ALAMANCE COUNTY

HAZARD

MITIGATION

PLAN

September 20, 2010

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INTRODUCTION

Alamance County originally received a grant to develop a hazard mitigation plan in 2004 and set in place. A designated agent was selected to oversee the development of the plan. The grant was awarded to the Alamance County Emergency Management Office. This plan is written to cover the county and the following towns/cities: Elon, Alamance, Haw River, Ossipee, Swepsonville, Green Level and Mebane, and includes the new participants – the Cities of Graham and Burlington. The towns that are participating in the planning process will follow the basic guidelines and mitigation strategies of the county hazard mitigation plan. The towns may add additional ordinances and specific mitigation strategies, as they deem necessary. Each jurisdiction will be addressed as to the 100-year flood plain for their area and other natural hazards. We have met with each jurisdiction to discuss with them the problems with natural hazards in the past and to get input for this plan.

The main difference with each jurisdiction is the impact of floods. Some of our jurisdictions will not be greatly impacted with the projected 100-year flood information. We will address each jurisdiction and how the flood plain affects their area in Alamance County. All jurisdictions have adopted the National Flood Insurance Program.

Purpose

The goal of our plan is to take steps to protect the citizens of Alamance County from a disaster before it happens. Preparing a plan to lessen the impact of a disaster before it happens will provide the following benefits to the County:

- to protect human life and health;
- to minimize expenditure of public money for costly recovery actions;
- to minimize prolonged business interruptions;
- to minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges;
- to help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas; and,
- to insure that potential homebuyers are notified that property is in a flood area.
- To demonstrate local commitment to hazard mitigation planning principles.
- To speed recovery and redevelopment following future natural hazard events.

- To comply with both State and Federal legislative requirements for local hazard mitigation planning; and

- To qualify for additional grant funding, in both pre-disaster and post-disaster situations.

Benefits of Mitigation

- Saves lives and reduce property damage from natural hazards through mitigation actions, such as moving families and their homes out of harm's way. We can reduce the risk to emergency workers who must rescue people and pets during a disaster.

- By having a mitigation plan in place in our communities, we are prepared to take steps that will permanently reduce the risk of future losses.

- Our communities will experience cost savings by not having to provide emergency services, rescue operations or recovery measures to areas that are dangerous to people in the event of a hazard. Our communities will also avoid costly repairs or replacement of buildings and infrastructure that would have been damaged had preventive mitigation measures not been taken.

- By identifying and ranking projects before the next disaster, our communities will be in a better position to obtain post-disaster funding because much of the background work necessary for applying for federal and state aid will already be done.

- By developing a mitigation plan, our communities can identify post-disaster mitigation opportunities in advance of a disaster. By having this strategy thought out in advance, our communities can be ready to respond quickly after a disaster.

COMMUNITY PROFILE

Alamance County is located in the central part of the state and is situated close to several large metro areas. Alamance County was largely rural until the last few years when the county started to become a very urban community. There is also a strong agriculture influence on our county. Tobacco is still the top agriculture product with an allotment of 1,441 acres. Our communities have experienced a large economic growth in housing. We are having more multi-family dwellings built in our towns/cities, with mostly single family dwellings in the rural areas of the county. With this large growth in population/multi-family dwellings, the risk of a natural hazard affecting a large number of people is increased. Our largest employer is Lab-Corp with over 4,000 employees. Next is Elon University with over 800 employees.

Alamance County is divided north and south by Interstate 85/40 and east and west by the Haw River. We have several small mill villages located on the rivers that were used for powering the mills before electrical service was available to the rural sections of the county. These houses in the mill villages are still being used, though most of the old mills are no longer in operation. Since the Haw River runs through our county north to south and all streams feed into it, a big concern is contamination of this river. Our municipalities and county have adopted building restrictions for the watershed areas to protect our water supplies. Our municipalities have been very pro-active in planning for future growth by building two additional lakes in the last few years for water supplies. These reservoir lakes should supply Alamance County with drinking water well into the middle of the twenty-first century. There are 11 businesses/industries and 278 homes and/or mobile home lots located in the 100-year flood plain (see the attached charts in the Hurricane/Flood section of this plan). These totals exclude the City of Burlington and their properties located in the county. The remainder of the 100-year flood plain covers open/wooded land.

Alamance County has experienced power outages due to natural hazards for several days in the past years. The main reason for these power outages came from high winds. The last major windstorm was in May of 2000. This storm caused over $4,000,000 worth of damage and several businesses to be closed for a few days. Most of the major damage was to single family dwellings.

Description of the Planning Process

Our planning process establishes a comprehensive emergency management system consisting of:

1. Preparedness activities undertaken to improve a community's ability to respond immediately after a disaster. Preparedness activities include the development of response procedures, design and installation of warning systems, exercises to test emergency operational procedures, and training of emergency personnel.

2. Response activities designed to meet the urgent needs of disaster victims. Response activities occur during the disaster and include rescue operations, evacuation, emergency medical care, and shelter programs.

3. Recovery activities designed to rebuild after a disaster. These activities include repairs to damaged public facilities such as roads and bridges, restoration of public services such as power and water, and other activities that help restore normal services to a community.

4. Hazard mitigation activities designed to reduce or eliminate damages from future hazardous events. These activities can occur before, during, and after a disaster and overlap all phases of emergency management.

Alamance County Department of Emergency Management served as the lead for the development of the multi-jurisdiction hazard mitigation plan. A mitigation planning group

was formed and participated in information gathering, analyzing and interviewing. Inventory of resources, facilities, and infrastructure were also gathered. The planning group participated in the public hearings for information as well as feedback. The planning committee consisted of all the following municipalities: Alamance County Emergency Management, Town of Elon, City of Mebane, Town of Swepsonville, Village of Alamance, Town of Green Level, Town of Haw River, City of Burlington, Town of Ossipee, and the City of Graham. The actual members and their position are:

Bruce Walker, Alamance County GIS Coordinator

David L. Leonard, Alamance County Emergency Management Coordinator

Alva Sizemore, Alamance County Assistant EM Coordinator/Chemical Planner

Mike Dula, Elon Town Manager

Robert Wilson, Mebane City Manager

Angela Stewart, Swepsonville Town Clerk

Ben Baxley, Gibsonville Town Manager

Ben York, Village of Alamance Town Clerk

Sandra McCollum, Green Level Town Clerk

Jeff Earp, Haw River Town Manager

Ray Rice, Director Inspections/Floodplain Administrator, City of Burlington

Chad Slaughter, CID/Emergency Management, City of Burlington

Chip Ferguson, Emergency Management, City of Burlington

Richard Overman, Town of Ossipee Financial Officer

Patti Dorsett, Town of Ossipee Town Clerk

Chris Rollins, Graham City Manager

Aaron Holland, Graham City Planner

The map showing the flood prone areas of Alamance County was done by the County's GIS Coordinator. Please note there are two municipalities that are split by other county boundary lines; Gibsonville in Guilford County and Mebane with Orange County.

Emergency management staff began the planning process by identifying the hazards that affect Alamance County and investigating how the county and its municipalities are vulnerable to these hazards. The hazard identification data from the North Carolina Center for Geographic Information and Analysis provided a valid starting point for gathering information for the vulnerability assessment. This data was supplemented with local knowledge gathered by each jurisdiction.

Interviews with local county government and municipality officials were used to identify existing capabilities and inventory hazard management/mitigation capabilities in terms of resources, facilities, hardware and software. The interviews were helpful developing the critical professional relationship needed to build a mitigation network. These personal interviews also allowed in-depth questioning when a particular question or response prompted additional issues. Where interviews were not possible, survey questionnaires were used to obtain data regarding each department's specific programs and authorities. These surveys, like the interviews, sought information from appropriate representatives about their department's day-to-day and emergency programs. Surveys were given at each public meeting to all those attending to allow them the opportunity to make recommendations.

The survey and interview process was also used to create a local capability assessment for each jurisdiction. A capability assessment, as explained in the Local Mitigation Planning Manual, describes the legal authority vested in local governments to pursue measures to mitigate the impact of natural hazards. The assessment also evaluates the community's political willpower, institutional framework, technical know-how and ability to pay for mitigation. In addition, the capability assessment is more than a mere inventory of existing mitigation measures and organizations with hazard mitigation responsibility. The capability assessment can, therefore, provide a mechanism to cite those systems that exist and are working in the community to reduce hazard vulnerability (whether such measures were designed for hazard mitigation purposes or not).

The next step was to present the findings of these assessments and to develop a draft hazard mitigation plan that reflected the needs of the county and its jurisdictions. Public meetings were held for each Town, City and County that is a part of this planning process. Each jurisdiction reviewed the draft plan and could make recommendations for changes necessary for their community. The public meetings were advertised on the County WEB site and posted on City, Town, and County bulletin boards and calendars. Copies of the draft hazard profile, vulnerability assessment and local capability assessment were distributed to all citizens attending these meetings. The public meetings were held at the regular scheduled meeting times for each jurisdiction. The meeting included a PowerPoint presentation summarizing the findings and conclusions of the comprehensive county and municipal assessments. This presentation also explained the reason for developing the plan. Questions by the public to gain further clarification and explanation were answered, although no recommendations or suggestions for changes to the document were put forth.

These meetings provided a broad opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the

planning process. In addition, hazard mitigation planning meetings were held in conjunction with the Local Emergency Planning Committee (LEPC), which has members from academia, non-profit organizations and businesses. Alamance County Local Emergency Planning Committee was the lead organization that was involved in the development of the draft plan.

