 it is reasonable to assume that some of these storms will cause heavy damage in the County. NCDM rates hurricanes a moderate risk for both Counties and this plan agrees.

### 3.2. Nor'Easters

The technical definition of a nor'easter is a coastal low pressure system along the Atlantic seaboard that is characterized by strong northeasterly winds off the Atlantic that produce heavy amounts of precipitation, high surf, and coastal erosion. The counter-clockwise rotation of the low pressure system and the location and track of the storm mean the onshore winds at the onset of the storm come from the northeast, hence its name nor'easter. They are the strong storms that form outside of hurricane season, and their origins are different from hurricanes because of the winter weather patterns. They typically form near the Bahamas, north of Cuba, along the Appalachian Front, or off Cape Hatteras. Nor'easters are spawned by a trough in the jet stream that dips far south allowing cold arctic air to meet warm air. The warm air rises over the cold, creating instability high in the atmosphere and an area of low pressure below. As the incoming air rises around the center, the jet stream whisks it away further increasing the speed of the incoming air. The faster the air moves the faster the barometric pressure drops, and the gradient of the pressure change generates the strong winds.

Figure 6: February 1998 Nor'easter.



The normal jet stream winter pattern is to follow the coast which drags the storm to the northeast. Sometimes a high pressure center further north blocks the path of the nor'easter and it churns over the ocean for a long time. This sends strong waves onshore causing tremendous erosion. During the October to April nor'easter season, February is the busiest month.

While a nor'easter does not achieve the wind-speed of hurricanes, their destructive capability is in their duration (up to a week) and size (up to 1000 miles or more in diameter). Because of their winter occurrence, they can also create problems with frozen precipitation. The March 1993 "Storm of the Century" is one example,

though it was not technically a nor'easter until it came east of the Appalachians and strengthened. It is listed under winter storm events for this report.

Though nor'easters are perceived as a coastal phenomenon, they pose a threat inland from wind and heavy rain. North Carolina's proximity to the Gulf Stream makes it vulnerable to nor'easters. This plan rates the risk of nor'easters as moderate.

### 3.3. Flooding

Flooding is the most pressing environmental hazard in much of the City of Rocky Mount. In the 2001 plan the Committee noted:

*Damage and losses (including physical damage, indirect or economic losses, and injuries/deaths) that are associated with hazards result when an event affects areas where people and improved property are located. After hazards are identified, especially if they can be characterized by a map, then some measure of how exposed people and property are – or how “at-risk” they are – can be estimated.*

*When the full range of possible natural and man-made hazards is reviewed, it becomes apparent that some events occur frequently and some are extremely rare. Some hazards impact large numbers of people to a limited degree, while others can cause very localized but very significant damage. A uniform system for ranking hazards has not been developed. The State of North Carolina has developed a qualitative assessment of relative risks, as described in Section 4.1.*

*It is widely acknowledged that Rocky Mount’s most significant hazard is flooding, given both recent disasters and the exposure of private and public property.*

It also observed that flooding was the primary vector for the public awareness of natural hazards:

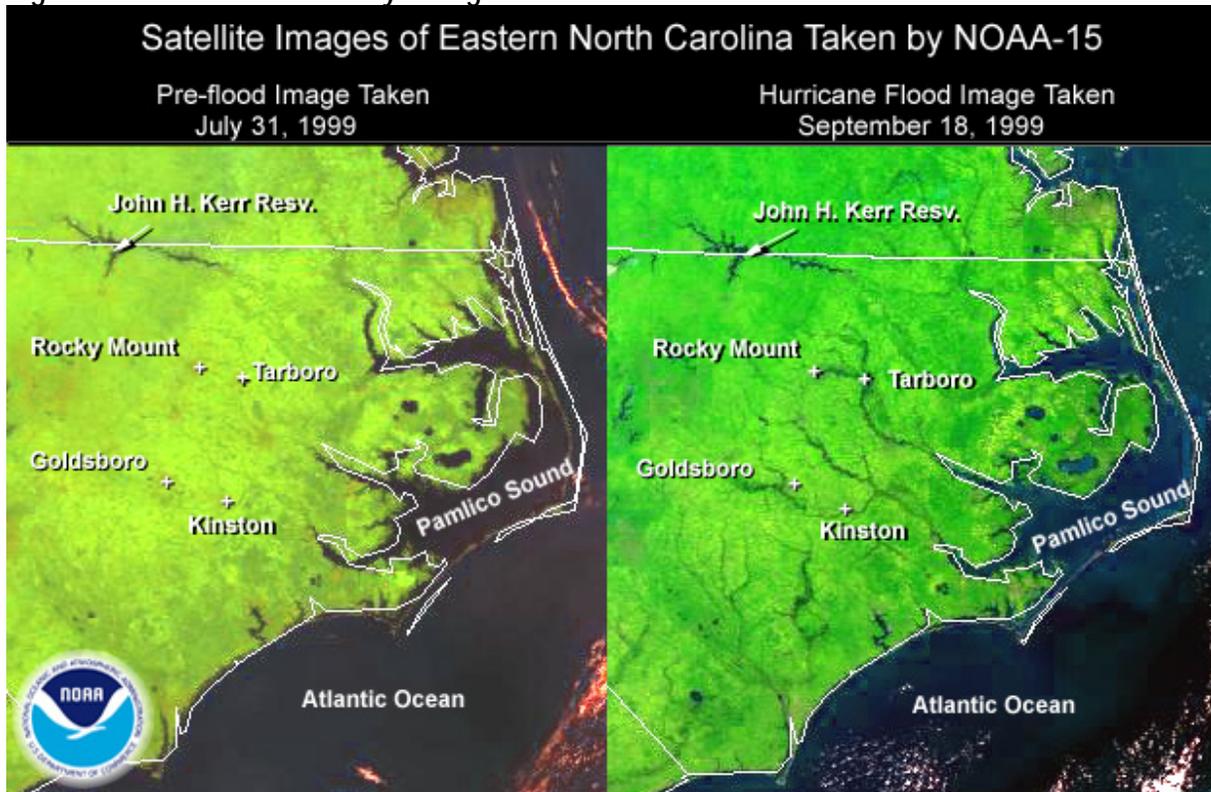
*Members of the Mitigation Planning Committee agreed that, except for those directly affected by Hurricane Floyd, the City’s average citizen does not perceive that any hazards pose significant threats to safety or property. Most consider localized storms as causing nuisance problems with flooded yards and street ponding, and power is interrupted due to downed lines. Generally, flooding has been perceived to be associated with hurricanes, as evidenced by peoples’ surprise when waterways flood and roads are blocked due to heavy rainfall in the upper watershed that does not directly affect the City.*

*With regard to wind hazards, the consensus of the Committee is that most citizens perceive that high winds are most likely to be associated with hurricanes. Some people are aware that tornadoes do strike Eastern North Carolina, because the surrounding counties have experienced damage in recent years.*

There are two types of flooding that affect the area: flash floods and general floods. General flooding is caused by tropical storms, hurricanes and nor’easters. Flash floods occur in urbanized areas with more impervious surfaces and the clay soils of the Piedmont. In Edgecombe County, flash flooding was noted during hurricane Irene, and Nash County has a number of flash flooding events, including some fatalities.

Flash floods are caused different ways. Generally they are caused when a great deal of precipitation falls over a short period of time and overloads the natural drainage systems. They can also be caused by dam or levee failure, or when an ice jam dislodges and releases the water it held back. They are more prevalent in areas with pronounced topographic relief or urbanized areas because the runoff is quickly channeled to the lowest lying areas faster than it can move downstream.

Figure 7: Before and After Floyd Images.



General floods result from precipitation falling over a longer time period over a given river basin. There are 3 types of general floods: riverine, coastal, and urban. Riverine flooding is a function of excessive precipitation and runoff within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor'easters and other large coastal storms. Urban flooding occurs where man-made development obstructs the natural flow of water and decreases the ability of natural groundcover to absorb and retain surface water runoff.

The severity of a flood event is determined by a combination of factors, including stream and river basin topography and physiography, soil saturation levels, precipitation and weather patterns, and the degree of urbanization or clearing of vegetation.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence whose probability can be determined based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by a 10-year flood event and the 100-year floodplain by the 100-year flood.

Flood probabilities, such as the "100-year flood," are determined by statistically analyzing the elevation of known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

Past flood events wreaked havoc on The City of Rocky Mount and both Edgecombe and Nash Counties. From 1995 until May of 2003, hurricanes, tropical storms, nor'easters, and intense summer storms all left their high-water marks on the City. Combined they are responsible for 500 million dollars of structural damage and over 3.0 billion in crop damage statewide. Floyd was a particularly devastating event for the City. NCDC Property and crop damage is listed in the hurricane section of this plan. The Comprehensive Plan details the destruction of Floyd:

- *Nearly 3,000 dwellings were damaged, with about 470 properties (nearly 800 housing units) targeted for acquisition*
- *Nearly 22% of the City's total area was affected by flooding (3,632 acres in the City and 7,573 in the ETJ);*
- *Areas inundated, by land use, included 684 acres of residential use, 400 acres of commercial, office, and religious. Use, 315 acres of parkland, and 177 acres of industrial use.*

The Plan also notes that the total losses reported to FEMA were just over \$23.92 million in the City. Tragically, flooding associated with Floyd also is responsible for 8 deaths in Edgecombe County and 4 in Nash County and are listed below.

Table 5: NCDC Flood Damage Report for Edgecombe and Nash Counties.

Storm	Date	Time	Type	Mag	Deaths	Injuries	Prop. Damage	Crop Damage
1 Rocky Mount	7/16/1994	1725	Flash Flood	N/A	0	0	0	0
2 Countywide	9/5/1996	2300	Flash Flood	N/A	0	0	0	0
3 Countywide	7/24/1997	0830	Flash Flood	N/A	0	0	0	0
4 NCZ011 - 028	1/22/1998	1600	Flood	N/A	0	0	0	0
5 NCZ028 - 039 - 042>043 - 073>077 - 084 - 086	1/27/1998	1300	Flood	N/A	0	0	0	0
6 NCZ026>028	2/9/1998	0800	Flood	N/A	0	0	0	0
7 Countywide	9/6/1999	2000	Flash Flood	N/A	0	0	0	0
<b>8 Countywide<sup>1</sup></b>	<b>9/15/1999</b>	<b>2200</b>	<b>Flash Flood</b>	<b>N/A</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>
9 Countywide	9/21/1999	1145	Flash Flood	N/A	0	0	0	0
10 Countywide	9/27/1999	2330	Flash Flood	N/A	0	0	0	0
11 Countywide	9/28/1999	1630	Flash Flood	N/A	0	0	0	0
12 Countywide	9/28/1999	0820	Flash Flood	N/A	0	0	0	0
13 Countywide	10/17/1999	1800	Flash Flood	N/A	0	0	0	0
14 Northeast Portion	6/16/2001	1100	Flash Flood	N/A	0	0	0	0
15 Central Portion	7/5/2002	2000	Flash Flood	N/A	0	0	0	0
16 Northwest Portion	9/16/2002	1100	Flash Flood	N/A	0	0	0	0
17 Tarboro	9/18/2003	1600	Flash Flood	N/A	0	0	0	0
<b>Total Edgecombe</b>								
					<b>8</b>		<b>0</b>	<b>\$ 0.00</b>

<sup>1</sup> Note: Hurricane Floyd Damage Listed Under The Hurricane Category

Nash County								
Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
79 Nash	7/4/1995	2100	Flash Flood	N/A	0	0	0	0
81 Spring Hope	8/27/1995	2140	Flash Flooding	N/A	0	0	0	0
82 Spring Hope	10/4/1995	1758	Flash Flood	N/A	0	0	0	0
100 Rocky Mount, castalia	9/10/1996	1710	Flash Flood	N/A	0	0	0	0
105 Countywide	7/24/1997	0830	Flash Flood	N/A	0	0	0	0
107 Red Oak	2/3/1998	1200	Heavy Rain	N/A	0	0	0	0
108 NCZ026>028	2/9/1998	0800	Flood	N/A	0	0	0	0
110 Nashville	2/16/1998	1200	Heavy Rain	N/A	0	0	0	0
123 Countywide <sup>1</sup>	9/15/1999	2200	Flash Flood	N/A	4	0	0	0
124 Countywide	9/21/1999	1145	Flash Flood	N/A	0	0	0	0
125 Countywide	9/28/1999	1630	Flash Flood	N/A	0	0	0	0
126 Countywide	9/28/1999	0730	Flash Flood	N/A	0	0	0	0
127 Countywide	9/28/1999	1100	Flash Flood	N/A	0	0	0	0
128 Countywide	10/17/1999	1800	Flash Flood	N/A	0	0	0	0
143 Southwest Portion	6/16/2001	1935	Flash Flood	N/A	0	0	0	0
153 Southwest Portion	8/26/2002	0800	Flash Flood	N/A	0	0	0	0
154 North Portion	8/27/2002	1035	Flash Flood	N/A	0	0	0	0
155 North Portion	8/30/2002	1115	Flash Flood	N/A	0	0	0	0
156 East Central Portion	9/16/2002	1014	Flash Flood	N/A	0	0	0	0
164 Nashville	6/7/2003	2040	Flash Flood	N/A	0	0	0	0
170 North Portion	8/17/2003	1755	Flash Flood	N/A	0	0	0	0
<b>Total Nash</b>					<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>

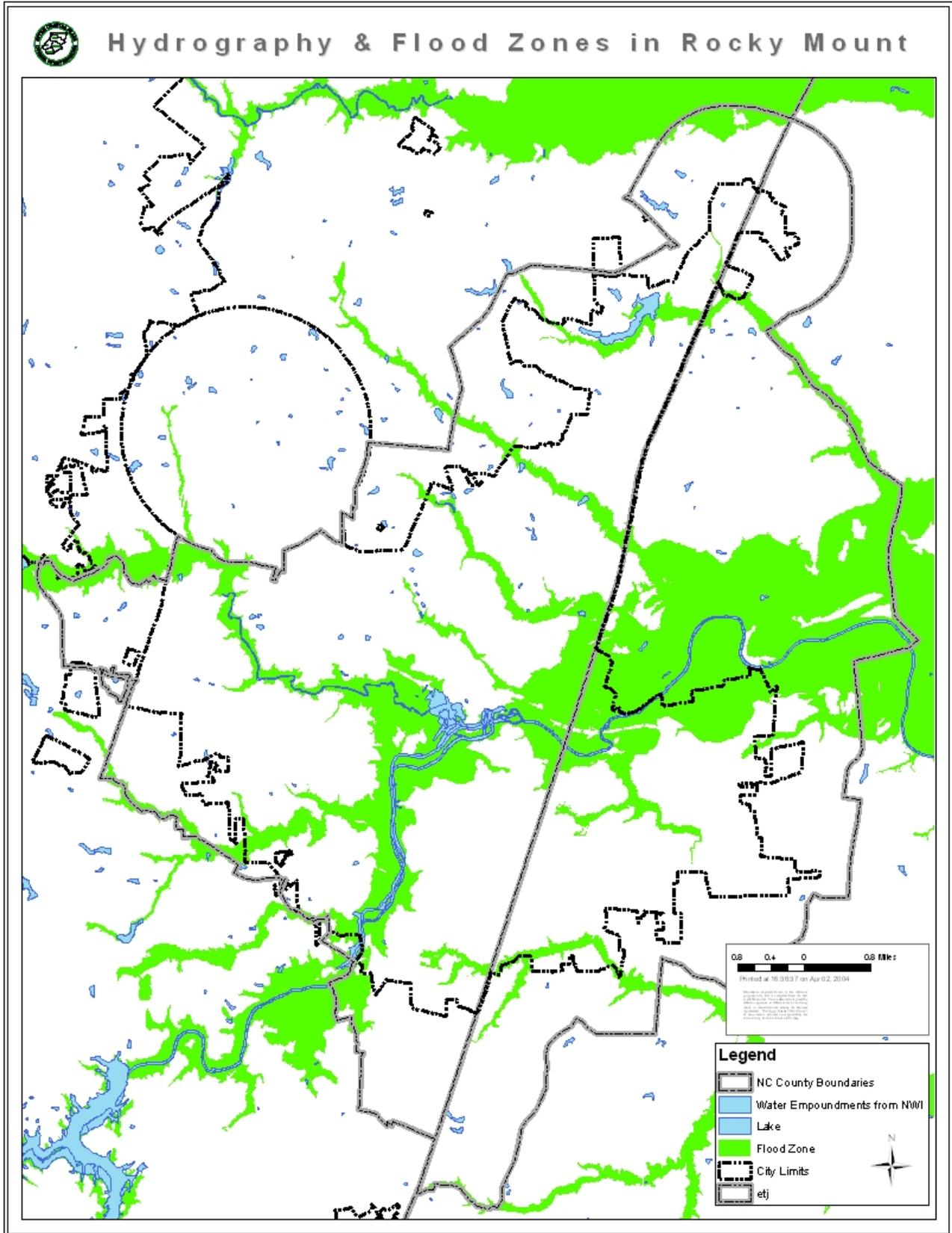
Note: Hurricane Floyd Damage Listed Under The Hurricane Category

Digital floodplain maps are newly re-mapped and adopted for the City of Rocky Mount, and this makes it much easier to accurately show vulnerable areas countywide. The new FIRM maps are set to become official on November 3<sup>rd</sup> 2004.

Figure 8: Rocky Mount Hydrography and Flood Zones Map shows the new flood zones.

NCDEM classified Nash and Edgecombe Counties as a low risk for flooding in the November 1998 *Local Hazard Planning Mitigation Manual*. In light of Hurricane Floyd in 1999 and subsequent weather events, this is probably an underestimation and should be upgraded to moderate and perhaps higher. The *Natural Hazards Mitigation Plan (409 Plan)* prepared by the NC Division of Emergency Management in 1999 took Floyd into account because it also rates flood risk as Medium for both Counties. The City rates the risk as Moderate.