The meetings were held on the following dates:

Mitigation Planning Group (City of Burlington) - September 19, 2009
Mitigation Planning Group (City of Graham) - August 4, 2009
Mitigation Planning Group (City of Burlington) - December 10, 2009
Alamance County Commissioners Meeting - December 21, 2009, Presentation of Plan
Alamance County Commissioners Meeting - January 19, 2010 First Public Meeting
Alamance County Commissioners Meeting - February 1, 2010 Second Public Meeting

As a result of input from meetings, the mitigation planning group was able to distill broad mitigation goals derived from existing plans and ordinances as well as mitigation objectives based on the needs of each community. The mitigation planning committee worked with each participating community to develop a mitigation action plan that addresses the needs of every jurisdiction. Final preparations of the plan involved developing a process for monitoring and evaluating the progress of the hazard mitigation plan as well as a process for updating the plan every five years.

Once the hazard mitigation plan draft was complete, the final plan was presented to and adopted by each participating jurisdiction. There is a copy of the resolution adopted by each jurisdiction attached to this plan (see Attachment A).

Incorporation of the Hazard Mitigation Plan into Other Planning Documents

The Alamance County has 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 a comprehensive plan, CAMA land-use plan, capital improvements plan, or emergency management plan, to name a few examples, the local planner for any participating jurisdictions will provide a copy of the hazard mitigation plan to each respective advisory committee member. The local planner will recommend the advisory committee members ensure that all goals and strategies of new and updated local planning documents are consistent with the hazard mitigation plan and will not contribute to increased hazards in the jurisdiction.

Hazard Mitigation Plan Goals

Alamance County has developed the following goals, which are broad policy statements, aimed at guiding and directing future County activity so that persons, property, government and infrastructure are protected from the impacts of Natural Hazards. These goals serve as the basis for development of the more specific plan objectives and hazard mitigation activities. The choice of the goals was guided by similar goals statements in the Alamance County Floodplain Ordinance and by the mandate of the hazard mitigation plan to reduce vulnerability to natural hazards.

1. To enhance local government capability to lessen the impacts of all natural hazards.

2. To identify and protect critical services, buildings, facilities and infrastructure that are at risk of damage due to natural hazards and to undertake cost-effective mitigation measures to minimize losses.

3. To develop an effective public awareness/education/outreach program for natural hazards the county and municipalities are most likely to experience.

4. To protect persons and property, as well as reduce damage and loss to existing community assets.

5. To ensure disaster resistant future development.

Plan Objectives

The mitigation objectives described in the text below and each section of the plan for each type of natural hazard will cover aspects of our mitigation activities. These objectives and activities have been developed as specific ways in which to reach the plan's stated goals.

1. Implement a public awareness campaign to educate citizens of the possible hazards associated with locating in floodplains and measures that can be taken lessen impacts of future floods.

2. Participate in the Community Rating System to help monitor hazard mitigation efforts and to improve the affordability of flood insurance for county citizens.

3. Ensure that all emergency service agencies are adequately staffed, equipped, and funded to protect public health and safety.

4. Encourage growth in areas suitable for development while discouraging growth in environmentally sensitive or flood hazard prone areas.

5. Increase control over development in the floodplain to prevent increases in flood velocities and levels that endanger both people and property.

6. Establish stricter building codes to ensure that structures are being built in a way that minimizes damage from natural hazards.

7. Require increased elevation of new or substantially improved residential construction within floodplains and flood proofing of new or substantially improved nonresidential construction.

The Alamance County Hazard Mitigation Plan and The Alamance County Emergency Operations Plan both were developed to address hazards which threaten our county. Both are designed to help lessen the effects of hazardous

situations on our county population. Both plans address the actions necessary to reduce the vulnerabilities of people and property to disasters and establish capabilities to respond effectively to actual occurrence of a disaster. Implementation of these plans will reduce or prevent the loss of lives and damage to property.

The County Emergency Management Coordinator will coordinate and activate agreements with each municipality in the county during emergencies that have the potential to threaten the safety of it citizens.

Mitigation Actions

The Planning Committee reviewed the results of the hazard analysis, surveys, and public meetings in each jurisdiction and identified the following mitigation actions to address significant hazards:

1. Consider directing each county office or agency to assess how it can better incorporate hazard mitigation goals into its planning and implementation of its duties.

2. Encourage builders, developers and architects to become familiar with the NFIP land use and building standards by attending annual workshops presented by the NC Division of Emergency Management (DEM). This can be accomplished by creating a mailing list and providing it to DEM to use for its announcements. This task can be further supported by distributing copies of DEM's announcements from the county's Inspections Department when builders and developers apply for permits.

3. Encourage citizens and businesses/industries to develop emergency preparedness plans.

4. Encourage homeowners to review insurance policies as part of an overall family disaster plan.

5. Increase awareness of the natural hazards potentials to local officials, the general public and private industry.

6. Maintain contact with NC Cooperative Extension Service through our local County Agency regarding problems relating to agriculture damage.

7. Maintain hazard mitigation plan and flood plain information on the County Website (www.alamance-nc.com).

8. Maintain shelter agreements with Red Cross.

9. Review methods of school construction to ensure that all new schools are constructed to the maximum cost feasible standards of wind resistance, flood resistance and access so that they can be used as shelters for evacuees during and after natural hazard events.

10. Review the subdivision regulations and make appropriate changes to encourage alternatives to placing lots in flood prone areas and to minimize imperious surface coverings, if necessary.

11. Discourage the public and developers from developing property in flood zones.

12. Look for opportunities to acquire or relocate structures vulnerable to floods.

13. Monitor structures affected by flood. Track damages and repair costs. If damages and repair costs are high relative to value of structure, consider mitigation including elevation, acquisition, or flood proofing

14. Consider adopting a policy prohibiting the development of critical public facilities in the 100-year flood plain in cases where viable alternatives exist. Presently most critical facilities located in the flood plain are waste pump stations because they must be located at low elevations because they handle gravity flowing sewage.

15. Consider expanding its Geographic Information Systems (GIS) capabilities to include maintaining elevation certificates in a computer database.

16. Continue Alamance County's participation in the National Flood Insurance Program, so citizens are eligible for flood insurance.

17. Join the National Flood Insurance Program (NFIP)

18. Consider joining the Community Rating System (CRS)

19. Develop specific regulations that prohibit dumping in the County's watersheds.

20. Maintain documents about flood insurance, flood protection, floodplain management, and natural and beneficial functions of floodplains at the local libraries and government offices.

21. Maintain GIS system at www.alamance-nc.com. From this site anyone from a private citizen, builder, insurance company, etc. can see if any property is located in the 100-year flood plain.

22. Monitor recreational facilities located in the flood plain and evaluate flood resistance of county structures. (See Attached Map).

23. Monitor reservoirs, lakes, and streams for potential flooding problems. Note any unexpected flooding issues.

24. Provide local real estate agents with handouts that will advise potential buyers to investigate the flood hazard for the property they are considering purchasing.

25. Educate citizens to listen for the watches and warnings issued by the National Weather Service.

26. Maintain Alamance County Communications' capability to monitor weather conditions and advise all emergency services regarding watches and warnings.

27. Put a weather alert radio in each school, day care, nursing home, rest home and government building.

28. Review all fire districts coverage to ensure that there are adequate quantities of water for firefighting purposes and that all water points are maintained on a regular basis.

29. Meet annually with State forester for Alamance County to improve coordination of wildfire control and response.

30. Coordinate with NCDOT to maintain adequate and effective snow and ice removal plans by the towns/cities and NC DOT. "Adequate" means that all major thoroughfares are cleared and remain clear within 12 hours of last snowfall.

31. Develop a detailed hazard assessment for dams in Alamance County and add to county hazard mitigation plan.

32. When the county land use plan is complete, create a land use map with an overlay of flood hazards and any other natural hazards that can be mapped.

The Planning Committee determined that no updates or revisions were needed, even with the inclusion of the Cities of Burlington and Graham.

Implementation Strategy

The success of the Hazard Mitigation Plan will be based on the implementation of the mitigation strategies that are identified. For each community/jurisdiction to become disaster resistant, the support of elected officials, appointed bodies, staff members, and the general public is required.

Plan implementation will start as soon as the plan is adopted. Each jurisdiction will be responsible for pursuing the development of policies, programs, ordinance revisions, and regulations as they are assigned. Each jurisdiction will be responsible to evaluate any successes and obstacles that have been encountered. The plan was reviewed annually during the past 5 years by the planning committee with a focus on completed actions. As a result of this there is no change in the mitigation strategy for the next 5 years.

The Alamance County Emergency Management Office will coordinate with all the jurisdictions for plan implementation. Alamance County will continue to support and participate in the directives of the County's Emergency Operations Plan and review this plan to make certain it is addressing the needs of this mitigation plan. The Alamance County Emergency Management Office will be the lead agency in reviewing these plans annually. Notices will be sent to each jurisdiction advising them of the time and place

for the annual review of these plans. Public notices will also be given as to the location and time of these meetings. This plan includes evacuation procedures and response to hazards not addressed in this plan such as hazardous materials, petroleum products, hazardous waste, nuclear threat/attack, and civil disorder.

There is a table summarizing mitigation actions, hazards addressed, jurisdiction and party responsible, benchmarks, and timeline on pages 93-97.

Monitoring

After the local hazard mitigation plan has been developed and adopted, it is important to evaluate how the implementation strategies in the plan work in practice. Alamance County Emergency Management will coordinate with all cities/towns to implement the plan and evaluate its effectiveness. This needs to be done to recommend additional mitigation actions and make periodic revisions to the plan. Changes in land use and development affect a variety of infrastructure issues such as potable water, sewer, roads, storm water facilities and ecological considerations such as water quality. Strong policies and programs should help achieve some of a community's mitigation objectives.

Alamance County Mitigation Planning Group monitored the progress of the mitigation actions and publicly submitted an annual progress each year for the past 5 years and reported to county commissioners and to each jurisdiction on the implementation status of the hazard mitigation plan. The mitigation goals on pages 8-10 have been met and completed over the last 5 years.

Evaluation

The annual progress report should indicate the status of each mitigation measure contained in the plan, evaluate the status by describing any problems or issues that have developed, and include recommendations for additional actions, modification, or no change to existing actions. Annual progress reports were provided to local officials, other appropriate state agencies and any other parties involved in plan implementation including the private sector, non-profit organizations, community groups and the media. The mitigation action tables on pages 83-88 list specific evaluation criteria or benchmarks as appropriate for each mitigation measure. The Plan was reviewed annually for the past 5 years utilizing the planning committee and with the Alamance County Emergency Management leading the process. There were no significant natural or manmade hazards affecting Alamance County during the last 5 years (yrs. 2005 up to 2010.)

Plan Maintenance and Update

Updates to the hazard mitigation plan will be necessary to correct flaws that are discovered in the plan or to present new information. There are always some contingencies that cannot be foreseen or events which cannot be predicted. Updates incorporate those changes necessary to better fit the plan to real-life situations. Periodic update of the mitigation plan will also help to ensure that local mitigation efforts

include the latest and most effective mitigation techniques and stay in compliance with state and local statutes and regulations. Each jurisdiction will produce an annual progress report with recommendations for updates and revisions and bring it before their Commissioners or Councils prior to submitting it to Alamance County Emergency Management for tracking and inclusion when the plan is to be updated.

The county plan will be updated following a significant natural hazard event. In the absence of significant natural hazard events, this plan will be updated at least every five years or whenever the need for updating is determined by county, city, town officials or the planning boards. As updates occur, the date, reason and responsible party should be noted.

As part of the update process, the mitigation committee representing all jurisdictions will submit an updated hazard profile, vulnerability assessment and local capability section updates or revisions to FEMA and NCDEM for review and approval. The updated plan will then be forwarded to the County and City/Town Managers for a final public review and subsequent adoption by the City/Town Council.

Continued Public Involvement

For the past 5 years annual public meetings were held to present an evaluation of the effectiveness of the plan and the public was invited to participate in the annual review of the plan through these advertised public meetings. Copies of the plan are kept by each jurisdiction and the plan is available on the Alamance County Website and contains an email address and phone number the public can use for submitting comments and concerns. All municipalities (covered by this plan) participated. Public notice was advertised on the county Web Page and by the municipalities for future public meetings.

Plan updates will require two (2) public meetings. The first meeting will be to explain the planning process and to recruit interested private individuals to participate. The second meeting will be to invite public comment on the final draft of the updated plan or any updated plan elements prior to adoption by county and participating jurisdictions. This process will continue for the next 5 years also.

HAZARDS IN ALAMANCE COUNTY

There are seven different natural hazards that the planning group feel could affect Alamance County communities, Thunderstorms (including wind and lightning), Tornadoes, Hurricane/Flooding, Severe Winter Storms, Drought, Wildfire and Earthquake. We based our plan on data collected from "NOAA's National Climatic Data Center". Based on this data, we have listed these in the order that have affected Alamance County. In the following appendixes we will discuss in detail each hazard and how in the past they have affected our communities. Though the natural hazards outside of flooding would affect all of our county's communities with approximately the same impact, we will be addressing each community in the Hurricanes/Floods part of our plan.

To analyze/evaluate vulnerability to natural hazards, the criteria in the following tables were used.

Table 1: Likelihood of Occurrence

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

Table 2: Probable Impact

Probable Intensity	Probable Impact
Negligible or none	Minimal property damage and minor injuries only; Less than 5% of property damaged
Limited	Some severe injuries, shutdown of critical facilities for two days or more; 5% to 10% of property damaged, including agricultural (both crop and livestock)
Critical	Death possible, multiple injuries; shutdown of critical facilities for up to a week; 10% to 25% of property damaged, including agricultural (both crop and livestock)
Catastrophic	Multiple injuries and deaths; shutdown of critical facilities for more than one week; more than one quarter of property in the area damaged or destroyed

Table 3: Area vulnerable

Proportion of County/City Vulnerable to hazard	
Location specific	Less than 10% of area vulnerable
Sizeable area	10% to 49% of area vulnerable
Substantial area	50% to 99% of area vulnerable
Countywide area	100% of area vulnerable

Climate

Alamance County is lucky to have a climate that represents each of the four seasons of the year. During the winter, average daytime temperatures are in the low 50's, and during the night, temperature fall to the high 20's to low 30's. Precipitation levels average around 3.5 inches for the months of December, January, and February, as some weather events include snow. The summers in our county can be hot and humid as daytime temperatures climb into the high 80's and 90's. This time of year usually experiences the most precipitation, averaging a little over four inches of rain for the summer months. The fall and spring seasons experiences a mild, comfortable climate with temperatures ranging from the 60's up to the 70's. The following table was taken from www.weather.com and illustrates a detailed table of our county for each month of the year.

Alamance County's Climate for Each Month of the Year

Month	Avg. High	Avg. Low	Mean	Avg. Precip.	Record High	Record Low
Jan.	50°F	28°F	39°F	3.99 in.	84°F (1997)	-6°F (1985)
Feb.	54°F	30°F	42°F	3.35 in.	83°F (1977)	4°F (1996)
Mar.	62°F	37°F	50°F	4.22 in.	89°F (1990)	8°F (1993)
Apr.	72°F	45°F	59°F	3.24 in.	95°F (1990)	22°F (1986)
May	79°F	54°F	67°F	4.15 in.	98°F (1996)	29°F (1983)
June	87°F	63°F	75°F	4.11 in.	105°F (1954)	43°F (1996)
July	91°F	68°F	79°F	4.45 in.	105°F (1977)	48°F (1988)

Alamance County's Climate for Each Month of the Year Continued

Month	Avg. High	Avg. Low	Mean	Avg. Precip.	Record High	Record Low
Aug.	89°F	66°F	77°F	4.04 in.	104°F (1988)	41°F (1986)
Sept	82°F	59°F	71°F	4.22 in.	103°F (1954)	36°F (1981)
Oct.	73°F	46°F	60°F	3.29 in	96°F (1954)	24°F (1962)
Nov.	63°F	38°F	51°F	2.99 in.	86°F (1974)	15°F (1987)
Dec.	53°F	30°F	42°F	3.14 in.	79°F (1998)	-4°F (1980)

Tornadoes

A tornado is a violently rotating column of air extending to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of 1 mile wide and 50 miles long. Tornadoes can cause large amounts of property damage, injury and death. The majority of tornadoes reported in North Carolina have been classified as: 71% as weak, 28% as strong, and approximately 1% as violent. Weak tornadoes have caused 3% of North Carolina tornado deaths, similar to the national figure. Strong tornadoes were responsible for 49% of North Carolina deaths compared to 70% for the nation. Based on state tornado statistics (SERCC, 1996), North Carolina ranks 22nd in total number of tornadoes and 18th in tornado deaths for the period 1953-1995. From the "Design Wind Speed" map, Alamance County is located in Zone III, so we can expect wind speeds from tornadoes to be as much as 200 miles per hour.

Tornadoes are ranked in six categories. Of those six categories, based on the figures from 2001, more people are killed and injured from category FI and FII tornadoes than all the others. Alamance County has had five (5) tornadoes in the last 31 years; three of those were category FI tornadoes.

Most tornadoes occurred in the spring, with 13% in March, 11% in April, 22% in May and 14% in June. The tornadoes that have hit our County have occurred in the months of March (3), May and July. Usually the tornadoes occur in the afternoon, though the tornado that hit our county in 1975 was at 6:50 a.m.

Where the tornadoes touched down were mostly in residential areas. The homes that were damaged the most were the mobile homes. Our Inspections Departments are trying to make certain that all mobile homes are tied down properly. If these homes are secured properly, they can withstand tornado winds as well as stick built homes. When the wind speeds reach the upper end of a category FII tornado, no home is going to withstand a direct hit. Power outages have resulted in the most damage in the county from tornadoes. The tornadoes have cut a path through the county close to the same vicinity each time.