Figure 8: Rocky Mount Hydrography and Flood Zones Map.



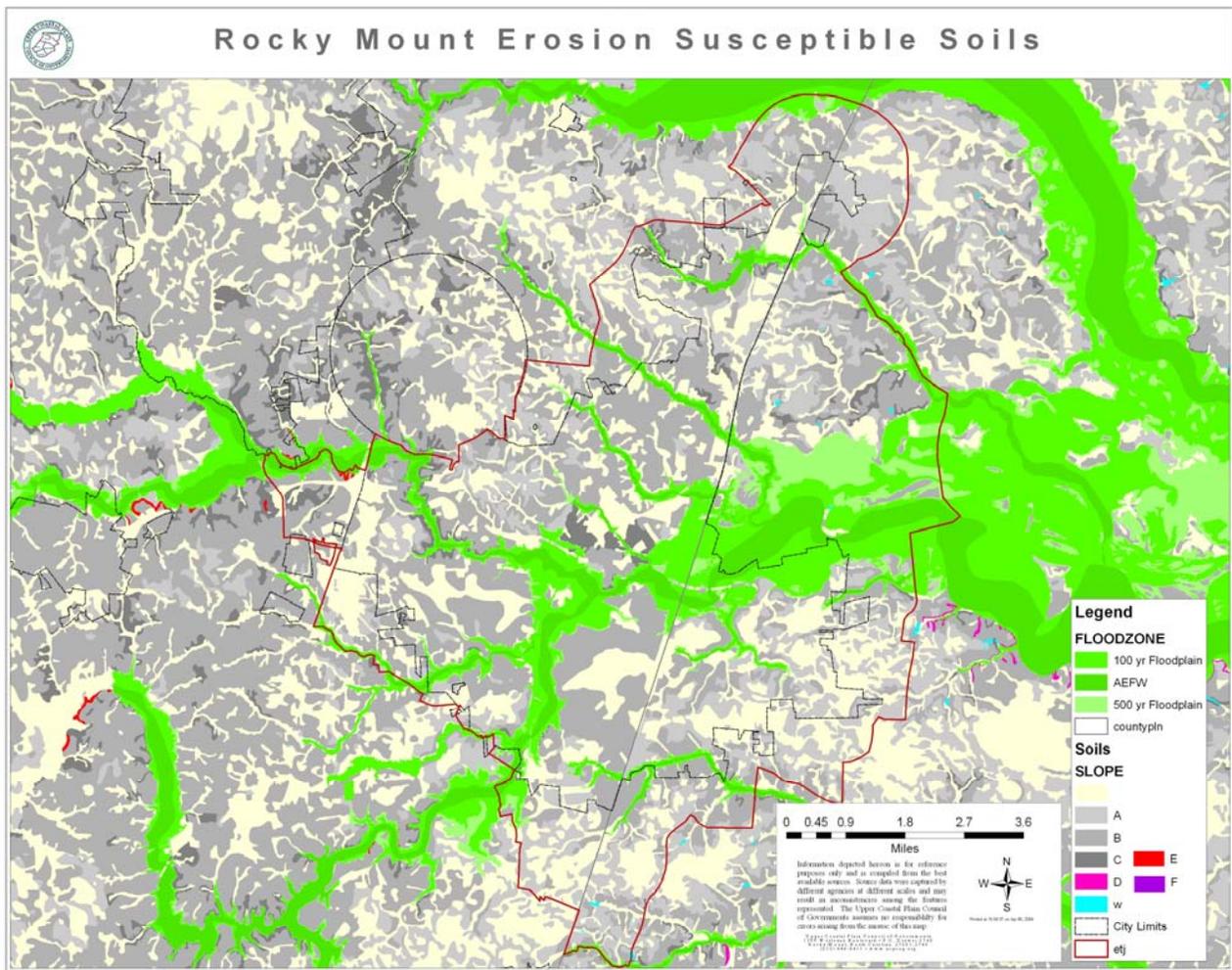
### 3.4. Coastal/Riverine Erosion

Erosion is the removal of soil or weathered material, usually by wind or water. Coastal erosion occurs during storm events from storm surge and wave action. Riverine erosion is generally a function of large flows caused by heavy rain events. There are two kinds of erosion that typify inland erosion processes: sheet erosion and rill erosion. Sheet erosion is more or less evenly distributed over an area and removes thin layers of soil. Rill erosion is caused by running water scouring small channels.

Rocky Mount is not a coastal city, and coastal erosion is not applicable to the area. Riverine processes do exist in the City, though. The City is relatively flat, but parts of the City adjacent to watercourses or recently cleared areas are susceptible to rill erosion. The United States Department of Agriculture (USDA) Soil Conservation Service Soil Survey for the County shows soils in the City with relatively steep slopes are those with a D, E, or F slope characteristic. Less than one percent of the City and ETJ are in these categories.

Generally, the rate of soil formation is enough to keep pace with erosion, and the risk for the City is low.

Figure 9: Erosion Prone Soils.



### 3.5. Severe Winter Storms/Freezes

Severe winter weather includes heavy snow, wind, freezing rain and ice pellets, and extreme cold. These storms are extra-tropical cyclones fueled by strong temperature gradients and an active upper-level jet stream. The severe winter storms that impact North Carolina usually emerge in the Gulf of Mexico or off the southeast coast.

Although most winter storms occur in the mountainous regions of the Appalachians, the geographical orientation of the mountains and the Piedmont contribute to a regular occurrence of freezing precipitation events in the Piedmont. These winter storms may result from cold air damming. Cold air damming is a shallow, surface-based layer of relatively cold, stable-stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then either becomes supercooled (liquid below the freezing point of water) or refreezes. This results in freezing rain or sleet. Cold air damming generally occurs in the western half of North Carolina. Edgecombe and Nash Counties are not classified as being vulnerable for cold air damming.

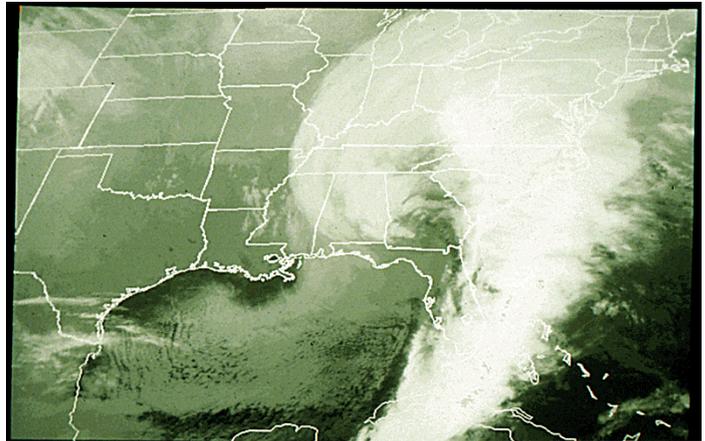


Figure 10: Storm of the Century--1993 Blizzard.

The largest threat for Edgecombe County and the City of Rocky Mount for severe winter weather is from nor'easters and other severe winter coastal storms. There are 8 winter weather events listed for Edgecombe County by the NCDC, and 23 for Nash. They include the March 1993 "Storm of the Century".

Table 6: Recorded Winter Storm Events for Edgecombe and Nash Counties (NCDC).

Edgecombe County									
Storm	Date	Time	Type	Mag	Deaths	Injuries	Prop. Damage	Crop Damage	
<a href="#">102 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</a>	1/18/2000	0200	Winter Storm	N/A	0	0	0	0	
<a href="#">103 NCZ007&gt;011 - 021&gt;024 - 026&gt;028 - 038&gt;043 - 076&gt;077 - 089</a>	1/20/2000	0000	Winter Storm	N/A	0	0	0	0	
<a href="#">104 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</a>	1/22/2000	1800	Winter Storm	N/A	0	0	0	0	
<a href="#">105 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</a>	1/24/2000	0500	Winter Storm	N/A	0	0	0	0	
<a href="#">106 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;077 - 083&gt;086 - 088&gt;089</a>	1/28/2000	1000	Winter Storm	N/A	0	0	0	0	
<a href="#">112 NCZ010&gt;011 - 026&gt;028 - 042&gt;043 - 077 - 077&gt;078 - 088&gt;089</a>	12/3/2000	1200	Winter Storm	N/A	0	0	0	0	
<a href="#">118 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</a>	1/3/2002	0000	Winter Storm	N/A	0	0	0	0	
<a href="#">126 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;077 - 083&gt;084</a>	12/4/2002	1500	Winter Storm	N/A	0	0	0	0	

Nash County								
<u>Location or County</u>	<u>Date</u>	<u>Time</u>	<u>Type</u>	<u>Mag</u>	<u>Dth</u>	<u>Inj</u>	<u>PrD</u>	<u>CrD</u>
<u>72 Northern Interior And</u>	2/10/1994	1000	Ice Storm	N/A	0	0	0	0
<u>84 NCZ027</u>	1/6/1996	1300	Ice Storm	N/A	0	0	0	0
<u>85 NCZ027</u>	1/11/1996	2200	Ice Storm	N/A	0	0	0	0
<u>86 NCZ027</u>	2/2/1996	0200	Ice Storm	N/A	0	0	0	0
<u>116 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	12/23/1998	1400	Ice Storm	N/A	0	0	0	0
<u>129 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	1/18/2000	0200	Winter Storm	N/A	0	0	0	0
<u>130 NCZ007&gt;011 - 021&gt;024 - 026&gt;028 - 038&gt;043 - 076&gt;077 - 089</u>	1/20/2000	0000	Winter Storm	N/A	0	0	0	0
<u>131 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	1/22/2000	1800	Winter Storm	N/A	0	0	0	0
<u>132 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	1/24/2000	0500	Winter Storm	N/A	0	0	0	0
<u>133 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;077 - 083&gt;086 - 088&gt;089</u>	1/28/2000	1000	Winter Storm	N/A	0	0	0	0
<u>139 NCZ010&gt;011 - 026&gt;028 - 042&gt;043 - 077 - 077&gt;078 - 088&gt;089</u>	12/3/2000	1200	Winter Storm	N/A	0	0	0	0
<u>144 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	1/3/2002	0000	Winter Storm	N/A	0	0	0	0
<u>157 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;077 - 083&gt;084</u>	12/4/2002	1500	Winter Storm	N/A	0	0	0	0
<u>158 NCZ007&gt;011 - 021&gt;027 - 038&gt;043 - 073&gt;077 - 083&gt;084 - 086</u>	2/16/2003	1200	Winter Storm	N/A	0	0	0	0
<u>174 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	1/26/2004	0430	Winter Storm	N/A	0	0	0	0
<u>175 NCZ007&gt;011 - 021&gt;027 - 038&gt;039 - 041</u>	2/15/2004	2300	Winter Storm	N/A	0	0	0	0
<u>176 NCZ007 - 021&gt;028 - 038&gt;039 - 041&gt;043 - 073&gt;078 - 083&gt;086 - 088&gt;089</u>	2/26/2004	0900	Winter Storm	N/A	0	0	0	0
<u>87 NCZ027</u>	2/3/1996	2200	Extreme Cold	N/A	0	0	0	0
<u>71 Northern And Central</u>	1/3/1994	1800	Heavy Snow	N/A	0	0	0	0
<u>88 NCZ027</u>	2/6/1996	0600	Heavy Snow	N/A	0	0	0	0
<u>89 NCZ027</u>	2/16/1996	0600	Heavy Snow	N/A	0	0	0	0
<u>106 NCZ027&gt;028 - 041&gt;043 - 073&gt;077 - 083&gt;084 - 086</u>	1/19/1998	0600	Heavy Snow	N/A	0	0	0	0
<u>138 NCZ007&gt;011 - 021&gt;028 - 038&gt;043 - 073&gt;077 - 083</u>	11/19/2000	1100	Heavy Snow	N/A	0	0	0	0

The 2001 Hazard Mitigation Plan for the City detailed winter storms as they affected the City prior to 2001:

*Prior to 1995, two winter storms stand out in Rocky Mount's history:*

*March 1, 1980, when 17" of snow fell overnight, causing the collapse of several older buildings; and February, 1977, when a prolonged deep freeze caused numerous water and sewer lines to freeze, hampering fire response. Considerable residential damage occurred due to frozen and burst pipes.*

*Since 1995, two major winter storms have prompted federal disaster declarations in Nash and Edgecombe Counties. Appendix B contains some comments by Committee members regarding the effects of these storms.*

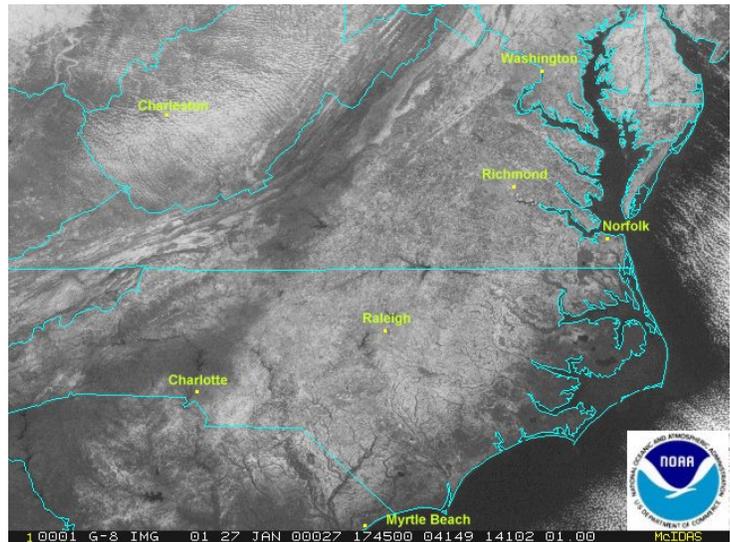
*Although many people were affected by the length of time it took to clear roads and restore power, no federal assistance was provided to cover private losses. The amounts of federal disaster assistance provided to cover the City's eligible costs were minor:*

*In 1996, approximately \$20,000 in federal assistance was received; and*

*In 1999, FEMA reimbursed nearly \$30,000 for the cost of snow removal and repairs for water and sewer lines.*

*In recent years the City has begun to add State System streets to its snow clearance workload, more than doubling the lane miles to be plowed and increasing the need for additional equipment. While these streets are the State's responsibility, they are not part of the interstate or primary/secondary roads that are the State's highest priorities during extreme and widespread winter storm events.*

In 1997 the National Climatic Data Center (NCDC) compiled extreme snowfall statistics for the contiguous United States. One-day, observed-maximum-snowfall amounts, in inches, were compiled for selected stations (many for the period of 1948-1996). Based on the Local Hazard Mitigation Planning Manual, the extreme one-day snowfall averaged for the FEMA study stations in Edgecombe County is 11.3 inches, and for Nash County it is 13.5 inches. This snowfall is below the extreme average-one-day snowfall for the County's Climate Division (Climate Division 8): 12.24 inches. Although the northern coastal divisions fall second in extreme average snowfall to the mountainous climate divisions (Climate Divisions 1 and 2) compared with the rest of the state, the North Carolina Division of Emergency Management has classified Edgecombe and Nash Counties as having a "Low" vulnerability to severe winter weather. Based on frequent ice and snow events in recent years, the multi-jurisdictional Advisory Committee recommends upgrading this risk assessment to "Moderate" due to the duration of school closings and general disruption of commerce lasting as long as a week.



**Figure 11: Visible Snow Cover From the January 24th 2000 Storm.**

### 3.6. Tornadoes/Severe Storms

Tornadoes are violently rotating air columns and are generated from major storm events. Sometimes the source is a hurricane. Other times, the main agent is not a hurricane, but a major thunderstorm. The strong winds of tornadoes can destroy weak or fragile structures and can blow down trees and limbs. This destruction may cause additional damage as the items fall to the ground.

Tornadoes occur all over the State of North Carolina. In fact, the state ranks 22nd nationally for number of tornadoes reported. Edgecombe County and the counties immediately surrounding Edgecombe have experienced a number of strong tornadoes in the last 100 years. The NCDC lists 5 reported tornadoes since 1980 either originating in or tracking through part of Edgecombe County and 12 in Nash. Some the Nash instances may be duplicated in the Edgecombe list. Together they account for over \$8 million in damage.

Tornadoes are measured using the Fujita scale, which ranks a tornado based on its wind speed and the level of destruction it causes.

**Table 7: The Fujita Scale of Tornado Intensity.**

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage Done
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel reinforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 mph	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies

Edgecombe County had 2 magnitude F3 (severe) tornadoes that did 250,000 dollars worth of damage in the 1950's, and numerous other smaller events that combined for a total of 325,000 dollars of damage. Nash County

also saw a number of tornadoes, and NCEM rated Nash county as having a high risk for tornadoes in its 1999 *Natural Hazards Mitigation Plan (409 Plan)*.