Fujita Tornado Scale:

Category	Maximum Wind Speeds	Equivalent Saffir-Simpson Scale	Typical Effects
F0	**40-72 mph**	**NA**	**Gale tornado. Light Damage: S**ome Damage: Some damage to chimneys; breaks twigs and branches off trees; pushes over shallow-rooted trees; damages signboards; some windows broken; hurricane wind speed begins at 73 mph.
F1	**73 – 112 mph**	**Cat 1/2/3**	**Moderate Tornado. Moderate** Surfaces off roofs; mobile homes pushed off foundations or overturned; outbuildings demolished; moving autos pushed off the roads; trees snapped or broken.
F2	**113 – 157 mph**	**Cat 3/4/5**	**Significant Tornado**. Considerable damage: Roofs torn off frame houses; mobile homes demolished; frame houses with weak foundations lifted and moved; boxcars pushed over, large trees Snapped or uprooted; light-object missiles generated.
F3	**158 – 206 mph**	**Cat 5**	**Severe Tornado**. Severe damage: Roofs and some walls torn off well constructed houses; trains overturned; most trees in forests uprooted; heavy cars lifted off the ground and thrown; weak pavement blown off roads.
F4	**207 – 260 mph**	**Cat 5**	**Devastating Tornado.** Devastating damage: Well constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and disintegrated; large missiles generated; trees in forest uprooted and carried some distance away.
F5	**261-318 mph**	**NA**	**Incredible Tornado.** Incredible damage: Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 200 ft; trees debarked; incredible phenomena will occur.
F6 – F12	**Greater than 319 mph.**	**NA**	The maximum wind speeds of tornadoes are not expected to reach the F6 wind speeds.

In the following table, the confirmed tornadoes in Alamance County have been listed for the period from 1950 to 1995. Although tornadoes occur infrequently in Alamance County, there is a possibility that one could occur if the proper conditions exist.

Alamance County Tornadoes					
Date:	**Event #**	**Time**	**# Dead**	**# Injured**	**F-Scale**
March 19, 1975	006	0650	0	1	F1
July 21, 1977	021	1400	0	0	F1
May 26, 1983	011	1525	0	0	F1
March 27, 1994	004	1840	0	0	F0
March 4, 2008	202	1654	0	0	F0
Source: The Tornado Project, 2008					

Historical Occurrences:

- ***March 19, 1975:*** Tornado was two miles long by 67 yards wide. Only one person was injured during this F1 Tornado.
- ***July 21, 1977:*** F1 Tornado occurred, resulting in no injuries or deaths.
- ***May 26, 1983****:* F1 Tornado was 17 yards wide, but it did not injure or kill anyone.
- ***March 27, 1994****:* F0 Tornado did not injure or kill anyone.
- ***March 4, 2008***: F0 Tornado, no injuries or deaths

General Information Regarding Tornadoes

A. Alamance County Communications has the capability to monitor storms approaching the county, as well as the potential intensity of the storms.

B. NWS issues watches and warnings to the public and government agencies.

C. Public education continues to take place regarding watches and warnings.

D. Weather alert radios have been placed in each school, day care, rest/nursing home, and all government agencies.

E. Access to considerable cooperation from local broadcast media to warn the public of the potential for severe storms.

F. Debris clearance, as required, can be requested from various agencies, including NCDOT.

G. Shelter agreements are in place via Red Cross to provide shelter operations.

Tornado Risk Summary

Likelihood of Occurrence	Probable Impact	Vulnerable Area
Possible	Limited	Entire County

Thunderstorm, Wind and Lightning

A typical thunderstorm may be three miles wide at its base, rise to between 40,000 to 60,000 feet in the troposphere, and contain half a million tons of condensed water. Conglomerations of thunderstorms along cold fronts (with squall lines) can extend for hundreds of miles. Thunderstorms contain tremendous amounts of energy derived from condensation of water. The half million tons of condensed water can release 300 trillion calories of energy, equivalent to about 100 million kilowatt-hours of electricity, or several Hiroshima-sized atomic bombs.

According to the National Weather service, a severe thunderstorm is one that produces tornadoes, hail 0.75 inches or more in diameter or winds of 58 mph or more. Structural wind damage may imply the occurrence of a severe thunderstorm. Hail, formed by the accretion of super cooled liquid water on ice particles in a thunderstorm updraft, can pose a serious threat to agriculture and exposed objects. Likewise, strong winds can potentially wreak havoc on fragile or flimsy structures, or yield secondary damage through the downing of trees. Lightning associated with thunderstorms poses a threat to people and animals in unsheltered areas. The tornado, however, is by far the greatest natural hazard threat from severe thunderstorm.

Each year lightning kills between 50-100 people; mostly during the spring/summer seasons. Most lighting strikes occur in the afternoon. In the United States, the National Weather Service recorded 3,239 deaths and 9,818 injuries due to lightning strikes between 1959 and 1994. Only 20% of lightning strikes cause immediate death. Approximately 70% of lightning strike victims that survive experience residual effects, most commonly affecting the brain (neuropsychiatric, visual, and auditory). These effects can develop slowly. Lightning strike victims have typically been walking in an open field or swimming before they are struck. Other lightning victims have been holding metal objects such as golf clubs, fishing poles, hay forks, or umbrellas.

Damage to property from direct or indirect lightning can take the form of an explosion, a burn, or destruction. Damage to property has increased over the last 35 years. This is probably due to increased population. The National Weather Service recorded 19,814 incidents of property damage between 1959 and 1994. Yearly losses are estimated at $35 million by the National Weather Service. This amount is compiled from newspaper reports, but many strikes are not reported. The National Lightning Safety Institute estimates damages at $4-$5 billion. This information is compiled from insurance reports and other sources that keep track of weather damages.

Thunderstorm "straight line" winds occur when rain-cooled air descends with accompanying precipitation. A thunderstorm is considered severe when winds exceed 57.5 mph. At the very extreme, winds of 160 mph have been recorded. These winds can smash buildings uproot and snap trees, and are often mistaken for tornadoes.

‘Downbursts’ can occur during a thunderstorm. This is an excessive burst of wind that is sometimes confused with tornadoes. These are defined as a surface wind in excess of 125 mph caused by a small-scale downdraft from the base of a convective cloud. A downburst occurs when rain-cooled air within a convective cloud becomes heavier than

its surroundings. Since cool air is heavier than warm air, it rushes toward the ground with a destructive force; exactly what triggers the sudden down rush is still unknown.

Downbursts can be further classified into two categories:

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

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

In the last few years, high winds have caused more damage in our community than any other natural disaster. Deaths and injuries related to thunderstorms peak in July and August. There have been five tornadoes that have affected Alamance County from January 1, 1950-March 4, 2008. The magnitude ranged from F0 to F1. There were no deaths reported and only one injury reported from the 1975 tornado.

Our major damage has occurred from "straight line" winds. In the last 52 years we have experienced 98 straight line wind events. These storms have caused a lot of property damage and major power outages.

These straight winds have caused major damage to single family homes, businesses and utilities, with the most destructive damage occurring to mobile homes and power lines.

The most recent severe storm in Alamance County occurred in May 2000. Damage from the storm was extensive and it took several weeks to remove debris from roadways and property. The high winds generated by this particular storm knocked power lines down across Interstate 40/85, which required that the Interstate be temporarily detoured while power crews made needed repairs.

Historical Occurrences (Thunderstorm / Wind Events):

- ***July 23, 1957:*** Thunderstorm wind
- ***August 11, 1958:*** Thunderstorm wind
- ***August 20, 1967****:* Thunderstorm wind
- ***June 22, 1970:*** Hail
- ***June 25, 1970:*** Thunderstorm wind
- ***February 22, 1974:*** Thunderstorm wind
- ***March, 1973:*** The windy weather in Alamance County took its toll in the business district as awnings and canopies fell under the March wind gusts.
- ***June 6, 1977:*** Thunderstorm wind
- ***July 21, 1983:*** Thunderstorm wind
- ***May 29, 1984:*** Hail
- ***July 5, 1984:*** Thunderstorm wind
- ***March 24, 1985:*** Two hail storms occurred within one hour of each other
- ***May 21, 1985:*** Thunderstorm wind
- ***May 22, 1985****:* Thunderstorm wind
- ***May 22, 1985:*** Two Hail storms occurred within 20 minutes of each other

- ***June 4, 1985:*** Thunderstorm wind
- ***June 5, 1985:*** Thunderstorm wind
- ***October 15, 1985:*** Thunderstorm wind
- ***April 26, 1986:*** Hail
- ***June 28, 1986:*** Thunderstorm wind
- ***July 26, 1986:*** Thunderstorm wind
- ***August 27, 1986:*** Thunderstorm wind
- ***July 3, 1987:*** Thunderstorm wind
- ***July 31, 1987:*** Thunderstorm wind
- ***September 10, 1987:*** Thunderstorm wind
- ***May 16, 1988:*** Thunderstorm wind
- ***May 17, 1988:*** Two hail storms occurred within two hours of each other
- ***May 23, 1988:*** Hail
- ***June 26, 1988:*** Thunderstorm wind
- ***March 15, 1989:*** Hail
- ***March 18, 1989:*** Thunderstorm wind
- ***April 29, 1989:*** Thunderstorm wind
- ***May 5, 1989:*** Thunderstorm wind
- ***May 6, 1989:*** Thunderstorm wind
- ***June 2, 1989:*** Thunderstorm wind
- ***June 16, 1989*:** Thunderstorm wind
- ***July 12, 1989:*** Thunderstorm wind
- ***February 22, 1990:*** Thunderstorm wind
- ***April 2, 1990:*** Hail
- ***May 1, 1990:*** Thunderstorm wind
- ***July 10, 1990:*** Thunderstorm wind
- ***August 16, 1990:*** Hail
- ***April 9, 1991:*** Thunderstorm wind
- ***August 4, 1991:*** Thunderstorm wind
- ***August 11, 1992:*** Thunderstorm wind
- ***July 1994:*** Fire destroyed a vacant mobile home in Spanish Oaks Trailer Park alongside NC 49. A nearby thunderstorm and the fact that neighbors said they heard a loud boom caused authorities to think the home may have been hit by lightning shortly before the fire was discovered.
- ***June 8, 1995:*** Several mobile homes were damaged near NC 119 and Turner Rd. Over a ton of roofing material was blown off an industrial building.
- January 19, 1996: Trees and power lines were down as a result of a thunderstorm with high strong winds.
- ***May 24, 1996:*** Hail
- ***February 16, 1998:*** Strong winds with gusts to 35 mph were common across the central North Carolina during the night of the 16th and into the morning hours of the 17th. The strongest gust was recorded at Goldsboro (52 mph). Several trees were downed in almost all of the counties in central North Carolina from Winston-Salem to Raleigh/Durham to Goldsboro and Rocky Mount. A combination of the wind and very soggy soils led to many of the trees to fall. Several homes were damaged in Sampson, Wayne, Wake and Cumberland counties.
- ***June 30, 1998:*** Trees were uprooted and snapped off on Highway 49 about 10 miles southwest of Graham during a severe thunderstorm.