**Table 8: Tornado Events in Edgecombe County 1980- June 2003.**

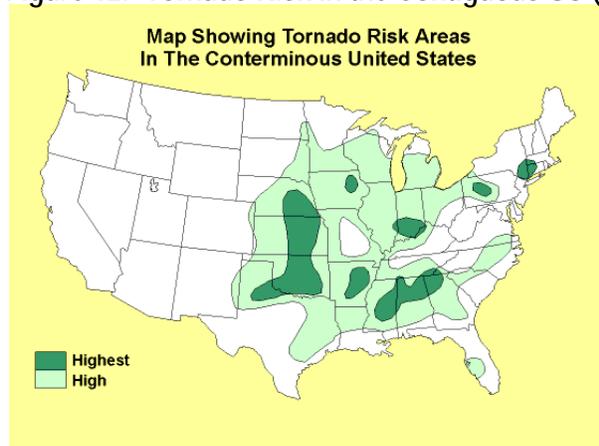
Storm	Date	Time	Type	Mag	Deaths	Injuries	Prop. Damage	Crop Damage
1 EDGECOMBE	3/15/1953	2050	Tornado	F3	0	0	0K	0
2 EDGECOMBE	11/8/1957	1800	Tornado	F3	0	3	250K	0
13 EDGECOMBE	5/5/1977	1730	Tornado	F1	0	0	25K	0
60 Pinetops	11/11/1995	1950	Tornado	F1	0	3	50K	0
125 Conetoe	10/11/2002	2338	Tornado	F1	0	0	0	0
<b>Totals:</b>					<b>0</b>	<b>6</b>	<b>\$325,000</b>	<b>0</b>

**Table 9: Tornado Events in Nash County 1950- June 2003 (NCDC).**

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 NASH	3/15/1953	2000	Tornado	F3	0	0	0K	0
2 NASH	10/2/1969	1330	Tornado	F1	0	0	25K	0
3 NASH	5/28/1973	2000	Tornado	F0	0	0	25K	0
10 NASH	6/3/1978	1715	Tornado	F1	0	0	3K	0
11 NASH	4/3/1979	1415	Tornado	F1	0	1	25K	0
13 NASH	2/11/1981	0336	Tornado	F2	0	0	2.5M	0
14 NASH	3/18/1983	1240	Tornado	F2	0	0	250K	0
15 NASH	3/28/1984	1910	Tornado	F2	0	0	2.5M	0
17 NASH	9/13/1984	0815	Tornado	F0	0	0	0K	0
33 NASH	11/28/1988	0055	Tornado	F4	2	22	2.5M	0
90 Spring Hope	4/15/1996	1745	Tornado	F1	0	0	50K	0
160 Nashville	5/9/2003	1820	Tornado	F0	0	0	0	0
<b>Totals:</b>					<b>2</b>	<b>23</b>	<b>\$7,881,000</b>	<b>0</b>

Rocky Mount’s eastern location - within a moderate distance to locations experiencing regular hurricane activity – increases its risk of tornado development. Its location makes it more likely than many other areas of the state to experience tornadoes. Accordingly, NCEM assigned Edgecombe and Nash Counties a “Moderate” threat level for tornado activity based on its general climatic conditions and the frequency of historic tornadoes.

**Figure 12: Tornado Risk in the Contiguous US (USGS).**



### 3.7. Wildfires/Forest Fires

A wildfire is an undesirable, uncontrolled burning of grasslands, brush or woodlands. According to the National Weather Service, more than 100,000 wildfires occur in the United States each year. Humans start roughly ninety percent of these wildfires, i.e., campfires, debris burning, smoking, et cetera. Lightning starts the other ten percent. The potential for wildfire depends upon surface fuel characteristics, weather conditions, recent climate conditions, topography, and fire behavior.



**Figure 13: Wildfire.**

Fuels are any combustible materials that sustain a fire. Typically, this is whatever vegetation is prevalent in a given area and the debris from the vegetation. Fuel availability is affected by how often fires occur; if an area has long intervals between fires, there is more fuel available when a fire event happens.

Weather is one of the most significant factors in determining the severity of wildfires. The intensity of fires and the rate with which they spread is directly related to the wind speed, temperature and relative humidity. Climatic conditions such as long-term drought also play a major role in the number and intensity of wildfires, and topography is important because the slope and shape of the terrain can change the rate of speed at which fire travels.

There are four major types of wildfires: ground fires, surface fires, crown fires, and spotting fires. Ground fires burn in natural litter, duff, roots or sometimes soils with high organic content like peat. Once started they are very difficult to control, and some ground fires may even rekindle after being extinguished. Surface fires burn in grasses and low shrubs (up to 4' tall) or in the lower branches of trees. They have the potential to spread rapidly, and the ease of their control depends upon the fuel involved. Crown fires burn in the tops of trees, and the ease of their control depends greatly upon wind conditions. Spotting fires occur when burning embers are thrown ahead of the main fire, and can be produced by crown fires as well as wind and topographic conditions. Once spotting begins, the fire will be very difficult to control.

Wildfires become significant threats to life and property along what is known as the “wildland/urban interface.” The wildland/urban interface is defined as the area where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Since 1985, approximately 9,000 homes have been lost to urban/wildland interface fires across the United States.

All of North Carolina is susceptible to wildfire, although according to the NCEM only the southern Coastal Plain is said to be at especially “high” risk. Although wildfires are possible throughout the year, normal fire season peaks for eastern North Carolina are in the spring and late fall months. Between 1928 and 2000, the North Carolina Division of Forest Resources has recorded a total of 281,660 wildfires for an average number of 3,858 fires per year. For that same period, a total of 9,598,498 acres have burned for an average of 131,486 acres per year. According to the U.S. Forest Service, a total of 4,949 fires burned 25,146 acres and destroyed 27 homes and 275 structures in North Carolina during the year 2000.

According to the NCEM, Edgecombe and Nash Counties face a low risk to wildfire. The North Carolina State Forest Service assessed wildfire potential using forest service records for the period between 1950 and 1993. The State Forest Service categorized Edgecombe and Nash Counties having a “Low” wildfire potential for both number of fires and number of acres burned.

The average wildfire category for Edgecombe and Nash Counties' climate division (Climate Division 8) is 2.2 ("Moderate"). Therefore, both Counties, with a category of 1 ("Low") for both number of fires and number of acres burned, fall below this average. Based on this information, wildfire does not appear to pose a significant natural hazard risk for The City of Rocky Mount.

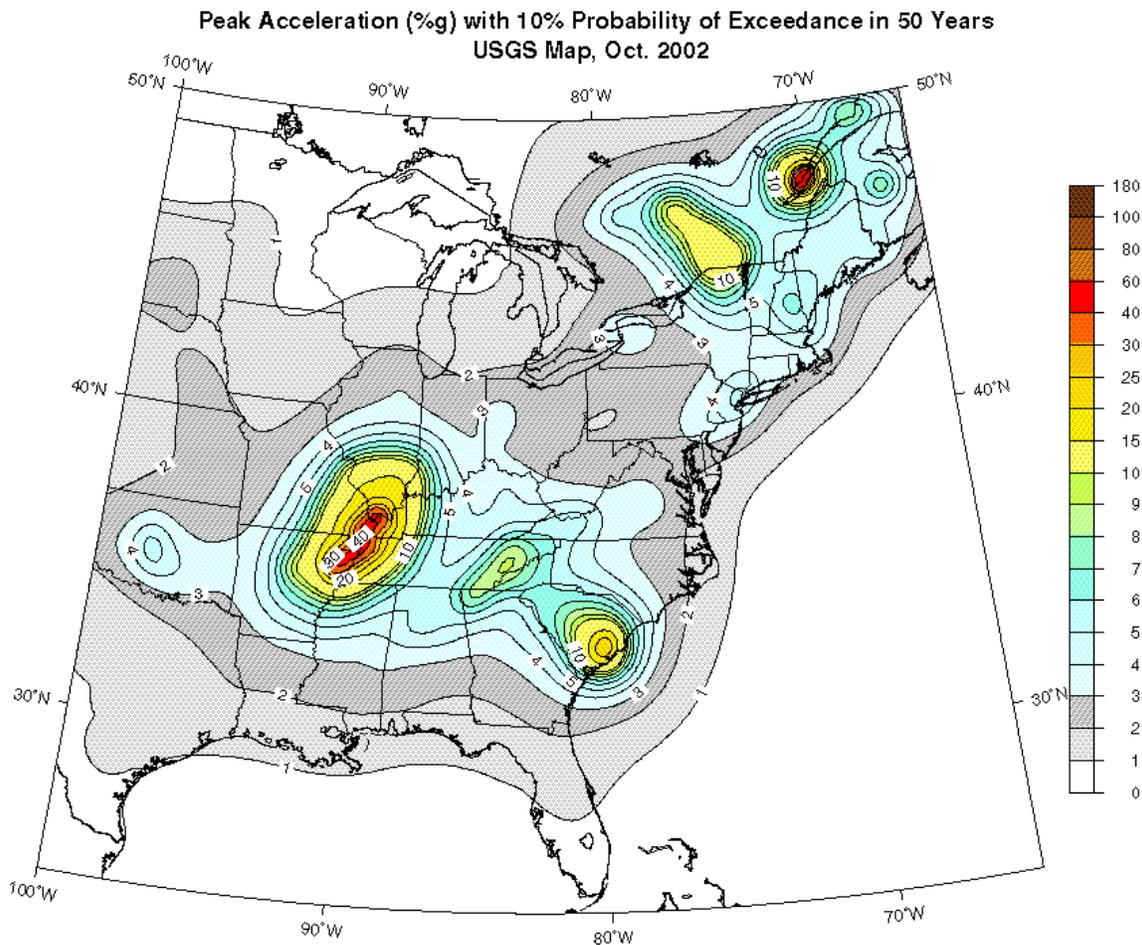


**Figure 14: Climate Divisions of North Carolina**

### 3.8. Earthquakes

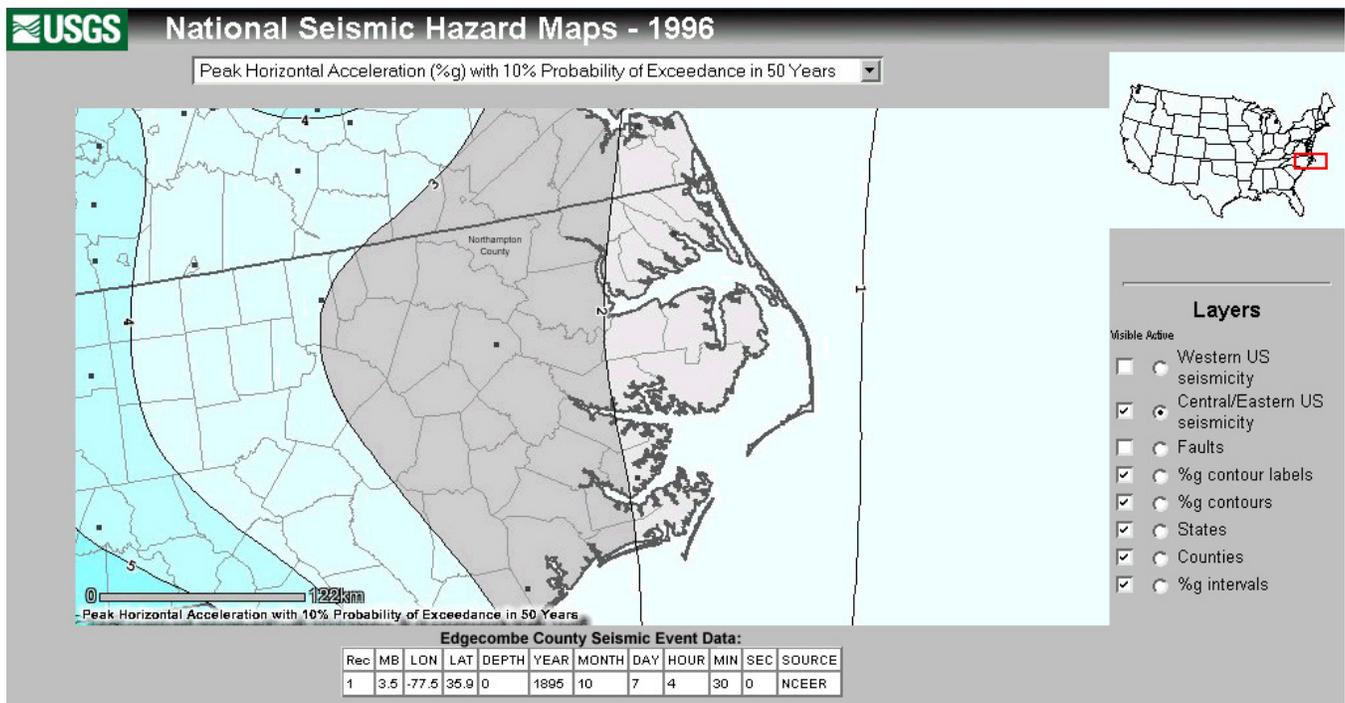
An earthquake is the violent shaking of the Earth caused by a sudden movement of rock beneath its surface. Rocks respond to stress (squeezed or pulled apart) near the Earth's surface by breaking, and when rocks move along either side of a fracture, it is called a fault. The land around a fault may shift horizontally, vertically, or a combination of these motions. The force that causes the stress within the rock is a result of movement of giant sections of the Earth's crust.

Figure 15: Earthquake Probability Map.



The epicenters of earthquakes affecting North Carolina are generally concentrated in the active Charleston and Eastern Tennessee Seismic Zones. The Charleston Seismic Zone is part of a crescent of moderate seismic activity risk extending from Charleston, South Carolina, northwestward into eastern Tennessee where it meets the East Tennessee Seismic Zone. This zone roughly follows the path of Interstate 75 between Chattanooga and Knoxville. The City of Rocky Mount lies well to the northeast of these regions. The Virginia Seismic Zone is far less active, but is much closer than the other major fault zones and plays a significant role in the City's earthquake history. It is discernable on the map as the northeastward bulge of 3 percent probability into central Virginia.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. Each unit increase in magnitude on the Richter Scale corresponds to a ten-fold increase in wave amplitude, or a 244-fold increase in energy (United States Geologic Survey, 1996). Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale. It is a twelve-level scale based on direct and indirect measurements of seismic effects. Roman Numeral I corresponds to imperceptible (instrumental effects), IV corresponds to moderate (felt by people), and XII for catastrophic (total destruction). There have not been any earthquakes in the Eastern Tennessee Seismic Zone since 1928 with MMI intensity greater than IV. (This corresponds to a Richter Scale magnitude between 4.8 and 4.2, and a maximum acceleration of less than 100 mm/sec.) However, the area has the potential to produce an earthquake of significant intensity in the future (NCDEM 1999).



North Carolina's vulnerability to earthquakes decreases from west to east and south to north in relation to the two Seismic Zones. The eastern portion of the State (including Edgecombe County) faces minimal effects from seismic activity. The U.S. Geologic Survey (USGS) rates earthquake probability by looking at past events and proximity to known background fault zones. The USGS estimates the probability of a major earthquake in a 50 year interval in Rocky Mount at 2 percent (see Figure 15: Earthquake Probability Map, above). Until the 4.5 magnitude earthquake on the 9<sup>th</sup> of December 2003, the closest significant earthquakes in recorded history occurred in Edgecombe County on October 4<sup>th</sup> 1895 and in central Virginia in 1875. The North Carolina Division of Emergency Management has classified Edgecombe and Nash Counties as a "Low" vulnerability area for earthquakes, and this Plan ranks the City as Low as well.

### 3.9. Drought/Heat Waves

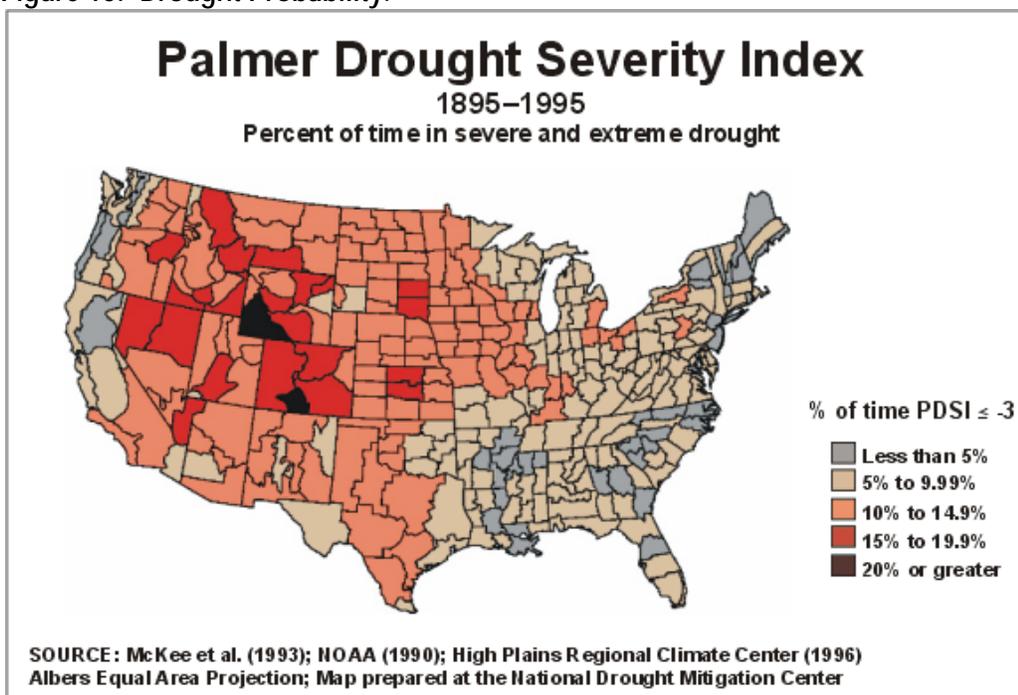
Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate.

Drought has scores of definitions, but it 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 by plants) 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 ability of the soil to absorb the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity.

Long term drought probability can be measured using the Palmer Index. The Palmer Index was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness. It has become the semi-official drought index. The Palmer Index is most effective in determining long term drought—a matter of several months—and is not as good with short-term forecasts (a matter of weeks). It uses a 0 as normal, and drought is shown in terms of minus numbers; for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought. The advantage of the Palmer Index is that it is standardized to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. The negative is that it is not as good for short term forecasts, and is not particularly useful in calculating supplies of water locked up in snow, so it works best east of the Continental Divide.