- ***July 22, 1998:*** Excessive hear plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23rd when rain cooled the environment enough to send temperatures into the lower 70's at most locations.
- ***March 4, 1991:*** Wind gusts of up to 52 mph battered Alamance County, causing falling trees, power outages, and disruptions in cellular communications countywide.
- ***May 2000:*** The state government has pledged $1.8 million to help local governments in Alamance and Guilford counties with debris removal expenses caused by severe thunderstorms. Alamance County alone estimated over $15 million in total residential loss. The severe storms moved through the area quickly on May 25th, downing trees and power lines and causing damage to some homes and buildings. Winds were recorded at speeds of up to 82 mph. Without relief funds from the state or federal governments, municipalities would have to pull large amounts of money from their fund balance accounts. The storm left 147,000 North Carolina residents without power and caused two deaths and 13 injuries in Alamance County during cleanup efforts. The storm also damaged the Haw River and its tributaries, having millions of gallons of untreated sewage spill into the bodies of water.
- ***June 15, 2002:*** A barn roof was ripped off on Stony Creek Church Road from a severe thunderstorm. Trees were also reported down across Alamance County.
- ***August 10, 2000:*** Downed trees blocked Hwy 62 as a result of a severe thunderstorm.
- ***April 30, 2003:*** Hail
- ***May 31, 2003***: Thunderstorm / Wind
- ***July 9, 2003***: Thunderstorm / Wind
- ***July 13, 2003***: Thunderstorm / Wind
- ***July 22, 2003***: Thunderstorm / Wind
- ***November 19, 2003***: Thunderstorm / Wind
- ***March 7, 2004***: High Wind
- ***May 2, 2004***: Thunderstorm / Wind
- ***June 11, 2004:*** Thunderstorm / Wind
- ***May 12, 2005:*** Thunderstorm / Wind
- ***July 13, 2005:*** Thunderstorm / Wind
- ***January 13, 2006:*** Thunderstorm / Wind
- ***April 3, 2006:*** Thunderstorm / Wind
- ***June 11, 2006:*** Thunderstorm / Wind
- ***July 3, 2006:*** Thunderstorm / Wind
- ***July 4, 2006:*** Thunderstorm / Wind
- ***August 30, 2006:*** Thunderstorm / Wind
- ***November 22, 2006:*** High Wind
- ***April 16, 2007:*** Strong Wind
- ***June 4, 2007:*** Thunderstorm / Wind
- ***July 10, 2007:*** Thunderstorm / Wind
- ***July 19, 2007:*** Thunderstorm / Wind

- ***August 21, 2007:*** Thunderstorm / Wind
- ***August 30, 2007:*** Thunderstorm / Wind
- ***February 10, 2008:*** Strong Wind
- ***March 4, 2008:*** Thunderstorm / Wind / Tornado: A weak F0 tornado touched down in northern Alamance County just northeast of the Union Ridge community. The tornado initially touched down about a half mile south of Willie Pace Road. On the north side of Willie Pace Road the tornado blew the roof off of a tobacco barn, lifted a carport, destroyed one shed and caused roof and porch damage to a home. The tornado exited the WFO RAH CWA and entered into WFO RNK CWA as it continued to track northeast into Caswell County for approximately 2 miles. Further north the tornado destroyed a barn on Vinson Road and damaged a tractor and irrigation system. Numerous trees were also blown down in the area. The tornado blew a large oak tree into a brick home on Blaney Road, resulting in substantial roof damage. A garage in the back yard was also destroyed. The last home to be damaged was on Baynes Road. A single wide mobile home on Baynes Road lost its roof from the high wind. The roof was tossed about 70 feet before becoming wrapped around a tree. Central North Carolina endured a one-two punch of severe weather as a well developed upper low and negatively tilted upper trough moved across the region. The first round of severe storms began in the afternoon as discrete storms developed well ahead of an organized squall line. Minor wind damage was reported, along with an isolated tornado. The second round of severe storms came later that evening, as the squall line swept through the state, producing widespread wind damage and another brief tornado touchdown**.**
- ***May 9, 2008:*** Thunderstorm / Wind
- ***June 23, 2008:*** Thunderstorm / Wind
- ***July 23, 2008:*** Thunderstorm / Wind
- ***August 2, 2008:*** Thunderstorm / Wind
- ***January 7, 2009:*** Strong Wind

General Information Regarding Thunderstorms/ Wind and Lightning

A. Close contact is maintained by telephone with the National Weather Service (NWS)

B. Alamance County Communications has the capability to monitor weather systems, as well as the potential intensity of the storms, via NWS and other electronic means.

C. NWS issues watches and warnings to the public and government agencies.

D. Public education continues to take place regarding watches and warnings.

E. Weather alert radios have been placed in each school, day care, rest/nursing home and all government agencies.

F. Access to and considerable cooperation from local broadcast media to warn the public of the potential for severe thunderstorms.

G. When necessary the Emergency Action System (EAS) can be activated at the local level by appropriate officials.

H. Debris clearance, as required, can be requested from various agencies, including NCDOT.

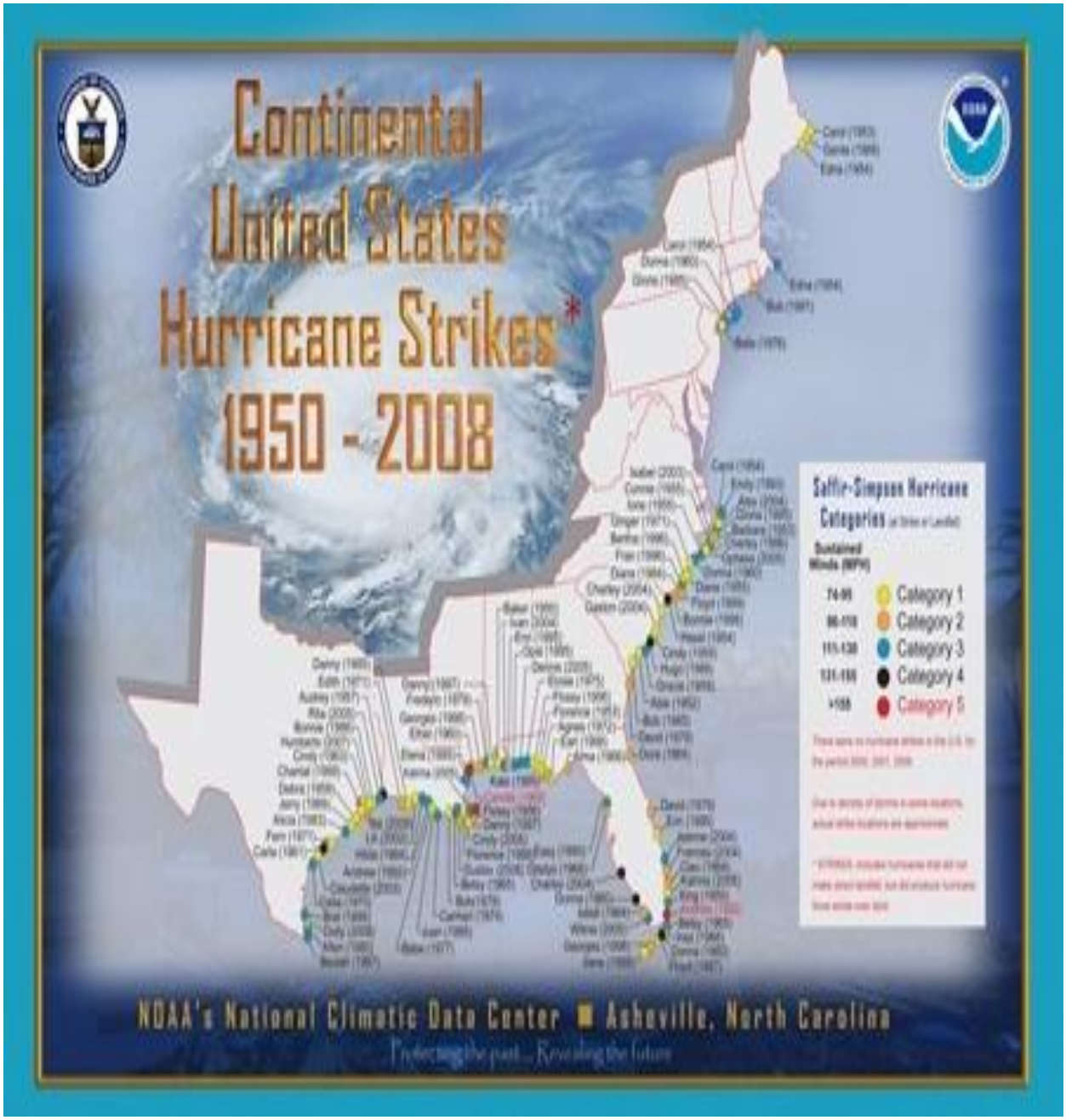
Thunderstorms/Wind Lightning Risk Summary

Likelihood of Occurrence	Probable Impact	Vulnerable Area
Highly Likely	Limited	Entire County

Hurricanes/Floods

Flooding occurs from a number of weather and non-weather related reasons. Floods typically occur from prolonged rainfall, but they can also occur from snowmelt, ice jams, and dam failures. Floods also occur in all 50 states, particularly in low-lying communities, near a water source, or downstream from a dam. All municipalities, including the county, are participating in the National Flood Insurance Program.