Edgecombe and Nash Counties, and thus Rocky Mount, are low risk areas for extreme drought, though seasonal droughts are not uncommon.

Figure 16: Drought Probability.

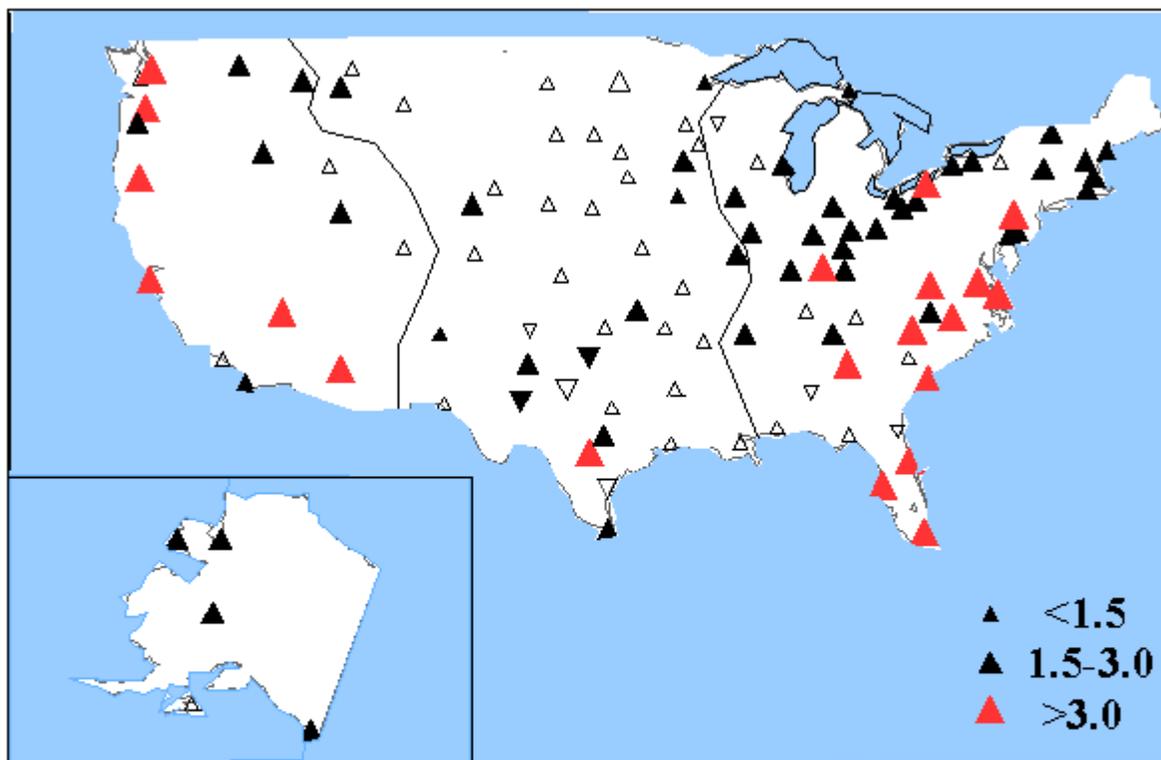


A heat wave is generally a period of abnormally and uncomfortably hot and usually humid weather. It could last from several days to several weeks. The Weather Channel uses the following criteria for a heat wave: a minimum of ten states with 90 degree plus temperatures and the temperatures must be at least five degrees above normal in parts of that area for at least two days or more.

Heat kills by taxing the human body beyond its ability to cool itself. North American summers are hot, and in the Southeast they are humid and sunny as well. High humidity and direct sunlight further burden the human body's ability to cool itself. Both are factors of the Rocky Mount summer.

The National Climatic Data Center looked at nearly 40 years worth of heat-related data for the Continental United States, and the Upper Coastal Plain shows a significant more, hotter days (see Figure 17: Temperature Trends Map from NOAA NCDC). Rocky Mount's location makes it prone to hot, humid summers. Therefore the risk of prolonged periods of hot, harmful weather is likely. The risk of experiencing a heat wave is moderate.

Figure 17: Temperature Trends Map from NOAA NCDC.



**Trends in the annual frequency of daily minimum apparent temperature exceeding local threshold values from 1949-1995. The size and color of the triangle indicates the magnitude of the trend (ranging from -2.7 to +5.2 per decade); its orientation (on its base or on its apex) indicates the sign of the trend (positive or negative, respectively). Filled triangles indicate significant trends (at  $p < 0.05$ , using non-parametric methods).**

### 3.10. Landslides/Sink Holes

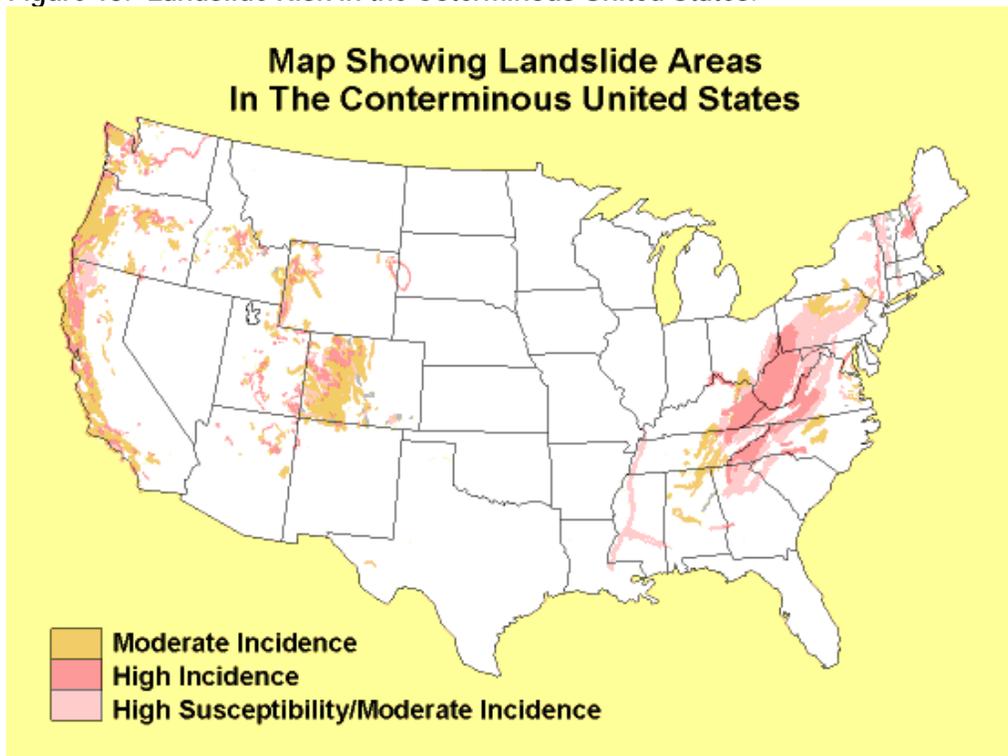
A landslide is the movement of earth materials caused by gravity, and generally involved downslope movement. An avalanche is a similar movement of snow and ice.

According to the USGS, landslides are a major geologic hazard that happen in all 50 states, cause over \$2 billion in damage annually, and result in 25 to 50 deaths each year (FEMA 2003). Landslides can be caused by heavy rainfall, steepening of slopes by erosion or construction, alternate freezing or thawing cycles, earthquakes, and volcanic eruptions.

Although uncommon in the northern Coastal Plains, landslides are common throughout the mountainous Appalachian region due to the clay-rich soils. The USGS identifies landslide incidence/susceptibility for the eastern United States by, "...classifying geographic areas by high, medium, or low landslide incidence and evaluating geologic formations in these areas by high, medium, or low susceptibility to a landslide."

The NCEM has classified the two Counties as having a "Low" vulnerability to landslides. As shown in the *Local Hazard Mitigation Planning Manual*, the County has a landslide vulnerability value of 1. Again, the "Low" classification includes vulnerability values of 1 and 2. The categorization is based on a scale of 1-6 ("Low to High") for national landslide susceptibility and incidence for the conterminous United States. The value of 1 implies low landslide incidence and low landslide susceptibility, meaning that less than 1.5 percent of the area has been involved in a landslide.

Figure 18: Landslide Risk in the Coterminous United States.



Source: USGS, *Geographic Distribution of Major Hazards in the US*

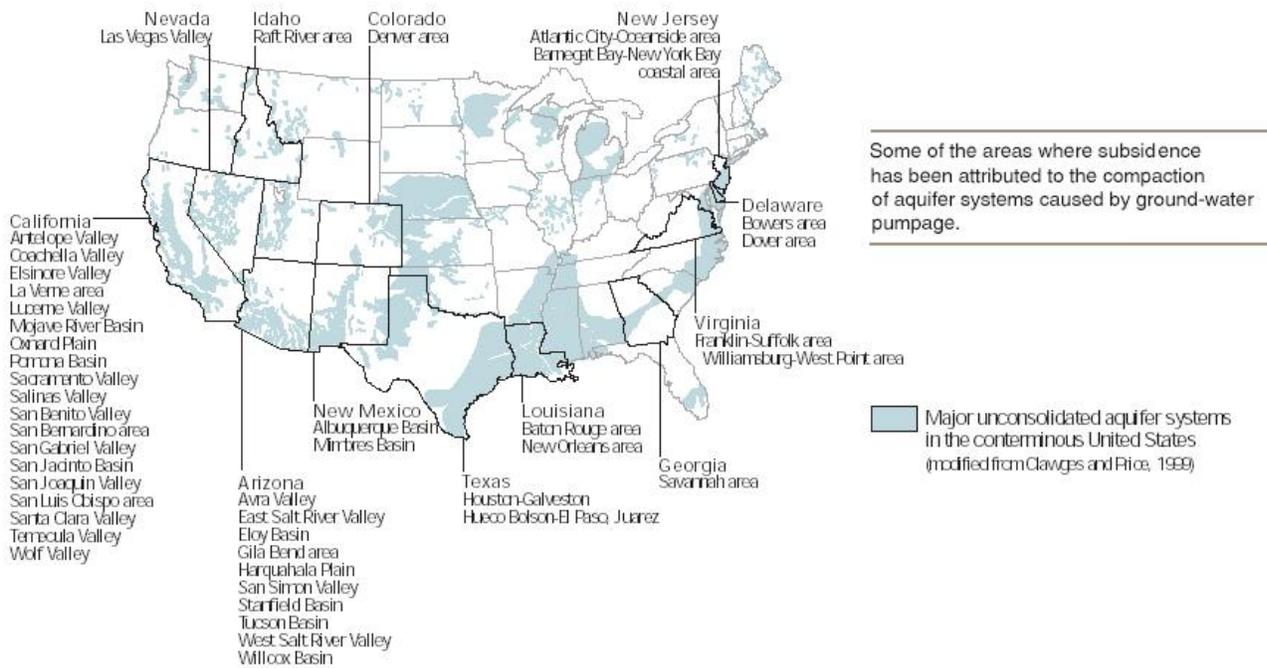
FEMA notes that:

*Areas that are generally prone to landslide hazards include existing old landslides; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used.*

*Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes.*

For most of the City, steep slopes are not problematic for development purposes. Less than one percent of the City has slopes that average greater than 10 percent. These slopes are found adjacent to drainage ways. Based on this information, landslides do not appear to pose a significant natural hazard risk for Rocky Mount.

Sinkholes are when soil subsidence occurs into a natural void beneath the soil surface. Three distinct processes account for most of the water-related subsidence—compaction of aquifer systems, drainage and subsequent oxidation of organic soils, and dissolution and collapse of susceptible rocks (USGS). The compaction of aquifer systems is generally caused by the mining of groundwater for municipal and agricultural use. As the water is withdrawn from an unconsolidated aquifer, the weight of the soil and structures above can exceed the pressure once exerted by the water, and subsidence occurs.

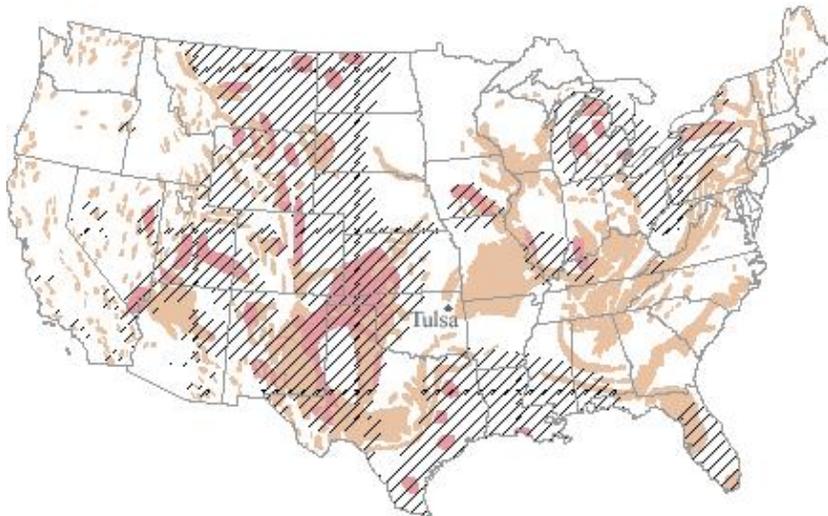


Organic soils are found mostly in the northern United States and Alaska, though some exist in the lowland swamps of the Southeast.



Most organic soils occur in the northern contiguous 48 States and Alaska.

Rock dissolution primarily occurs in areas of limestone or gypsum bedrock. Subsidence occurs when groundwater passes over soluble minerals in the bedrock, dissolving the bedrock. Eastern North Carolina does have some areas with this kind of bedrock.



Salt and gypsum underlie about 40 percent of the contiguous United States. Carbonate karst landscapes constitute about 40 percent of the United States east of Tulsa, Oklahoma (White and others, 1995).

-  Evaporite rocks—salt and gypsum
-  Karst from evaporite rock
-  Karst from carbonate rock  
(modified from Davies and Legrand, 1972)

Sinkhole risk in the Rocky Mount vicinity is primarily from unconsolidated aquifers. Though there is significant agricultural activity in the county, there is generally sufficient rainfall to recharge the aquifers. Sinkhole risk is therefore low.

### 3.11. Tsunamis

A tsunami is a series of waves generated by an undersea disturbance such as an earthquake. From the area of the disturbance, the waves will travel outward in all directions, much like the ripples caused by throwing a rock into a pond. The time between wave crests may be from 5 to 90 minutes, and the wave speed in the open ocean will average 450 miles per hour. Very large inland lakes, such as North America's Great Lakes can also have tsunamis.

Japanese for "harbor wave", tsunamis reaching heights of more than 100 feet have been recorded. As the waves approach the shallow coastal waters, they appear normal and the speed decreases. Then as the tsunami nears the coastline, it may grow to great height and smash into the shore, causing much destruction.



Figure 19 Tsunami.

Tsunamis are caused by an underwater disturbance, usually an undersea earthquake. Landslides, volcanic eruptions, and even meteorites can also generate a tsunami. Tsunamis can originate hundreds or even thousands of miles away from coastal areas. Local geography may intensify the effect of a tsunami. Areas at greatest risk are less than 50 feet above sea level and within one mile of the shoreline.

Rocky Mount is 56 miles from Pamlico Sound, which is protected by the Outer Banks barrier island chain. It is roughly 112 miles to the open sea from eastern Rocky Mount. Rocky Mount has a low risk of tsunamis because tsunamis generally do not impact so far inland.

### 3.12. Dam/Levee Failure

Dam and levee failure are generally caused by heavy precipitation events, and will result in flash flooding, covered in the flood section. In some high-magnitude general floods, levees can be breached but not destroyed, and this can result in a wider general flood rather than a flash flood. The general flood behind the levee can be prolonged as well, with the levee holding the water back on the “protected” side after the initial flood subsides.

The City has dams along the Tar River that are maintained by the City. These dams held during Hurricane Floyd and are considered a low risk for failure.