Flooding can cause destruction to property and injury and death to people. Since 1900, 10,000 lives have been lost to flooding. A 1987 study concluded that over 9 million households and $390 billion in property are at risk from a 1 percent annual chance flood (100 year flood plain). There are seven types of flooding in the United States Riverine Flooding, Flash Floods, Aluvial Fan Floods, Ice Jam Floods, Dam Break Floods, Local Drainage or High Groundwater Levels, and Fluctuating Lake Levels.


Continental
United States
Hurricane Strikes*
1950 - 2008
Saffir-Simpson Hurricane
Categories
Sustained
Winds (MPH)
74-95
96-110
111-130
131-155
>155
Category 1
Category 2
Category 3
Category 4
Category 5
NOAA's National Climatic Data Center ■ Asheville, North Carolina
Protecting the past... Revealing the future

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

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

Dam Break Floods: Results from structural failures of dams.

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

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

Hurricane season starts in June and runs through mid November. Alamance County has been affected by four hurricanes since January 1, 1950 – December 31, 2003 (National Oceanic and Atmospheric Administration information). One hurricane occurred in July, while the other three occurred in September. These events have caused over three million dollars in damage. The most damage occurring from hurricanes is flooding. Most of our flooding problems come from over bank and ponding. Our areas bordering the Haw River, Stoney Creek, Back Creek and Great Alamance Creek have been the largest areas affected by flooding from hurricanes. Heavy rainfall in the northern counties surrounding Alamance County can cause major flooding of these streams. Locally heavy rainfall may produce flooding in areas other than mapped flood plains. If local drainage conditions are inadequate to accommodate rainfall through a combination of infiltration into the ground and surface runoff, accumulation of water in certain areas may cause flooding problems. Flooding problems resulting from runoff of surface water generally increase as areas become more urbanized.

Greater population density generally increases the amount of impervious area, e.g., pavement and buildings. This reduction in the amount of natural ground that can absorb rainfall results in an increase in the amount of surface runoff generated. Uncontrolled, this runoff may be channeled to areas that cause flooding of structures and roadways. This may be especially true where the predevelopment land surface had a gently sloping surface with no defined channels.

A second major change that occurs as a result of urbanization is the development of a drainage network to control the increased runoff. The straightening and lining of channels, and the construction of sewers, culverts, and other means of controlling runoff, result in improved "hydraulic efficiency" of the local drainage network. In other words, the time required for surface runoff to reach a stream channel is reduced. Unless the drainage network is specifically designed to counteract this increase in rate of runoff from the watershed, the result is likely to be an increase in flood peaks. Thus flooding will happen more quickly and usually to greater depths than before urban development occurred.

Urban areas are particularly susceptible to flash floods. Most of Alamance County's flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in local areas or heavy rains from hurricanes and tropical storms. Areas subject to rapid floodwater inundation pose special threats to life and property because there is insufficient time for warning, evacuation, emergency flood proofing or other protective measures.

Large amounts of impervious surfaces in urban areas increase runoff amounts and decrease the lag time between the onset of rainfall and stream flooding. Man-made channels may also constrict stream flow and increase flow velocities. (See attached maps of the 100-year floodplain for each town/city covered in this plan.)

The worst impact that the floods have on Alamance County is that we have so many streams and a major river that separates the county. When a large flood occurs our citizens are not able to move around due to the flooded roads. Of course, when roads are flooded, it has a major impact on commerce for our county. Some industries were closed due to flooding at their plant. The major plant affected by our past floods has stopped using the section of the plant that floods most often. Not many homes are actually flooded, but their accessibility is very much affected. Most of our damage from floods has been with our wastewater treatment plants. This problem has been helped by moving some of the vital equipment out of the flood prone areas.

Our worst flood conditions have been flash floods with 23 occurring in the last thirteen years (National Oceanic and Atmospheric Administration).

Our county has adopted a flood plain ordinance to restrict building in the 100-year flood plain. (See the Mitigation Strategy section in this plan) All jurisdictions have adopted a flood plain ordinance to restrict building in the 100-year flood plain.

Population Chart	
Name of Town/City	**Number of Residents**
Alamance	357
Ossipee	467
Elon	7,060 (see note)
Haw River	2,012
Green Level	2,149
Swepsonville	1,053
Graham	14,533
Mebane	10,624
Burlington	50,000
Alamance County	143,000

*The total residents for the Town of Elon includes Elon University population.

Population Projections	
Year	**Alamance County**
1940	57,427
1950	71,220
1960	85,674
1970	96,362
1980	99,319
1990	108,213
2000	130,800
2005	143,343
2010	154,914
2015	167,587
2020	181,031
2025	194,703
2030	208,799
Source: US Census Bureau, NC Office of State Planning 1998	

The Planning Committee gathered information and charts for homes, businesses, industries, etc. in flood prone areas and compiled the following charts concerning flood prone areas and repetitive loss properties located in the identified hazard areas for each jurisdiction.

Alamance County Flood Prone Areas (Assessment Charts)

Chart for Town of Alamance

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	0	0	0	0
Potential Future Conditions	0	0	0	0

Chart for Town of Ossipee

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	0	0	3	481,174
Potential Future Conditions	0	0	3	341,520

Chart for Town of Elon

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	20 / 50	2,576,424	1	310,520
Potential Future Conditions	20 / 50	0	0	0

Chart for Town of Haw River

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	9 / 22	307,187	0	0
Potential Future Conditions	5 / 12	943,655	0	0

Chart for Town of Green Level

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	0	0	0	0
Potential Future Conditions	0	0	0	0

Chart for Town of Swepsonville

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	0	0	0	0
Potential Future Conditions	0	0	0	0

Chart for City of Mebane

	# Homes/ # Residents	Value Property	# Business and/or Industry	Property Value
Present Conditions	5 / 12	536,653	0	0
Potential Future Conditions	5 / 12	589,653	0	0

Chart for Graham

Developed Land Subject to Flooding			
Land Use	**# of People/ # of Acres**	**# of Properties**	**Estimated Real Property Value**
Residential			
Single Family	132 / 33.5	53	$4,845,136
Multi-Family	80 / 3.5	32	$1,227,344

We have divided our county by fire districts for all types of emergency planning and response. The following chart lists the homes, businesses and industries located in the flood plain for each fire district. This is excluding the towns/cities. The information within this chart is for the rural areas within Alamance County

Chart for Mobile Homes & Mobile Home Parks

Fire District	# of Homes/ # of Residents	Property Value	# of Mobile Home Parks
A. O.	11 / 27	1,062,267	2
Swepsonville	24 / 60	3,008,383	1
Mebane	4 / 10	407,539	0
Haw River	5 / 12	943,655	1
Eli Whitney	1 / 3	177,196	0
Snow Camp	6 / 15	479,892	0
Faucette	11 / 27	1,118,051	0
Elon	0		0
E.M. Holt	2 / 5	252,286	0
North Central	0		0
North Eastern	0		0
Total	**64**	**7,449,269**	**4**

Future Potential Conditions

Fire District	# of Homes	Property Value	# of Mobile Home Parks
A. O.	11 / 27	1,168,267	2
Swepsonville	24 / 60	3,308,383	1
Mebane	4 / 10	457,000	0
Haw River	5 / 12	1,038,655	1
Eli Whitney	1 / 3	195,196	0
Snow Camp	6 / 15	529,892	0
Faucette	11 / 27	1,218,051	0
Elon	0		0
E.M. Holt	2 / 5	277,286	0
North Central	0		0
North Eastern	0		0
Total	**64**	**8,192,273**	**4**

Chart for Industry & Business

Fire District	# Industries	Property Value	# Businesses	Property Value
Swepsonville	0		0	
A. O.	2	481,174	0	
Mebane	0		0	
Haw River	0		3	64,938
Eli Whitney	0		0	
Snow Camp	0		1	152,634
Faucette	1	2,158,346	3	169,809
Elon	0		0	
E. M. Holt	0		0	
North Central	0		0	
North Eastern	0		0	
Total	**3**	**2,639,520**	**7**	**387,381**

Future Potential Conditions

Fire District	# Industries	Property Value	# Businesses	Property Value
Swepsonville	0		0	
A. O.	2	531,174	0	
Mebane	0		0	
Haw River	0		3	70,938
Eli Whitney	0		0	
Snow Camp	0		1	167,634
Faucette	1	2,378,346	3	186,809
Elon	0		0	
E. M. Holt	0		0	
North Central	0		0	
North Eastern	0		0	
Total	**3**	**2,909,520**	**7**	**425,381**

Chart for Churches & Government Facilities

Fire District	# Churches	Property Value	Government Facilities	Property Value
Swepsonville	0		0	
A. O.	0		0	
Mebane	0		1 (Waste Plant)	1,000,000
Haw River	0		0	
Eli Whitney	1	157,114	0	
Snow Camp	0		0	
Faucette	0		0	
Elon	0		0	
E. M Holt	0		0	
North Central	0		0	
North Eastern	0		0	
Total	**1**	**157,114**	**1**	**1,000,000**

Future Potential Conditions

Fire District	# Churches	Property Value	Government Facilities	Property Value
Swepsonville	0		0	
A. O.	0		0	
Mebane	0		1 (Waste Plant)	1,100,000
Haw River	0		0	
Eli Whitney	1	173,114	0	
Snow Camp	0		0	
Faucette	0		0	
Elon	0		0	
E. M Holt	0		0	
North Central	0		0	
North Eastern	0		0	
Total	**1**	**173,114**	**1**	**1,100,000**

Note: All values of property are based on the appraised tax values as of 2008. We used the Alamance County Tax Department values to arrive at these figures. These areas for flood prone areas are based on the 100 year flood maps.