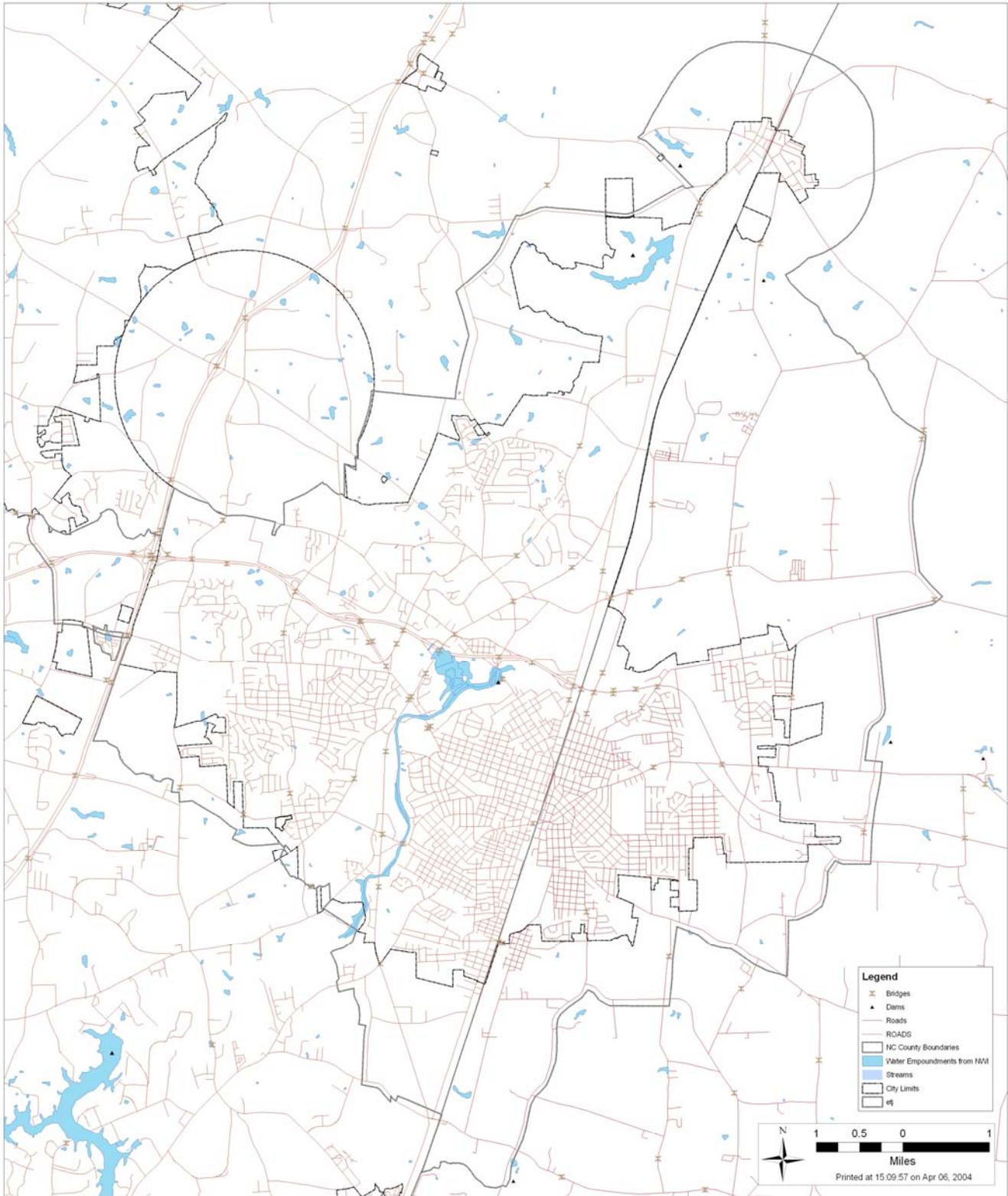
In addition, ponds of over 10 acre-feet (a water volume measurement equal to one foot of water on one acre of land) are regulated by the NC Department of Natural Resources’ Land Management Division’s Land Quality Section. This covers repairs to old dams and new dams not otherwise exempt (Corps of Engineer, TVA, SCS et cetera).

There are over 300 agricultural retention and irrigation ponds in the City’s planning jurisdiction based on the National Wetlands Inventory. These are in various states of repair, but generally do not hold large volumes of water and are not near populated areas, and therefore they pose a low risk.

Figure 20: Impoundments and Levees from NWI.



### Water Impoundments, Dams, and Bridges in the City of Rocky Mount



### 3.13. Hazard Identification Synopsis

The Advisory Committee went through the background data for each hazard and reviewed the plan recommendation for potential risk based on the worksheet in Table 10: Hazard Identification Analysis Worksheet for the City of Rocky Mount. Most of the categories are in line with the State's assessment for either Nash or Edgecombe County.

Table 10: Hazard Identification Analysis Worksheet for the City of Rocky Mount.

Type of Hazard & Associated Elements	Likelihood of Occurrence (Highly Likely, Likely, Possible, Unlikely)	Intensity Rating (Intensity Scales or Relative Terms)	Potential Impact (Catastrophic, Critical, Limited, Negligible)	Conclusions (Rank the Seriousness of the Hazard)
Hurricane/Tropical Storm	L i k e l y	M o d e r a t e	Catastrophic	M o d e r a t e
Nor'easters	L i k e l y	M i l d	Negligible	M o d e r a t e
Flooding	L i k e l y	M o d e r a t e	Critical	M o d e r a t e
Coastal/Riverine Erosion	U n l i k e l y	M i l d	Negligible	L o w
Freezes/Severe Winter Storms	L i k e l y	M o d e r a t e	Limited	M o d e r a t e
Tornadoes/Strong Storms	L i k e l y	M i l d	Critical	M o d e r a t e
Wildfires/Forest Fires	U n l i k e l y	M i l d	Limited	L o w
Earthquakes	U n l i k e l y	M i l d	Negligible	L o w
Drought	U n l i k e l y	M i l d	Limited	L o w
Heat Wave	L i k e l y	M o d e r a t e	Negligible	M o d e r a t e
Landslides/Sink Holes	U n l i k e l y	M i l d	Negligible	L o w
Tsunamis	U n l i k e l y	M i l d	Negligible	L o w
Dam/Levee Failure	U n l i k e l y	S e v e r e	Critical	L o w

#### 4. AREA VULNERABILITY ASSESSMENT

##### 4.1. Residential Development Trends

The City's western half is experiencing significant residential growth. In 2003, two hundred and thirty-four single family and 32 multifamily units were permitted, worth nearly 19 million dollars. Most of these were on the Nash County side, and the City voluntarily annexed some new developments beyond its borders. When mobile homes are added to this, there are an additional 87 units worth around 1.5 million dollars.

##### 4.2. Future Residential Development

In the first half of 2004, there were an additional 119 single family homes, 26 multifamily units, and 50 mobile homes permitted. There are also a number of projects that have been before the Planning Board but are not far enough along to be in the building permit phase. Ford's Colony, just west of the Battleboro area is quite large, with build-out projected more than a decade from now.

##### 4.3. Commercial and Industrial Trends

After the initial loss of traditional manufacturing jobs, the region is beginning to diversify and get its economic footing back. The shift from traditional industry to service is reflected in the building permit numbers: 3 new industrial buildings were permitted in 2003 compared to 9 commercial, which range from office to retail. The dollar values permitted more starkly illustrate the development trend, with the commercial construction valued around 5.6 million dollars, and the industrial only around \$177,000.

##### 4.4. Future Commercial and Industrial Development

The City continues to work with the Carolinas Gateway Partnership to attract, grow, and recruit new businesses. The division of types is likely to continue to reflect regional and national trends in a shift toward a service economy.

##### 4.5. Critical Facilities and Infrastructure Development Trends

###### 4.5.1. Sewerage Treatment

The City has a sewage treatment plant in the eastern ETJ on the Tar River, with a maximum daily treatment capacity of 21 million gallons per day. Current usage is around 14.5 Million Gallons per Day (MGD).

###### 4.5.2. Public Water System

The City has two water treatment plants with a combined treatment capacity of 28 million gallons per day. Current usage is around 14.6 MGD.

###### 4.5.3. Municipal Electric System

The City has over 27,000 electric meters and a system peak around 161 Mega Watts.

###### 4.5.4. Natural Gas System

The City has over 235 miles of distribution lines, and over 14,500 gas meters.

###### 4.5.5. Schools

Schools are a joint venture with Nash County; the school board is a separate entity since the merger of the 2 systems in 1992. There are 13 elementary, 4 junior high or middle, and 4 high schools that serve the City.

There are also some ETJ residents that use Edgecombe County Schools including 2 elementary, 2 middle, and two high schools. Other schools include a charter school, an early childhood learning center, and an alternative learning center for grades 7-12, all three in the Nash-Rocky Mount Schools. There are also 6 religiously affiliated schools, one private school, the Rocky Mount Campus of Edgecombe Community College, Nash Community College, and North Carolina Wesleyan College.

#### 4.5.6. Police

The police station is part of City Hall in downtown Rocky Mount, just west of the Nash-Edgecombe County line. There are over 150 full-time officers, plus reserve officers and support personnel.

#### 4.5.7. Fire/EMS

There are 7 fire stations throughout the City, plus City Hall which functions as an emergency operations center. There are nearly 130 firefighters and support staff involved with fire protection and EMS. There is also a Life Safety Services building in downtown.

#### 4.5.8. Roads and Bridges

The City has 262.28 miles of paved and 7.82 miles of unpaved streets according to the 2004 NCDOT Powell Bill report. The Public Works Department also maintains associated drainage culverts and bridges.

#### 4.5.9. Medical or Nursing Homes (?)

There are 3 hospitals in the City: Nash General Hospital, Nash Day Hospital, and Coastal Plain Hospital. Other medical facilities include the Bryant T. Aldridge Rehabilitation Center, Nash Urgent Care, and Community Health Services.

Nursing homes were tallied from the group quarters report sent to the Census annually, and include: Alterra Sterling House, Heritage Retirement Center, the Rocky Mount-Wilson Apartments for the Elderly, Brekenridge, Nash Rehabilitation and Nursing Center, Guardian Care, Hunter Hills, Somerset Court, Spring Arbor, and South Village.

#### 4.5.10. Dams

The City maintains 1 major dam on the Tar in support of the water treatment plant.

#### 4.5.11. Shelters

The City works with both Counties on designated shelter issues.

### 4.6. Future Critical Facility and Infrastructure Development

#### 4.6.1. Public Water System

There are no major expansions planned other than extensions to newly annexed areas.

#### 4.6.2. Sewerage Treatment Plants

There are no major expansions planned other than extensions to newly annexed areas.

#### 4.6.3. Schools. Etc.

There are no new schools planned within the City; however, any new schools constructed are planned to be outside the City's jurisdiction. These new schools may serve some of the City's school age population. Two facilities in the City are slated for replacement: Rocky Mount High School and Pope Elementary.

The City's 2001 Mitigation Plan reexamined the vulnerability of many flood risk types in great detail. The new flood maps will change the properties at risk, and some mitigation efforts and buyouts have removed vulnerable structures from the flood zone. Other damaged properties were redeveloped to keep the structures out of harm's way. These will be profiled in the latter part of this section, after a look at the 2001 Plan:

*As of mid-2001, the January 1982 Flood Insurance Rate Maps (FIRM) prepared by FEMA offer the best overview of flood risks. The FIRMs are used to regulate new development and substantial improvement or repair of substantial damage of older buildings. Map 5-1 shows the City of Rocky Mount with mapped special flood hazard areas.*

*Using the City's GIS mapping and the 1982 FIRM as an overlay to the property parcel data, approximately 5.9 square miles of the City's 36.2 square miles (16%) is mapped SFHA.*

*Following on the widespread flooding due to Hurricane Floyd, in 2000 the North Carolina Legislature authorized funding and a program to cooperate with FEMA to revise and republish Flood Insurance Rate Maps throughout the State. The City of Rocky Mount anticipates receiving the new maps and study in late 2001, and will revise the above figures.*

The new flood area mapping done post-Floyd was available for this analysis. The results are listed in Table 11: Worksheet #2--Geographic Planning Area Vulnerability Assessment. Only dams and non-parcel based, i.e., structures in public rights-of-way such as bridges and trestles, vulnerabilities were used from the 2001 Plan as being the best available data. Text of the 2001 plan vulnerability assessment is included after the updated numbers in Worksheet 2 for context and reference.

The new FIRM mapping was done after Hurricane Floyd using airborne LIDAR and digital imagery. The City plans to adopt the new FIRM maps on November 3, 2004. The new data are reflected in the maps used in this plan except where the 2001 plan is specifically referenced.

**4.7. Table 11: Worksheet #2--Geographic Planning Area Vulnerability Assessment.**

Geographic Planning Area: The City of Rocky Mount

Hazard: Flood and Steep Slope

Current Conditions The City contains little steep slope but does have some floodplain.				Potential Future Conditions		
Type of Development	Number of Existing Private Buildings	Current Value	Current Number of People	Projected Number of Private Buildings	Projected Value (If developed under existing policies)	Projected Number of People (If developed under existing policies)
Residential	140	\$ 3,664,620	365	35-40	2.5 million (average value of recent approvals x #)	90
Commercial	21	\$ 258,108	20+	8-10	4-5 million (average value of recent approvals x #)	9+
Industrial	4	\$ 950,650	33+	-	-	-
Institutional (non-government)	5	\$ 633,292	Varies by day	-	-	-
Other	-	-	-	-	-	-
<i>Total</i>	<i>170</i>	<i>\$ 5,506,670</i>	<i>415+</i>	<i>43-50</i>	<i>6.5 to 7.5 million</i>	<i>99+</i>

Data was collected from the County Tax Office for areas that intersect with Hydrologic Soil types. Data was collected and totaled by County, Category, and Conditions.

Worksheet #2 Continued on next page...

Worksheet #2, continued from previous page. Note this includes only facilities in the 100 and 500 year flood zones.

Current Conditions				Potential Future Conditions		
Public Buildings and Critical Facilities						
Type of Facility	Number of Existing Public Buildings and Critical Facilities	Current Replacement Value	Current Number of People	Projected Number of Public Buildings and Critical Facilities	Projected Value	Projected Number of People
Sewage Treatment Plant	1	47,000,000	vary	-	-	-
Water Treatment Plant	1	1,620,000	vary	-	-	-
Hospital	-	-	-	-	-	-
Schools	-	-	-	-	-	-
Infrastructure (roads, bridges, drainage, etc.)	48 linear miles in 100 and 500 year, some NCDOT roads included	Data Unavailable	n/a	-	-	-
Police Station		-	-	-	-	-
Fire Station	-	-	-	-	-	-
Hazardous Materials Facilities	3; 2 public, one private	5,877,767	vary	-	-	-
Government Offices	3; Warehouse, animal shelter, bldg	791,599	vary	-	-	-
Emergency Shelters	-	-	-	-	-	-
Public Housing	-	-	-	-	-	-
<i>Subtotal</i>	<i>8</i>	<i>\$55,289,366</i>	<i>varies</i>	-	-	-
<b>Total</b>	<b>8</b>	<b>\$55,289,366</b>	<b>varies</b>	-	-	-

From 2001 Plan: ***Flood Risks – Buildings***

*Flood-prone buildings will be re-assessed upon issuance of the revised Flood Insurance Rate*

*The City's Department of Planning & Development has estimated the number of buildings in some of the mapped flood hazard areas.*

*Excluding the main stem of the Tar River, Little Cokey Swamp and Cowlick Creek, it is estimated that approximately 500 buildings are flood-prone. As evidenced by flooding from Hurricane Floyd, the total number in the City is considerably higher. Six manufactured home parks and subdivisions are found within the City limits and the ETJ, and some are subject to flooding.*

*Based on flood insurance data provided by FEMA, 29 properties have received multiple insurance claim payments and meet FEMA's definition of "repetitive loss." Repetitive loss properties are those that have received 2 or more claims of at least \$1,000 since 1978. As of March 2000, twenty of those properties were slated for inclusion in the Floodplain Buyout Program. Map 5-2 shows the general locations of the eight repetitive loss properties that are not slated for acquisition (the remaining property is unaccounted for due to incomplete address).*

*The presence of buildings in flood hazard areas means more than potential property damage, it means people are at-risk. Improved flood hazard information, accessible in GIS format, will help improve communication during anticipated flooding periods and will enhance the City's ability to issue flood warnings, to evacuate and to undertake other safety measures.*

From 2001 Plan: ***Flood Risks – Public Buildings & Infrastructure***

*The City of Rocky Mount owns several buildings throughout the City. Hurricane Floyd revealed that a number of buildings are at-risk if a flood event is of such severity. Map 5-3 shows City-owned property (not buildings) relative to the mapped flood hazard areas. Map 5-4 (in 2001 Plan) shows the locations of fire stations and public schools, indicating that none appear to be at-risk of flooding (based on older FIRMs).*

*The City provides public utility services, including some services to areas and towns outside of its corporate limits. The City:*

- Owns and maintains its own electric and gas distribution systems, including above-ground and underground infrastructure (pipes, poles, switching stations, etc.);*
- Owns and operates two water plants and distribution system; the plants draw from the Tar River and can treat 26-28 million gallons per day;*
- Owns and operates the Rocky Mount Regional Wastewater Treatment Plant, which treats all the wastewater in the municipal system; the City has an ongoing program of replacing and sealing sewer lines and upgrading lift stations.*

*The City has no record of damage sustained by City-owned buildings due to high winds or heavy winter storms.*

*Hurricane Floyd: Infrastructure Recovery*

*An engineering report was prepared for the River Drive Water Plant after Hurricane Floyd to evaluate the damage and identify options; some low-cost measures were implemented, including anchoring raw material tanks to prevent flotation.*

*During Hurricane Floyd, the pump station flooded, impairing the on-site generator at the wastewater treatment plant; the generator has been elevated above the flood level experienced in Hurricane Floyd, but the screw pump motors are subject to extreme flooding.*

*Hurricane Floyd flooded 20 sewer lift stations in the collection system. Some switchgear and breaker equipment were raised above flood levels experienced in Hurricane Fran and additional electrical controls were elevated after Hurricane Floyd. Generators are being placed on platforms to elevate equipment above the flood levels experienced in Hurricane Floyd.*

*Several electric substations are in the mapped floodplain; Hurricane Floyd flooded three substations, they are being rebuilt (elevating components that can be elevated) using FEMA recovery funds.*

**From 2001 Plan: *Flood Risks – Roads***

*Based on the Flood Insurance Study (1981) for the City, in which are available flood profiles showing water surface elevations for those areas with detailed studies, a total of 64 road crossings span waterways within the City. It is notable that this inventory is based on a data source that is +20 years old, and thus is not a definitive list of all flood-prone crossings. Five crossings carry the Seaboard Coast Line Railroad; 59 crossings carry roads ranging in size from large highways (US 64 and US 301) to a dirt road over Compass Creek.*

*Flood-prone roads will be re-assessed upon issuance of the revised Flood Insurance Rate Map (anticipated late 2001).*

*Table 5-1 (in 2001 Plan) lists thirty-seven road crossings over waterways that are subject to some degree of flooding as indicated by the flood profiles contained in the City's Flood Insurance Study. Map 5-5 (in 2001 Plan) shows the locations for those road crossings where the depth of water for the predicted 100-year flood condition ranges from 1-foot to 4 feet deep. The following are notable conclusions:*

- Old Mill Road (SR 1713) over Maple Creek is the most severely flood-prone, predicted to have +4' of water during the 1%-annual-chance flood.*
- Nine roads are predicted to flood between 2-4' deep, which poses considerable threat to the traveling public as 18-24" of water can float the average car.*
- Fifteen roads are predicted to flood between 1-2' deep, which is generally considered to be less significant threats to vehicles unless velocity is present; however, 2 feet of flooding can be hazardous to adults and children on foot.*
- Twelve roads are expected to experience minor overtopping during the 1%-annual chance flood event.*
- One Seaboard Coast Line rail crossing (located on Compass Creek between US 301 and the confluence with Indian Branch) appears to be subject to minor flooding of about 1' under 500-year flood conditions.*

*Nationwide, flooded roads pose the greatest threat to people: on average, more than 200 people die in floods; most of them are lost when they try to cross flooded roads. Many cars will float in less than 24" of water and fast moving water can quickly wash cars off the road. While most roads in the Rocky Mount area*

*are unlikely to have deep or fast moving water during flood conditions up to the level of the 100-year flood, this threat still exists.*

*Another national statistic is associated with flooded roads: replacing roads and bridges that are washed out by floods costs millions of dollars each year. If the damage is caused by a Presidentially-declared disaster, FEMA may pay up to 75% of the costs. If roads are locally-owned, local jurisdictions are expected to pay at least 25%. Local jurisdictions pay 100% of the repair or replacement costs if the damaging event is not declared a major disaster.*

From 2001 Plan: *Table 5-1*

**100-Year Flood: Predicted Depth Over Road (FIS, 1981).**

0-1 foot	1-2 feet	2-4 feet	+4 feet
US 301/Business (Hornbeam Br)	SR 1251 (Tar River Trib)	SR 1268 (Tar River Trib)	1713/Old Mill Rd (Maple Cr)
SR 1541/Jeffries Rd (Hornbeam Br)	Hunting Lodge Rd (Tar River Trib)	Dirt Road (Compass Cr)	
NC 48/St. Catherines Walk (Hornbeam Br)	SR 1401 (Compass Cr)	SR 1538 (Compass Cr)	
SR 1536 (Hornbeam Br)	US 301 (Compass Cr)	Leggett Rd (Cowlick Cr)	
NC 97 (Compass Cr)	NC 48/St Catherines Walk (Compass Cr)	Virginia St (Cowlick Cr)	
Seaboard Coast Line RR (Compass Cr)	Stokes Ave (Cowlick Cr)	Madison St (Parkers Cr)	
Farm Rd (Cowlick Cr)	East Grand Ave (Parkers Cr)	US Hwy 64 (Stony Cr downstream)	
SR 1616/Country Club Rd (Goose Br)	Olive St (Parkers Cr)	SR 1158/Vance St (Little Cokey Swamp)	
SR 1616/Country Club Rd (Stony Cr)	Coleman Ave (Parkers Cr)	Boone St (Little Cokey Swamp)	
SR 1717/Westmount Dr (Grape Br)	Park Ave (Parkers Cr)		
SR 1002/Old Wilson Rd (Little Cokey Swamp)	SR 1544/Barnum Rd (Goose Br)		
Powell Dr (Little Cokey Swamp)	SR 1714/Bethlehem Rd (Maple Cr)		
	Church St (Little Cokey Swamp)		
	Kinlaw St (Little Cokey Swamp)		
	SR 1727 (Little Cokey Swamp)		
	SR 1251 (Tar River Trib)		

From 2001 Plan: *Flood Risks – Hazardous Materials*

*When floodwaters impact locations where hazardous materials are stored or used, the stage is set for potential effects that go far beyond the physical on-site damage associated with flooding. Certain materials are reactive in water and others may pose health and safety risks if distributed downstream by rising waters.*

*The Edgecombe and Nash County Emergency Management Departments maintain information on certain reported hazardous materials. If the information is verified to determine whether the actual physical locations of the materials can be determined, it can be used with the flood hazard maps to screen for potential interactive risks. Depending on the nature of the materials and the facilities, it may be appropriate for owners to examine potential damage under a reasonably anticipated flood.*

From 2001 Plan: *Flood Risks – Stormwater Management*

*Experience shows that many drainage problems in Rocky Mount are not dramatic or life-threatening. Many areas experience accumulations of rainfall that are slow to drain away, causing disruption of normal vehicular and pedestrian travel, soil erosion, water quality problems, and some minor damage and disruption for residents and businesses.*

*As of mid-2001, Rocky Mount's stormwater management provisions are applied only through the subdivision process, and thus not to single large lot developments. For two reasons, stormwater management is not intended or likely to significantly reduce severe flooding along the Tar River and major tributaries:*

- Most of the Tar River watershed is outside of the City and thus not subject to regulations imposed by the City; and*
- Stormwater management generally focuses on runoff from the 2- and 10-year storms, which helps improve water quality, minimizes erosive effects on receiving streams, and reduces the likelihood of low level and localized flooding.*

*The Rocky Mount Comprehensive Plan acknowledges that improving water quality and maintaining the capacity of local drainageways is important. The City is initiating evaluation of alternatives to regulate and finance a stormwater management program.*

From 2001 Plan: *Flood Risks – Dams*

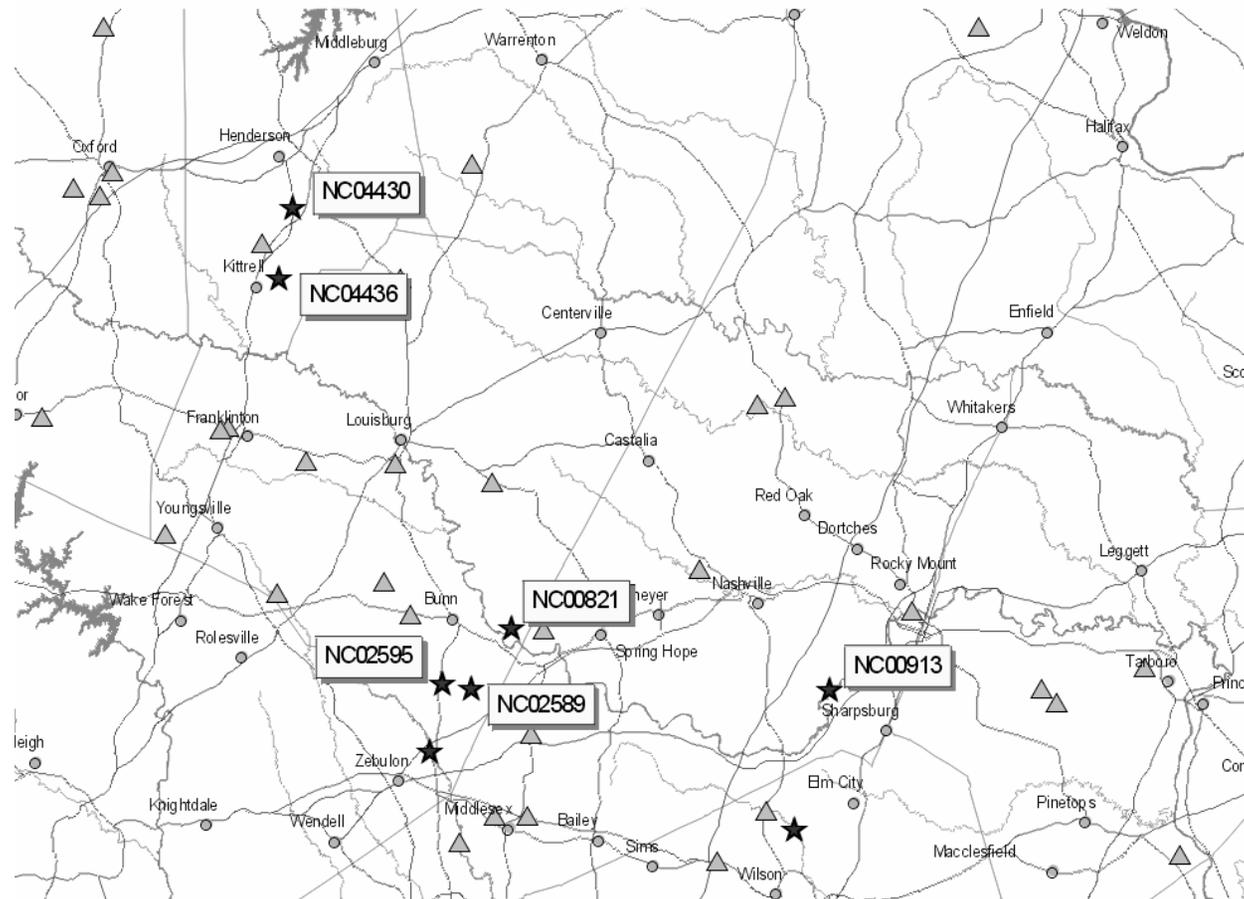
*FEMA and the U.S. Army Corps of Engineers maintain the National Inventory of Dams (1998), a database of high and significant hazard dams. For the most part, data on non-federal dams is provided by state agencies responsible for regulation and inspection of dams. The North Carolina Department of Environmental Health and Natural Resources has reported on dams located on waterways that drain through the City of Rocky Mount.*

*Dams are categorized into three hazard potential classes:*

- ***High hazard potential** dams are those where failure or operational failure will probably cause loss of life and/or significant infrastructure losses.*
- ***Significant hazard potential** dams are those where failure or operational problems are unlikely to cause loss of human life, but can cause economic loss, environmental damage, disruption of lifelines or other concerns.*
- ***Low hazard potential** dams are those where failure would cause no probably loss of human life and low economic and/or environmental losses, and such losses typically are limited to the owner's property.*

*Map 5-6 (in 2001 Plan) shows the location of high and significant hazard dams that appear to be in the Tar River watershed. Mapped locations are based on latitude and longitude data contained in National Inventory; actual locations may need to be verified. Table 5-2 (in 2001 Plan) summarizes certain information related to the hazards these dams may pose to downstream communities.*

Figure 21: 2001 Plan Map 5-6, High and Significant Hazard Dams in the Tar River-Watershed.



**Map 5-6**  
**High and Significant Hazard Dams**  
**Tar River Watershed**

★ High Hazard Dam/ID#
 ▲ Significant Hazard Dam

Source: FEMA and USACE, National Inventory of Dams

0 1 2 Miles

Map prepared by the City of Rocky Mount Information Systems Division

From 2001 Plan: Flood Risks –Table 5-2  
High Hazard Dams in the Tar River Watershed.

Dam Name Owner Purpose	NID # Waterway	Year Built Inspected by DEHNR	Emergency Action Plan Height of Dam
Lake Royale Dam Lake Royale Devel. Corp. Recreation	NC00821 Cypress Creek	1973 Mar 1993	No 45 feet
Tar River Dam City of Rocky Mount Water Supply	NC00913 Tar River	1971 Nov 1994	No 35 feet
Lambert Dam George W. Lambert Fire/Farm Pond	NC002589 Press Prong Creek	Not reported Oct 1993	No 18 feet
Cone Pond Dam D. and E. Cone Fire/Farm Pond	NC002595 Norris Creek	1989 Oct 1994	No 17 feet
Rose's Warehouse Dam Rose's, Inc. Fire/Farm Pond	NC04430 Not reported	Not reported March 1993	No Not reported
Buffalo Millpond Buffalo Mining/D. Spencer Irrigation	NC04436 Not reported	1864 Nov 1993	No 20 feet

None of the dams are noted as having Emergency Action Plans. Emergency Action Plans typically include some form of identification of vulnerable property (dam failure inundation map or list), coordination protocols for notification of emergency personnel, and delineation of evacuation routes.

## 5. CAPABILITY ASSESSMENT

This portion of the Plan assesses the City of Rocky Mount's current capacity to mitigate the effects of the natural hazards identified in the Risk Assessment Chapter of the Plan. The assessment includes a comprehensive examination of the following local government capabilities:

- Staff & Organizational Capability
- Technical Capability
- Policy & Program Capability
- Fiscal Capability
- Legal Authority
- Political Climate

The purpose of conducting this capabilities assessment is to identify potential hazard mitigation opportunities available to the City of Rocky Mount through its operation as a local government. Careful analysis should detect any existing gaps, shortfalls or weaknesses within existing government activities that could exacerbate community vulnerability. The assessment will also highlight the positive measures already in place or being done at the City level, which should continue to be supported and enhanced if possible through future mitigation efforts.

The capabilities assessment serves as the foundation for designing an effective hazard mitigation strategy. It not only helps establish the goals and objectives for the City of Rocky Mount to pursue under this Plan, but ensures that those goals and objectives are realistically achievable under given local conditions.

### 5.1. STAFF & ORGANIZATIONAL CAPABILITY

The City of Rocky Mount has adequate staff and organizational capability to implement hazard mitigation strategies.

The City of Rocky Mount is governed by a 7-member City Council plus the Mayor who bear the responsibility of serving the people and improving the quality of life in the City. A City Manager acts on their behalf and manages City finances and services.

The City has 13 Departments including the City Clerk. Since the FY 03-04 budget year, the City has added several new positions, including an E-911 Coordinator.

Table 12: Applicable Elected and Appointed Boards and Commissions.

Body/Department	#Members/Staff	Annual Budget	Term Length (Years)	Staggered Terms?
City Council	8	\$509,555	4 years	Yes
Planning Board	12	-----	4 years	Yes
Board of Adjustment	16	-----	4 years	Yes
Historic Preservation Commission	11	-----	4 years	Yes
Housing Authority	5 members/1 Alternate		5 Years	Yes
Inspection Services Advisory Committee	12		3 years	Yes
Redevelopment Commission	9		5 years	Yes
Stormwater Advisory Committee	Up to 18		Duration of stormwater management program	No—meets as needed

Table 13: Staff/Contracted Services.

Body/Department	# Members/ Staff	Annual Budget
City Manager/City Clerk	15	\$909,343
Human Resources	9	\$1,127,487
Human Relations	4	\$266,369
Finance	85	\$1,428,103
Police	200	\$10,179,268
Fire <sup>2</sup>	146	\$8,225,285
Public Works	108	\$9,084,740
Engineering	25	\$1,244,567
Planning <sup>3</sup>	27	\$1,368,365
Parks and Recreation	62	\$5,467,998
Water Resources	97	\$24,165,090
Public Utilities	81	\$98,747,490

<sup>2</sup> Level II Firefighter, HAZMAT Operations, and EMTD are baseline certifications

<sup>3</sup> Includes Building Inspections and Community Development

## 5.2. TECHNICAL CAPABILITY

The City of Rocky Mount has the capability to implement hazard mitigation strategies.

### **Technical Expertise**

The City of Rocky Mount has over 800 full-time employees including professional engineers, planners, police officers, fire crews, and other first responders.

### **Information Technology**

The City has a capable Information Services (IS) department of 8 persons and is part of the City Finance Department, with an annual budget of over a million dollars.

### **Geographic Information Systems (GIS)**

GIS systems can best be described as a set of tools (hardware, software and people) used to collect, manage, analyze and display spatially-referenced data. Many local governments are now incorporating GIS systems into their existing planning and management operations.

The City of Rocky Mount currently has 2 GIS staff within the IS department. The City can also draw on the resources of the Upper Coastal Plain Council of Governments, of which the City is a member. Additionally, both Counties maintain many of the geographic data layers that the City uses. The City coordinates and shares data with both Counties.

### **Internet Access**

The City has email and staff access to the Internet.

It is believed that Internet access will help further the City's hazard mitigation awareness programs, but should be supplemented with more traditional (and less technical) means as well.

### 5.3. FISCAL CAPABILITY

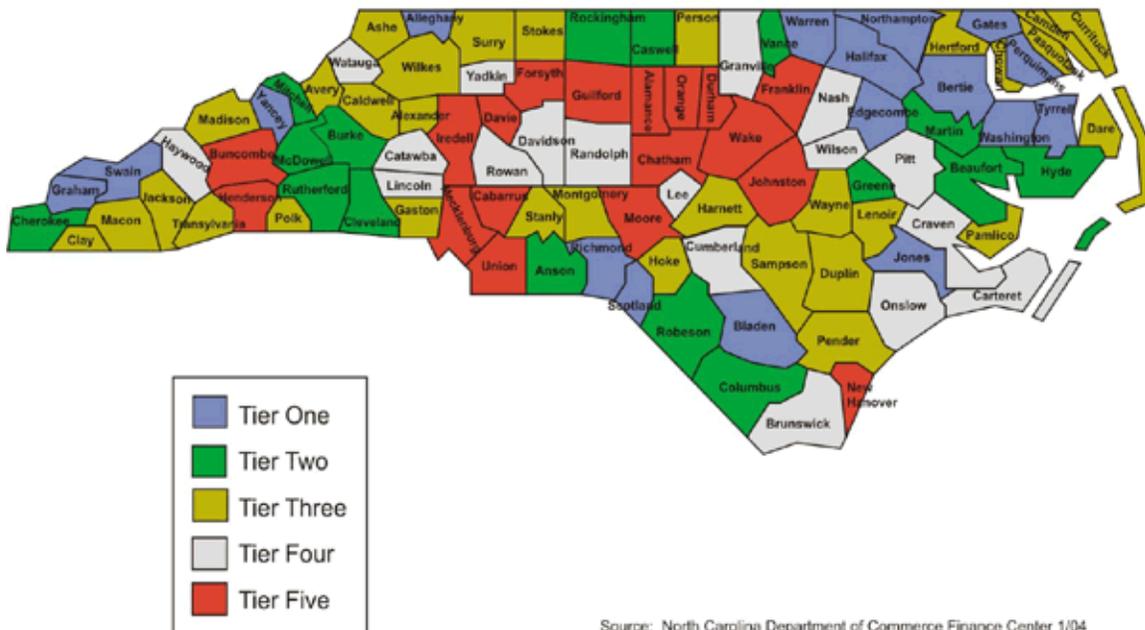
Rocky Mount has some fiscal capability to implement hazard mitigation strategies. The annual budget for the City in FYr 03-04 was \$174,748,712.