General Information Regarding Flooding

A. Watches and warnings issued by the National Weather Service.

B. Public education in flood potential and the availability of flood insurance.

C. Public education programs regarding flooding and emergency management are conducted as often as possible or requested.

D. Weather alert radios are in each school, day care and rest/nursing home. Radios are also in each government agency.

E. Discouragement of the public and developers from developing property in flood zones.

F. Shelter agreements are in place via Red Cross to provide shelter operations.

G. All property locations are now known so work can begin on further mitigation efforts.

Historical Occurrences

- ***June 1995:*** A relentless downpour battered the Piedmont for an entire day, stranding train's passengers, sending raw sewage down the Haw River throughout the Triangle. While no serious weather-related injuries were reported, the state Highway Patrol said at least 210 wrecks had occurred in an area from Guilford to Johnston counties. The Alamance County Fire Marshal said this was the most destructive flood he had ever seen. A 75-foot section of Norfolk Southern railroad tracks were washed away in Alamance County. Rising waters from a Haw River tributary overwhelmed the Graham Wastewater Treatment Plant's pump house, creating a discharge of raw sewage into the Haw River. Two cars were swept away in Alamance County.
- ***September, 1996:*** According to the National Weather Service center, 10.82 inches of rain fell near the Piedmont Triad International Airport. This was the forth wettest September in the 20th century for the Triad. As a result of these heavy rains, farmers could not get into their fields to plow or sow wheat, oats and other small grains. The crop planting was behind, and farmers were in need of a stoppage in rain.
- ***February 4, 1998:*** Because of two days of rain from a nor'easter, the Haw River reached flood level, but never increased at a level over 20 feet to cause damage. Accompanying rainfall was winds that gusted to 35 mph. which created ongoing electric power outages in Alamance County. Heavy rain on the 4th and into the early morning hours of February 5th caused flooding on the Haw River. The Haw River at Haw River began flooding on February 5th and crested on that day at a foot above flood stage at the gage sight. The Haw River at Bynum began flooding on February 4th and crested on February 5th at 2 feet above flood stage.
- ***September, 1999:*** More than a fourth of the 1999 rainfall in Alamance County has come in September, delaying farm work and keeping watchful eyes on creeks and ditches. Over 10 inches of rain fell during this month. Even though drought has hurt the area in the previous months, the heavy **rains have created problems.**
- ***July 23, 2000:*** Streams and creeks flooded from Saxapahaw to Graham and Burlington due to 4 to 5 inches of rain in three hours.
- ***March 20, 2003:*** Persistent heavy rain brought widespread flooding across central North Carolina, beginning in the morning of March 20 and continuing into the afternoon. Numerous roads across the area had to be closed due to flooding, and numerous creeks overflowed their banks. Rainfall amounts were mainly between 2 and 4 inches in the less than 12 hours. The heaviest rain fell in Forsyth County, where major flooding occurred along Muddy Creek, Mill Creek and Grassy Creek, and several water rescues were needed.
- ***April 10, 2003:*** Persistent showers and thunderstorms produced heavy rain and flooding across the Piedmont of North Carolina. Several creeks and streams overflowed their banks, leading to road flooding and numerous road closures.
- ***June 16, 2003:*** **Flash Flood**
- ***July 13, 2003:*** **Flash Flood**
- ***August 4 2003:*** **Flash Flood**
- ***August 5, 2003:*** **Flash Flood**
- ***August 9, 2003:*** **Flash Flood**
- ***August 10, 2003:*** Heavy rainstorms flooded streets and pushed creeks over their banks in the evening. Just before 8:00 p.m. on August 10th, the National Weather

Service issued a flash flood warning for Alamance County after radar showed slow moving thunderstorms bringing heavy rain to the county. When the flood warning was issued, the county had already received more than two inches of rain. Several storms passed through the area within a few hours and by 10:15 p.m. the Weather Service had registered about 3 inches of rain in Burlington, A woman was rescued form a home by two volunteer firemen, and three homes were evacuated. A creek jumped and washed across a street.

- ***June 9, 2004:*** **Flash Flood**
- ***December 10, 2004:*** **Flash Flood**
- ***June 7, 2005:*** **Flash Flood**
- ***June 23, 2006:*** **Flash Flood**
- ***November 22, 2006:*** **Heavy Rains**
- ***August 27, 2008:*** **Flash Flood;** Law enforcement reported numerous roads closed due to flooding in western Alamance County including several road closures in Gibsonville. The remnants of Hurricane Fay which made landfall along the Louisiana coast moved northeast across central North Carolina producing several weak tornadoes along with significant flash flooding.
- ***September 6, 2008:*** **Flash Flood**

The Saffir/Simpson Hurricane Scale

Category	Definition - Effects
1	**Winds: 74 – 95 mph** No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.
2	**Winds: 96 – 110 mph** Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.
3	**Winds: 111 – 130 mph** Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain may be flooded well inland.
4	**Winds: 131 – 155 mph** More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.
5	**Winds: 155+ mph** Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.

<u>Historical Occurrences</u>

- ***October 15, 1954:*** Considered one of the five most serious hurricanes to hit North Carolina, Hurricane Hazel attributed to 19 deaths in Alamance County. Hazel's winds blew away the roof of many buildings.

- ***August 27, 1995:*** The remnants of Hurricane Jerry produced a near record rainfall event in northeastern Alamance (10 inches) and southeastern Caswell Counties (15 inches). The majority of this water fell in the drainage basin of the Stag and Back Creeks. The result was a major flood that took four lives. Three people (two adults and one child) drowned when their car was washed off the road where Stage Creek runs under Highway 49. An hour later, a vehicle was washed off the road where the creek passes under Highway 119, just north of Mebane. The occupant was rescued, but a local fire fighter drowned when his safety line got tangled in debris. Later that evening, the water flowed into Back Creek and caused record flooding on the Back Creek where it passes under Highway 70.
- ***July 12, 1996:*** Hurricane Bertha moved along the edge of the NWSFO Raleigh County warning area. Three counties sustained substantial crop damage: Wayne $12 million, Wilson $7 million and Johnston $2 million. Structural damage was light and was primarily caused by trees on homes and cars. The hardest hit county was Wayne where property damage was estimated at $500 thousand. Power outages were widespread in the eastern counties as trees took down power lines. Two F0 tornadoes occurred: one in Wake and one in Wilson Counties. No injuries or deaths were reported. The highest wind recorded was 60 mph at Seymour Johnson AFB near Goldsboro. Greatest rainfall was four inches, also at the AFB.
- ***September 5, 1996:*** Damage from Hurricane Fran in Alamance County shot well past the $10 million mark in the wake of the storm, according to initial projections by local government officials. Building related damages, including structural damage to private homes, were projected at about $3.8 million in the county. Additional damages were estimated at up to $8 million in crop losses and damages to farm equipment and structures. As much as half the areas of tobacco crops were lost. The hurricane left 90 percent of Duke Power's Alamance County customers without power. The number of deaths caused from the storm was 21. Hurricane Fran was the worst natural economic disaster to occur in North Carolina history. In the RAH county warning area along, the damage exceeded 2 billion dollars. Damage to crops, livestock, and farm equipment/buildings was over 400 million. The agricultural damage was the greatest in Sampson, Johnston, and Wayne counties. Several hundred thousand trees were uprooted or broken. Tens of thousands of homes were damaged by falling trees. In the path of the storm's center, almost every neighborhood was affected. The copious rainfall produced many severe flash and river floods. The flooding on the Haw River at the town of Haw River, the Neuse River at Smithfield and Goldsboro, and the Tar River at Louisburg and Rocky Mount, all neared or exceeded the highest flood on record. Many homes located in the flood plain had to be evacuated. The most massive evacuation occurred in Goldsboro where residents of 550 homes had to be moved to public shelters. Hundreds of cars in Goldsboro were damaged by water, many of which were underwater with only their radio antenna showing. Many homes and businesses incurred heavy losses. Along the Crabtree Creek in Raleigh, which crested at its highest since 1973, hundreds of new cars from local dealerships floated in 6 feet of water. Scores of businesses reported heavy damage at the area's largest shopping center. The basic necessities of life were missing for several days: milk, bread, drinking water, power, and telephone service. It took more than 10 days for power to be restored in many areas. Schools were closed for a week in the hardest hit counties. Automobile travel was hazardous for days after the storm due to fallen

and falling trees. A full twelve days after the event, 150 secondary roads were still closed.