The City straddles the Nash County/Edgecombe County line, and the bulk of the City lies within Nash County. Nash County has experienced significant growth in the last decade, with the City growing to the north, west, and southwest.

It is likely that City of Rocky Mount could afford to provide the local match for the existing hazard mitigation grant programs. However, considering the current budget deficits at both the State and local government level stemming from an economic recession and slow growth, funding is a concern. Increased reliance on local accountability by the Federal government is a significant and growing financial concern for City of Rocky Mount.

The North Carolina Department of Commerce classifies counties into one of five tiers, with Tier 1 representing the most economically disadvantaged and Tier 5 the most prosperous. Tiers 1, 2 and 3 are considered "distressed" based on various economic and demographic characteristics. Edgecombe County is currently classified as a Tier 1 county, which makes it easier for the City to access a special utilities fund, priority status for Community Development Block Grant funds for economic development, and a waiver of local matching fund requirements for CDBG funds and Industrial Development Fund loans and grants. Nash is a Tier 4 and receives few of these benefits, but this is mitigated by the growth that creates a larger tax base.

**2004  
NORTH CAROLINA TIER DESIGNATIONS**



#### 5.4. POLICY AND PROGRAM CAPABILITY

This part of the capabilities assessment includes the identification and evaluation of existing plans, policies, practices, programs, or activities that either increase or decrease the community's vulnerability to natural hazards. Positive activities, which decrease hazard vulnerability, should be sustained and enhanced if possible. Negative activities, which increase hazard vulnerability, should become targeted for reconsideration and be thoroughly addressed within the Mitigation Strategy for the City of Rocky Mount.

Included in this section are Plans, Ordinances, Laws, Policies, and Political Climate.

#### 5.5. MITIGATION CAPABILITIES ASSESSMENT

##### 5.5.1. Emergency Operations Plan

City of Rocky Mount has an Emergency Operations plan titled The City of Rocky Mount Emergency Response Plan that became effective March 1, 1996 and continues to be updated and monitored. Significant updates were done in April of 1999 and again in June of 2002. The stated purpose of the Plan is:

*"...to facilitate the effective and efficient use of the City's resources in the event of an emergency. This plan is designed to be flexible enough that it may be immediately adjusted to any situation. It provides the mechanisms for integrating the various departments of government into one cohesive unit. This unit has a single mission—one of containing the emergency. Identifying and implementing the most direct course(s) of action to mitigate a situation in a manner that best meets the overall demands of the citizens of Rocky Mount are prime objectives."*

##### 5.5.2. Floodplain Management Plan

City of Rocky Mount has a Flood Damage Prevention Ordinance adopted June 3, 1987, and revised in 2001 and 2004. The 5 purposes outlined in the Ordinance are as follows:

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

##### 5.5.3. Stormwater Management Plan

City of Rocky Mount has an adopted stormwater management plan, the City of Rocky Mount Stormwater Management Plan—Tar-Pamlico River Basin: Stormwater Program for Nutrient Control adopted by the City Council on August 9, 2004. The intent of this plan is to serve as a guidance document for the operation of the City's comprehensive stormwater management program as it relates to compliance with the Tar-Pamlico River Basin – Nutrient Sensitive Waters Management Strategy: Basin-wide Stormwater Requirements.

**5.6. INVENTORY OF LOCAL ORDINANCES RELEVANT TO HAZARD MITIGATION**

The City of Rocky Mount has adopted several ordinances relevant to hazard mitigation.

**5.6.1. Zoning Ordinance**

The City of Rocky Mount adopted their Land Development Code (LDC) on July 12, 2004. The stated purpose of the Code follows:

This LDC classifies and regulates the use of land, buildings and structures within the corporate limits and the ETJ. The zoning regulations contained herein are enacted to promote the health, safety, convenience and welfare of the City’s inhabitants by dividing the City into districts and regulating therein the use and size of parcels of land and the use and size of buildings and structures as to height and number of stories, the coverage of land by buildings, the size of yards and open space, density of population and location of buildings. It is the intention of the City Council that the provisions of this LDC will implement the purpose and intent of the adopted Comprehensive Plan and other development plans of the City by encouraging the most desirable use of the land for residential, recreational, agricultural, commercial, industrial, conservation, public service, floodplain and drainage purposes, and the most desirable density of population in all parts of the City, and by encouraging the most appropriate use and occupancy of buildings, and by promoting good land use planning. The subdivision regulations establish proper legal description, monumentation and recordation of land that will facilitate identification and permanent location of real estate boundaries, while setting forth requirements for layout, design and construction improvement standards for streets, utilities and similar public facilities.

The LDC covers subdivision, watershed protection, fire and life safety access, sedimentation and erosion control, stormwater, and a floodplain protection zoning overlay district as well as zoning. Because this Code contains more than just zoning, it is a very effective hazard mitigation tool.

**5.6.2. Manufactured Housing and Travel Trailer Park Ordinance**

The City regulates manufactured homes in the Zoning Ordinance and does not have a separate Manufactured Housing Ordinance.

**5.7. LEGAL AUTHORITY**

Local governments in North Carolina have a wide range of tools available to them for implementing mitigation programs, policies and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of North Carolina, which are (a) Regulation; (b) Acquisition; (c) Taxation; and (d) Spending.

The scope of this local authority is subject to constraints, however, as all of North Carolina’s political subdivisions must not act without proper delegation from the State. Under a principle known as “Dillon’s Rule,” all power is vested in the State and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize North Carolina’s enabling legislation which grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

**5.7.1. Regulation**

**5.7.1.1. General Police Power**

North Carolina’s local governments have been granted broad regulatory powers in their jurisdictions. North Carolina General Statutes (N.C.G.S.) bestow the general police power on local governments, allowing them to enact and

City of Rocky Mount	61	Hazard Mitigation Plan 2004
---------------------	----	-----------------------------

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), cities, towns 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 (N.C.G.S. Ch. 160A Art. 8 (Delegation and Exercise of the General Police Power to Cities and Counties); Ch 153A, Art. 6 (Delegation and Exercise of the General Police Power to Counties)).

City of Rocky Mount has enacted and enforces regulatory ordinances designed to promote the public health, safety and general welfare of its citizenry. These ordinances are listed and further discussed in Worksheet 3 of this Chapter.

#### 5.7.1.2. 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. Many of these standards are imposed through the building code.

North Carolina has a State mandatory building code, which applies throughout the state (N.C.G.S. 143-138(c)). However, municipalities and counties may adopt codes for their respective areas if approved by the State as providing “adequate minimum standards” (N.C.G.S. 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. N.C.G.S. Ch. 160A, Art. 19. Part 5; and Ch. 153A Art. 18, Part 4 empower cities and counties to create an inspection department, and enumerates its duties and responsibilities, which include enforcing state and local laws relating to the construction of buildings, installation of plumbing, electrical, heating systems, etc.; building maintenance; and other matters. City of Rocky Mount has adopted the state building code, and has established a Building Inspections Department to carry out its building inspections.

#### 5.7.1.3. Land Use

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

Each local community possesses great power to prevent unsuitable development in hazard-prone areas. See N.C.G.S. Ch. 160A, Art. 8. (Delegation and Exercise of the General Police Powers to Cities and Towns); Art. 19 (Planning); Part 3 (Zoning); and Ch. 153A. Art. 6 (Delegation and Exercise of the General Police Power to Counties); Art. 18 (Planning and Regulation of Development); Part 2 (Subdivision Regulation); and Part 3 (Zoning).

#### 5.7.1.4. 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 (N.C.G.S. 160A-387). 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 (N.C.G.S. 160A-361). The importance of the planning powers of local governments is emphasized in N.C.G.S. 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. City of Rocky Mount has a Department of Planning and Development which includes 3 divisions: Planning, Inspections, and Community Development. The City also has a Comprehensive Plan that ties with many other plans. The 2001 Hazard Mitigation Plan described the Comprehensive Plan:

#### *History and Overview*

*Rocky Mount's Comprehensive Plan (2001) is the result of a process initiated in October 1998. It contains an overview of existing conditions and describes the regional context within which Rocky Mount was established and has grown. Considerable detail is provided on the City's population, employment, economic environment, transportation, infrastructure, and housing.*

#### *Public Involvement*

*The Comprehensive Plan process included a commitment to engage everyone who was interested in the City's future. Appointed by City Council, the 23-member Steering Committee included citizen representatives, business leaders, civic and neighborhood organizations, and elected and appointed leaders. The Committee guided the process, gathered ideas presented in public forums, and facilitated a consensus decision-making process.*

*Rocky Mount's development of the Comprehensive Plan was interrupted in September 1999 by the occurrence of flooding from Hurricanes Dennis and Floyd. Inevitably, when the planning process resumed after the disaster, considerable attention was paid to mitigating the impacts of future floods. The imprint of the disaster remains on both the City and the Comprehensive Plan. Numerous references and strategies relate to enhancing the resistance of the City and its citizens to future flood events.*

#### *Vision and Goals*

*The vision for the Comprehensive Plan is “to balance growing inward through reinvestment and redevelopment, and accommodating new growth on the City's periphery – both seamlessly blending together.” This vision is further defined by nine goals; each goal is supported by a variety of strategies:*

- *Community Appearance;*
- *Community Facilities;*
- *Land Use;*
- *Economic Development;*
- *Housing;*
- *Natural Environment;*
- *Transportation;*
- *Utilities; and*
- *Neighborhoods.*

*One of several principles, or statements of purpose, relates to natural hazards, notably flooding: Floodplain considerations will play a larger role in the City's development and infrastructure decisions. This principle plays out in numerous strategies that directly or indirectly address flooding.*

#### *Strategies*

*The Comprehensive Plan sets forth 228 strategies organized under nine broad goals. In addition to strategies that are “ongoing,” tentative timeframes are established for each strategy, ranging from Short Term (2001-2005) to Mid-Term (2006-2010) to Long Term (2011-2025).*

The key to using the Comprehensive Plan as a tool for hazard mitigation lies in the ties it has under “Vision and Goals.” Each of these bullets is linked to another plan, i.e., community facilities and utilities are elements of a Capital Improvement Plan; Transportation is tied to NCDOT’s Thoroughfare Plan and it’s local counterpart at the City and MPO; Economic Development is related with the regional Comprehensive Economic Development Strategy submitted to the Economic Development Administration of the Federal Department of Commerce, et cetera.

Because the Comprehensive Plan already coordinates with these other plans, these plans are also included by association.

#### 5.7.1.5. Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. Broad enabling authority for municipalities in North Carolina to engage in zoning is granted in N.C.G.S. 160A-381; and for counties in N.C.G.S. 153A-340 (counties may also regulate inside municipal jurisdiction at the request of a municipality (N.C.G.S. 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 (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and set backs, density of population, etc. Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts (N.C.G.S. 160A-382). Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text. City of Rocky Mount adopted zoning originally in 1975 to guide growth and development.

#### 5.7.1.6. 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. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division/sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures.

Broad subdivision control enabling authority for municipalities is granted in N.C.G.S. 160-371, and in 153-330 for counties outside of municipalities and municipal extraterritorial planning jurisdictions (ETJs). Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street (N.C.G.S. 160A-376). The definition of subdivision does not include the division of land into parcels greater than 10 acres where no street right-of-way dedication is involved (N.C.G.S. 160A-376(2)).

City of Rocky Mount subdivision provisions are part the LDC described in §61.

#### 5.7.1.7. Floodplain Regulation

In the summer of 2000, the North Carolina General Assembly adopted Senate Bill 1341, entitled “An Act to Prevent Inappropriate Development in the One Hundred-Year Floodplain and to Reduce Flood Hazards.” This act was proposed through the North Carolina Department of Environment and Natural Resources in the wake of Hurricane Floyd and the catastrophic flooding that followed.

Under the Act, the North Carolina General Statutes regulating development within floodways were rewritten to include floodplain regulation (N.C.G.S. 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; and (3) promote the public health, safety and welfare of citizens of North Carolina in flood hazard areas.

The new statute affects local governments by directing, not mandating, that local government entities: (1) designate a one hundred-year floodplain; (2) adopt local ordinances to regulate uses in flood hazard areas; (3) enforce those ordinances, and (4) grant permits for use in flood hazard areas that are consistent with the ordinance. The act also makes certain that local ordinances meet the minimum requirements of participation in the National Flood Insurance Program (NFIP).

The incentive for local governments adopting such ordinances is that they will afford their residents the ability to purchase flood insurance through the NFIP. In addition, communities with such ordinances in place will be given priority in the consideration of applications for loans and grants from the Clean Water Revolving Loan and Grant Fund. Additional points may be awarded for actions taken toward the implementation of a comprehensive land-use plan, such as the adoption of a zoning ordinance or any other measure that significantly contributes to the implementation of the comprehensive land-use plan and the flood hazard prevention ordinance.

The statute establishes minimum standards for local ordinances and provides for variances for prohibited uses as follows:

*A flood hazard prevention ordinance adopted by a county or city pursuant to this Part shall, at a minimum:*

- Meet the requirements for participation in the National Flood Insurance Program and of this section.
- Prohibit new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities in the 100-year floodplain except as authorized under subsection (b) of this section.
- 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.

A flood hazard prevention ordinance may include a procedure for granting variances for uses prohibited under N.C.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:

- The use serves a critical need in the community.
- No feasible location exists for the location of the use outside the 100-year floodplain.
- 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.
- The use complies with all other applicable laws and regulations.

The City of Rocky Mount's Floodplain Protection Zoning Overlay provisions are administered through the LDC and meet the above state requirements.

### 5.7.1.8. Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazardproofing” a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. North Carolina legislation empowers municipalities and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain (N.C.G.S. Ch 153A. Art. 8; Ch. 1600A. Art. 11).

City of Rocky Mount used acquisition as a local mitigation tool. Quite extensively in the wake of Hurricane Floyd, going down in the history books as the largest FEMA buyout in FEMA’s history. Nearly 3,000 dwellings were damaged, with about 470 properties (nearly 800 housing units) were acquired.

### 5.7.1.9. 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 the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise 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 (N.C.G.S. §160A-238). This can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of 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.

Table 14 Edgecombe County Tax Rates (Source: NC Dept. of Revenue).

Entity	Last Re-evaluation	2003-2004 Tax Rate per \$1000 Valuation	Other (\$)	City (\$)	Total (\$)	<i>Special district rates for each County are given in the notes. Noted also are district rates levied by municipalities</i>
<b>Rocky Mount</b>						
In Edgecombe		0.91		0.50	1.41	
In Nash		0.66	***	0.50	1.36	*** Rocky Mount downtown municipal service district: \$0.20

The City of Rocky Mount does levy property taxes, and uses a downtown municipal service district as indicated above for purposes of guiding growth and development.

#### 5.7.1.10. Spending

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

A CIP is a schedule for the provision of municipal 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.

#### 5.8. POLITICAL WILLPOWER

Most City of Rocky Mount residents are quite knowledgeable about the potential hazards that their community faces, and in recent years, they have become more familiar with the practices and principles of mitigation. Flood prone structures have been acquired through buyout programs associated with the fallout from Hurricane Floyd. It is strongly believed that such tangible and visual changes within the community have created a greater sense of awareness among local residents, and that hazard mitigation is a concept that they readily accept and support. Because the residents and constituents understand the importance of mitigating the effects of a Floyd- or Hazel-scale disaster, it is expected that the current and future political climates are favorable for supporting and advancing future hazard mitigation strategies.

## 6. HAZARD MITIGATION GOALS

The 2001 Hazard Mitigation Plan articulated a broad vision for hazard mitigation and set a number of goals and policies for the City. Many of the goals are now reality and demonstrate the City's commitment to making the City a safer, more livable place. This section will review the vision and goals laid out in the 2001 Plan, review the status of the actions prescribed in 2001, and add new actions and goals set in this plan by the Advisory Committee.

In the 2001 Hazard Mitigation Plan, the City of Rocky Mount developed a broad vision statement which

*"...encompasses both its goal and how it will be achieved. As required by the planning process, the Mitigation Planning Committee developed a goal statement specifically focused on hazards. In the context of what is known about hazards and exposure, especially as evidenced by Hurricane Floyd, the Committee reviewed the City's vision statement and several goal statements from other communities. After discussion, modification, and the opportunity to comment, the Committee adopted a mitigation goal statement.*

*The City's mitigation goal statement is consistent with its vision statement and with the North Carolina Division of Emergency Management's mitigation goals and mission statements.*

### ***Vision for the City of Rocky Mount***

*The vision of the City of Rocky Mount is to be recognized as a progressive and livable community where government is respected for responsiveness to the needs of its citizens. We will accomplish our vision through proactive and innovative leadership, responsible stewardship of public resources and delivery of quality services.*

### ***Rocky Mount Mitigation Goal Statement***

*The mitigation goal of the City of Rocky Mount is to protect public health, safety and welfare by identifying natural and man-made hazards, by increasing public awareness of those hazards, and by fostering both individual and public responsibility in mitigating risks due to those hazards."*

The 2001 Plan laid out a series of goals, measures, and responsible parties that are still pertinent and are included below. New measures that were not in the 2001 plan will follow. Worksheets 4, 5 and 5a detail all facets of the goals and measures and included at the end of the section just prior to the update and monitoring.

**Table 15: Mitigation Actions from 2001 Plan.**

### **Mitigation Actions.**

Mitigation Actions	Assignment	Date Completed
<b>High Priority: Short-Term Timeframe (2001 – 2005)</b>		
Action 1. Incorporate digital floodplain and topographic data into automated permit database/system and Geographic Information System data layer inventory.	Planning & Development; Engineering; Geographic Information System	<i>Completed. New Flood Maps will be official 11/3/2004</i>
Action 2. Evaluate whether public buildings and facilities are exposed to flood hazards.	Engineering; Planning & Development	<i>Completed</i>

Mitigation Actions.

Mitigation Actions	Assignment	Date Completed
Action 3. Improve pre-disaster flood warning and public safety.	Fire; Engineering; Water Resources; Geographic Information System; Public works; Police	<i>Completed and ongoing</i>
Action 4. Develop and implement multi-year public awareness campaign.	Public Information Office; all agencies	<i>Completed and ongoing</i>
Action 5. Identify hazardous materials handlers/waste sites in the mapped floodplain.	Fire	<i>Completed and ongoing through Action 1 implementation</i>
Action 6. Evaluate flood damage potential of electric utility, water and sewer distribution systems.	Utilities; Water Resources; Engineering; Planning & Development	<i>Completed</i>
Action 7. Increase City's classification in the NFIP Community Rating System.	Planning & Development	<i>Completed, went from 8 to 7</i>
Action 8. Develop comprehensive open space/reuse plan to support floodplain acquisition initiatives and recreational opportunities.	City Manager's Office; Planning & Development; Parks & Recreation	<i>Completed and ongoing, including Regional Open Space Inventory 2004</i>
<b>Medium Priority: Mid-Term Timeframe (2006-2010)</b>		
Action 9. Make flood hazard information available to other public agencies.	Planning & Development	<i>Completed and ongoing</i>
Action 10. Evaluate flood damage potential of transportation infrastructure.	Engineering; Public Works	<i>Completed and ongoing</i>
Action 11. Identify high hazard dams on waterways that drain through City.	Water Resources	<i>Draft Action Plan submitted to City Manager 8/04</i>
Action 12. Obtain and maintain North Carolina Certified Floodplain Manager status.	Planning & Development	<i>CFM left position, currently have 2 in training (9/04)</i>
Action 13. Standardize procedures for handling certain post-damage permit processing procedures.	Planning & Development	<i>Completed and ongoing, some Standard Operating Procedures need to be formalized</i>
City of Rocky Mount	70	Hazard Mitigation Plan 2004

Mitigation Actions.

Mitigation Actions	Assignment	Date Completed
Action 14. Enhance awareness of the private sector.	Planning & Development; City Manager's Office	<i>In progress; need to identify stakeholders</i>
Action 15. Support enhancement of emergency management functions in the City.	Fire Department	<i>Completed and ongoing</i>

Table 16: Linking Mitigation Goals & Actions from the 2001 Plan.

Element of Goal	Actions Relating to Goal
Identifying natural and man-made hazards	1, 3, 5, 11, 14
Increasing public awareness of those hazards	3, 4, 7, 9, 13, 14
Fostering both individual and public responsibility in mitigating risks due to those hazards	All Actions

7. 2004 MITIGATION—GENERAL GOALS AND POLICIES IN PLACE (all hazards or specified in parenthesis).

All goals and policies are the responsibility of City staff unless otherwise specified. The EMCC will coordinate tasks among the various City departments. Funding will be operating funds and/or grants where available.

- 7.1. Continue to use and implement existing practices, policies, and programs:
  - Municipal Code—addresses minimum housing (windows for heat wave, operable heat for winter storms)
  - Building Code—(wind load for tornadoes, hurricanes and strong storms, operable heat for winter storms)
  - Fire Code—(reduce wildfire risk to structures)
  - Land Development Code—(flooding, erosion)
  - Minimum Housing--addresses operable windows and doors (heat wave) and operable heat (winter storm)
  - Continue to be a certified "Storm Ready Community." (all)
  - Continue to keep City representatives on both Edgecombe and Nash Emergency Operations Centers
  - Continue to participate in multi-jurisdictional hazard mitigation drills
  
- 7.2. 2004 Mitigation-General Goals and Policies--New
  - Pre-set debris removal contracts to speed up the recovery process (all except heat wave/drought)
  - Continue to work with Nash and Edgecombe County Human Services or Social Services Departments who will designate Cooling Stations for elderly and other at-risk populations (heat wave).
  - Work with the Area Agency on Aging at the Upper Coastal Plain Council of Governments to serve the needs of seniors in the region, including a fan distribution program (heat wave).
  
- 7.3. Mitigation Goals and Policies for Existing Structures
  - Evaluate City-maintained bridges and culverts for elevation or capacity improvements (flood)
  - Work with NCDOT to improve bridges, bridge approaches, and culverts/drainage on NCDOT roads (flood)
  - Maintain Dikes and Dams (flood)--plan recently submitted to City Manager's office
  - Backup Generator at fire station number two (applied for grant 2004) (all)
  - Expand fire station number six as a backup EOC (supported in CIP) (all)
  - Structural Upgrade to the City communications tower to address greater wind load--working with State Highway Patrol on this project (all, hurricane tornado, winter storm, and strong storm in particular).
  
- 7.4. Mitigation Goals and Policies for Natural Resources Protection/Future Development
  - Continue to support the new City stormwater utility and use the results of basin modeling to strengthen existing ordinances (flood)
  - Continue to use the Land Development Code for all applicable provisions, especially the Floodplain Overlay Zoning District (flood)
  - Continue to use the Comprehensive Plan, which identifies the following mechanisms to address natural resources related to managing flood-related hazards:
    - *Surface Water and Quality: under the Water Supply Watershed Protection Act of 1989, regulations impose a 50-foot buffer throughout the Tar River Watershed. The Tar-Pamlico regulations take effect in October 2004. (flood)*
    - *Vegetation – Wetlands: activities that impact wetlands may be subject to permit requirements administered by the U.S. Army Corps of Engineers. (flood)*

- The City participated in a 5-county regional Open Space Inventory in 2004 that identified existing open space assets both passive and active and seeks to connect them in the future by highlighting priority areas (flood)
- Continue to use and update the Land Development Code including:
  - Flood Hazard Provisions (flood)
  - Tar-Pamlico Vegetated Buffer (flood)

7.5. Mitigation Goals and policies—Education

- Complete the formal adoption of new flood elevation maps (flood)
- Educate the public about various hazards and steps they can take to protect themselves. (all)
- Find ways to address tornadoes in education--tornado drills in schools as example (tornado)
- Continued Education and Certification for Emergency Responders (all)
- Create a Regional Confined Space Rescue Team; seek grants for additional equipment and training, funds (all)
- Evaluate the feasibility of creating a regional public safety training facility in conjunction with partners such as Nash County, local community colleges (all)

In the post-Floyd environment, the City took steps to educate the public about hazard risks. The 2001 Plan outlined some steps already happening, and the City will continue programs deemed cost effective:

The City has taken some steps to improve public awareness of hazards:

- Developed agreements with local broadcast media after Hurricane Floyd;
- Transmits awareness notices on its cable access channel;
- Set up web-based mechanism for citizens to report stormwater and drainage concerns; and
- Fostered local news reporting.

## 8. MITIGATION GOALS AND POLICIES—UPDATES AND MONITORING

The City of Rocky Mount will continue to update and monitor the plan in a variety of ways:

- Continued meetings of the Emergency Management Coordinating Committee, which acts as the Advisory Committee, with a regular review of progress on implementation policies;
- The EMCC can choose to add new goals and policies as the need arises in order to respond quickly to changing conditions;
- Incorporate an update of man-made hazard types from the 2001 plan into this plan;
- Continued work on lowering the Community Flood Rating score and submittal of CFR reports to FEMA and the State Hazard Mitigation Officer (SHMO) by the Planning Department at least annually. The public will be able to access the plan on the internet or at the Planning Department in City Hall during business hours.

In five (5) years from the adoption of this plan, the City will revisit this plan to assess progress, evaluate existing programs, and add new goals as needed. The EMCC will evaluate progress annually as part of the CFR process and forward report to the SHMO.

At the regular five-year updates required by the Disaster Mitigation Act of 2000 (DMA2K) the City will use the following questions as criteria for assessing the effectiveness and appropriateness of their plan:

- Do the goals and objectives address current and expected conditions?
- Has the nature or magnitude of risks changed?
- Are the current resources appropriate for implementing the plan?
- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did the agencies and other partners participate in the plan and planning process as proposed?

This evaluation will include how well the goals address current and expected conditions, the nature and magnitude of the risks and if there has been change in either, current resources, problems, outcomes from successfully completed goals, and how other partners may be involved to maximize benefit and minimize cost. The five year update will also be submitted to the SHMO for approval by the State and FEMA.

# 9. APPENDIX

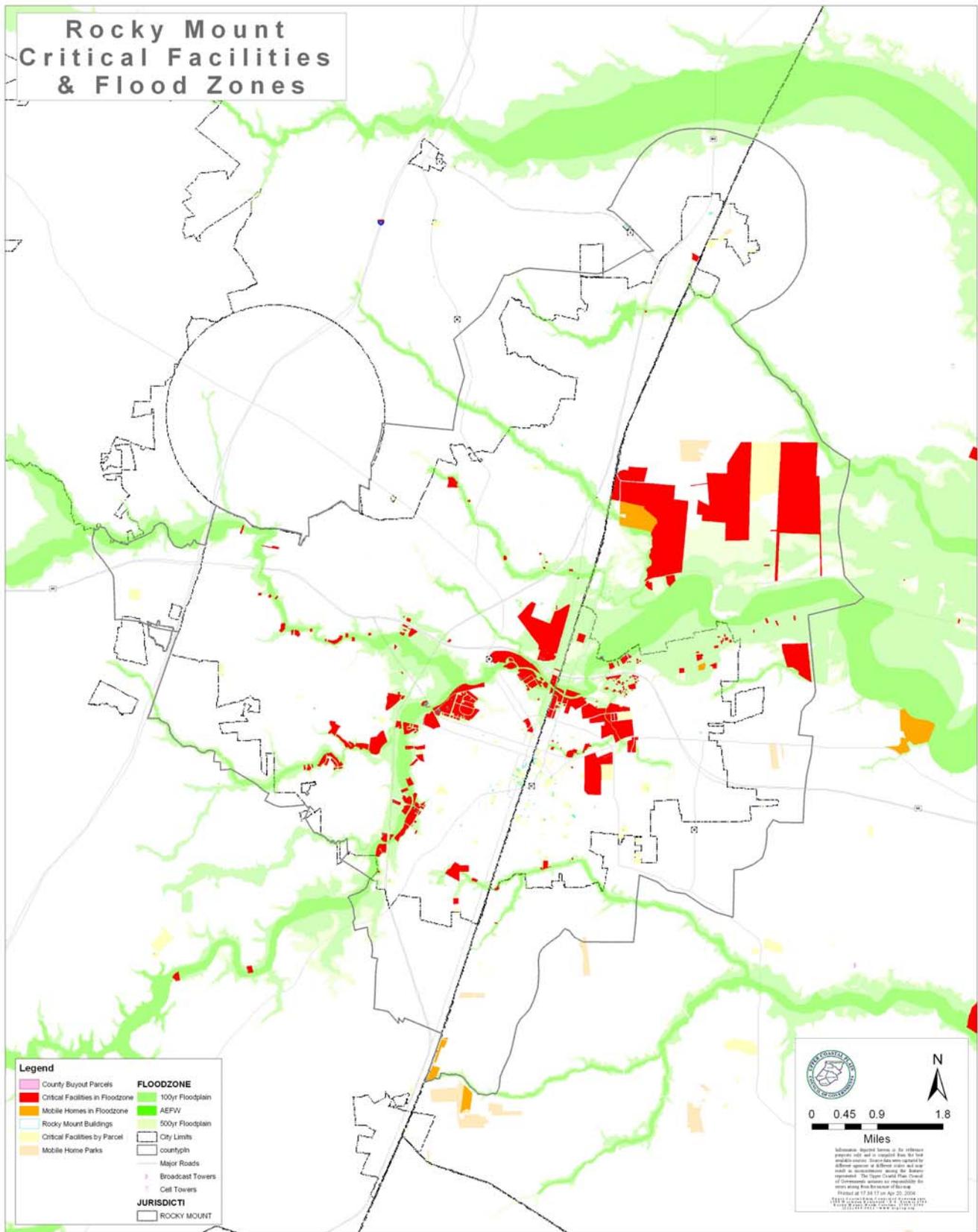


Table 17: Worksheet #4: Community Goals

Goal Category	Goal Statements	New or Existing Goal?		Hazard Threat Addressed
Existing structures	Evaluating City bridges and culverts for capacity and improvement will help to protect these structures from hazards such as floods. Expanding fire station number six as a backup EOC for mitigation for all hazards. Structural upgrade to City communications towers to address greater wind and ice loads in defense against hazards such as tornados and hurricanes.	New	Existing	Flooding; hurricane; tornado; tropical storm; severe storm; freezes / severe winter storms; nor'easters
Natural resources protection	A 50' buffer through the Tar River watershed for new development will help to protect commercial forest, along with livestock operations and agricultural lands, from flooding which could severely damage lands and such operations.	New	Existing	Flooding
Future development	Continuing to use and update the Land Development Code will help to identify flood hazards provisions and the Tar- Pamlico vegetative buffer.	New	Existing	Flooding
Public education	Adoption of the new flood maps will educate the public on areas which are more prone to flooding. This as will help identify areas less suitable for development and other land usage.	New	Existing	Flooding
General	The existing Emergency Operation Plan helps to provide guidance for emergencies and emergency assistance.	New	Existing	All emergencies
Public education outreach	New inserts in bills for public education will provide information on various hazards and will also provide steps the public can take to help better prepare and deal with hazards.	New	Existing	Various ones, heat wave

Table 18: Worksheet # 5: Geographic Planning Area Policies

Geographic Planning Area: City of Rocky Mount

Policy (classify each as a new initiative, a continuation and support of existing policies, or a recommended change to an existing policy)	Type(s) of Hazard This Policy Will Target	Funding (amount and source; local match required?)	Responsible Party/Start & Completion Dates	Benchmarks and Indicators of Progress (Monitoring and Evaluation)	Priority (high, medium, low)
(Continuation) • Codes, plans, ordinances, and certifications	Heat wave, winter storms, tornado, hurricane, strong storms, and wildfires	N/A- existing revenue stream	Planning and Inspections Date: ongoing	N/A – continued use	Medium
(New) • Pre-set debris removal contracts	Flood	N/A –no cost to set up contract	Public Works Date: complete by 1 year after plan adopted	Bid or other competitive process, contract selected and awarded	Medium
(Continuation) • Cooling stations and fan distribution	Heat waves	N/A – existing revenue stream	Public Affairs Date: ongoing	Continued participation with county agencies, use City media to help publicize	Low
(New) • Evaluate City–maintained bridges for elevation or capacity improvements; coordination with NCDOT	Flood	Existing staff	Public Works Date: complete by 1 year after plan adoption	Bridges identified, weaknesses identified, cost/benefit performed	Medium
(Continuation) • Dikes and dam evaluation	Flood	Existing staff	Fire Dept., Public Works Underway to State for review	Plan for dam failure response submitted to Manager, implementation	High
(New) • Backup generator for Fire Station No. 2	All	Grant	Fire Dept. Date dependent upon grant	Grant applied for, upon award bids, selection, and purchase	High

<p>(New)</p> <ul style="list-style-type: none"> <li>Expand Fire Station No. 6 as backup Emergency Operations Center</li> </ul>	All	Programmed into CIP	Fire Dept., Manager's Office Date: outlined in CIP	Bid and selection purchase and installation 2 years after CIP stated	High
<p>(New)</p> <ul style="list-style-type: none"> <li>Structured upgrade to City communications tower</li> </ul>	All, wind	NCSHP To fund	Police Dept., Fire Dept. Duty dependent on NCSHP Funding	Funding committed design, bid, award and construct (NCSHP)	High
<p>(Continuation)</p> <ul style="list-style-type: none"> <li>City stormwater utility initiatives</li> </ul>	Flood	Stormwater fees	Stormwater in progress basin-by-basin evaluation to be completed	Basin modeling	High
<p>(Continuation)</p> <ul style="list-style-type: none"> <li>Open space inventory</li> </ul>	Flood	Existing staff	Parks and Recreation, Stormwater	Quantify buyout properties useful for passive vs. active recreation	Low
<p>(Continuation)</p> <ul style="list-style-type: none"> <li>Hazard education, tornado drills</li> </ul>	All	Existing staff	Public Affairs, Fire Dept. from within 5 years of plan adoption	All 2001 plan education and outreach complete or continuing	Low
<p>(Continuation)</p> <ul style="list-style-type: none"> <li>Adopt new flood maps</li> </ul>	Flood	FEMA, NCEM	City Council Adopt at Nov. 2004 meeting	Adoption	High

<b>Policy</b> (classify each as a new initiative, a continuation and support of existing policies, or a recommended change to an existing policy)	<b>Type(s) of Hazard This Policy Will Target</b>	<b>Funding</b> (amount and source; local match required?)	<b>Responsible Party/Start &amp; Completion Dates</b>	<b>Benchmarks and Indicators of Progress</b> (Monitoring and Evaluation)	<b>Priority</b> (high, medium, low)
(Continuation) • Responder education and certification	All	Existing budgets	All responders and Planning and Inspections	Necessary certifications in place	Medium
(New) • Create a regional “confined space rescue team”	All	Funds program need in City budget: additional grants being pursued for more equipment and transportation	Fire Dept.	Linear mileage of roads being improved	High
(New) • Evaluate feasibility of creating a regional public safety training facility	All	Grants; State, Federal, or other local partners	Fire Dept. will develop necessary relationships with potential partners, initial contracts ongoing	Annual updates on funding likelihood to EMCC	Medium