- ***September 6, 1996:*** Persistent heavy rain in advance of Hurricane Fran and the passage of the center of the storm in the early morning hours produced major flooding of creeks, secondary roads, and low lying areas. Some creeks likely reached record levels.
- ***September 4, 1999:*** After meandering off the coast and ruining the Labor Day weekend for millions, the remnants of Hurricane Dennis finally moved inland across the central portion of the state. Its main impact was to end the drought in the eastern half of the state. The Triangle received from 6 to 8 inches of rain with Chapel Hill peaking out at 12 inches. The Interstate 40 corridor of counties also got dumped on with totals in the 6 to 10 inch range. This water caused considerable urban and lowland flooding. Several main stem rivers also went into flood. The winds with the remnants of Dennis were generally not a significant problem. There were many old, larger trees uprooted and widespread limb damage was reported. However, the wind and rain combination caused considerable crop damage.
- ***September 5, 1999:*** The remnants of Hurricane Dennis dumped 6-8 inches of rain across the Heart of Carolina. This water caused many streams and creeks to overflow their banks. In the Capital area, the Crabtree Creek and Walnut Creek flooded nearby streets and communities. The same scenario was repeated across the rest of the Triangle and surrounding counties.
- ***September 15, 1999:*** Hurricane Floyd produced more human misery and environmental impact in North Carolina than any disaster in memory. The 15-20 inches of rain that fell across the eastern half of the state caused every river and stream to flood. Many rivers set new flood records. Whole communities were underwater for days, even weeks in some areas. Thousands of homes were lost. Crop damage was extensive. The infrastructure of the eastern counties, mainly roads, bridges, water plants, etc., were heavily damaged. By the end of 1999, $1.5 billion had already been spent, with estimates that the cost would reach $3-4 billion. The counties within the Raleigh county warning area probably sustained more than half of the state total. Even worse was the loss of life, mainly due to flooding. Many Carolinians did not heed the call to evacuate and many more drove into flooded streams and rivers. In the central part of the state, 21 people lost their lives. Also, the loss of livestock was significant, mainly swine and poultry. Floyd will indeed go down in the history books.

Dam Failure

One of our major problem dams was one on Sidney Avenue, Snoffer's Lake. Several times floodwaters ran over the dam. This dam was an earthen dam with a concrete spillway. The spillway was not big enough to control the floodwaters. This dam was rated by the NCDEMNR as a hazardous dam. There is an apartment complex directly below the dam that was a large concern if the dam failed. This past year the dam was broken to avoid a chance that it would flood the apartments if it were breached.

We also have several dams along the Haw River that were once used for powering the textile plants located on the river. Two of the dams are still being used to make

electrical power. A couple of the dams are being used to supply water for the sprinkler systems and for the dyeing of cloth for the facilities located at each site. None of these dams are considered to be hazardous dams. These dams would pose no threat to the population downstream if they failed.

We have two dams that are being used for water supply that are considered to be hazardous dams by NCDEMNR. They are both located on Stoney Creek. We also have some private dams that are listed as hazardous dams.

The remaining dams are used for water supply and irrigation of golf courses and agriculture crops. The major dams in our county that are listed as hazardous dams by the North Carolina Division of Natural Resources are Burlington's Lake Cammack and the Graham/Mebane Lake. Both of these dams are used to supply water for Alamance County citizens. Each City has conducted a hazardous analysis of these dams and has included it in the Hazardous Mitigation plan.

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Multi-Jurisdictional Flood Risk Assessment

Haw River: Inspections and code enforcement are handled by the County Building Inspections Department, except for fire inspections. Most of the single family dwellings affected by the 100-year flood plain are located on/or near Stone Street Extension. The only business in the 100-year flood plain is located on Hwy. 70. Building restrictions are handled by the Town of Haw River and Alamance County to restrict future building in the flood plain.

Green Level: Inspections and code enforcement are handled by the County Building Inspections Department and Fire Marshal's Office. Twelve single family dwellings are located in the 100 year flood plain. Eleven of these are located in mobile homes parks. These are located on Back Creek. Building restrictions are handled jointly by the Town of Green Level and Alamance County to restrict future building in the flood plain.

Swepsonville: Inspections and code enforcement are handled by the County Building Inspections and Fire Marshal's Office. The town of Swepsonville has no homes or businesses located in the 100-year flood plain. There is one sewage pump station that has been affected by heavy rains. Building restrictions are handled jointly by the Town of Swepsonville and Alamance County to restrict future building in the flood plain.

Mebane: The inspections and code enforcement are handled by the City's Inspection Department and Fire Department. The City's Waste Plant has experienced some flooding from past storms, but action has been taken to hopefully mitigate this problem by moving the equipment out of the prone flood areas. The City of Mebane Inspection and Planning Departments are restricting building in the 100 year flood plain area.

Ossipee: Inspections and code enforcement are handled by the County Building Inspections and Fire Marshal's Office. The town of Ossipee has no homes or businesses located in the 100-year flood plain. There is one sewage pump station that has been affected by heavy rains. Building restrictions are handled jointly by the Town of Ossipee and Alamance County to restrict future building in the flood plain.

Town of Alamance: Inspections and code enforcement are handled by the County Building Inspections and Fire Marshal's Office. The town of Swepsonville has no homes or businesses located in the 100-year flood plain. There is one sewage pump station that has been affected by heavy rains. Building restrictions are handled jointly by the Town of Alamance and Alamance County to restrict future building in the flood plain.

Town of Elon: Inspections and code enforcement are handled by the Town of Elon, the County Building Inspections and Fire Marshal's Office. The Town of Elon has no homes or businesses located in the 100-year flood plain.

Graham: Inspection and code enforcement are handled by the City of Graham's Building and Inspection Department as well as the Fire Prevention Bureau. Ordinances are in place to prevent any additional construction within the 100-year flood plain

Burlington: Inspection and code enforcement are handled by the City of Burlington's Building and Inspection Department as well as the Fire Prevention Bureau. Ordinances are in place to prevent any additional construction within the 100-year flood plain

Hurricane/Flooding Risk Summary

Likelihood of Occurrence	**Probable Impact**	**Vulnerable Area**
Likely	Limited	Winds - Entire County Flooding – See Maps

Winter Storms

The occurrence of snowstorms and/or ice storms has a substantial impact on our communities. In addition, there is a substantial impact on transportation, power transmission, communications, agriculture and people.

Severe winter storms can produce an array of hazardous weather conditions, including heavy snow, blizzards, freezing rain and ice pellets and extreme cold.

The most damage from winter storms for our county has been ice storms. These storms cause major power outages and a lot of property damage. The longest that we have been affected by power outages in our communities from ice storms has been about eight (8) days. Ice storms can occur when the temperature is above freezing. We have had six major ice storms in the last 10 years. Most of these occurred in late January. Also, In the last 10 years we have also had 13 winter storms and three heavy snows, and experienced an extreme cold condition in 1996 (National Oceanic and Atmospheric Administration). Our largest ice storm occurred when the temperature was around 35 degrees.

Heavy snow storms for our county can be as little as one foot; however, heavy snowstorms do not occur very often in Alamance County, so we are not well equipped to handle the large snow accumulations. As long as the snowfall is below 10 inches, our equipment can handle getting the roads clear in a short time, but with a deeper snow, it is a different story. We usually experience one snow of more than an inch each winter. Approximately every 3-4 years, Alamance County experiences a snow of as much as 6-10 inches.

In the past several years the higher levels of snow have occurred in the southern end of the county. Since this is the most rural area of the county, this has caused the most problems with longer road closings. A major snowstorm would affect the entire county, but our larger municipalities have been able to get their streets open much quicker, to lessen the effects of a snowstorm on the citizens. With the interstate coming through Alamance County, this takes priority for DOT, so in a big snowstorm, secondary roads can be several days before being cleared of snow.

Historical Occurrences

- ***February 1967:*** The worse ice storm occurred in ten years. The top most limbs in many trees broke off under the extra weight, snapping power and telephone lines as they fall.
- ***January, 1968:*** A large mountain of snow and ice was picked up from the downtown section and dumped at the end of South Maple Street near Interstate 85. Due to the icy weather conditions, garbage pick-up and street clearing were not on schedule.
- ***January 13, 1978:*** A hardwood tree in a resident's yard in the Jones Street snapped under the pressure of the ice. Many other trees in the Jones Street-McGee Street neighborhood did not withstand the storm.
- ***January 20, 1978:*** For a second weekend in a row, many residents lost power due to an ice storm. Motels in Alamance County were blocked with residents and out-of

town electric workers since they had power. Many restaurants in the area never lost power so their business increased a great deal during the winter storm.

- ***February, 1979:*** Heavy snow storm
- ***January 3, 1994:*** Heavy snow storm
- ***February 10, 1994:*** A strong cold front brought a surge of arctic air into North Carolina and plunged temperatures 40 to 50 degrees from readings the previous day to below freezing. Low pressure developed along the front causing widespread sleet and freezing rain across northern and western sections. The greatest ice accumulation of one to two inches and associated damages to trees and power lines occurred in the northern Piedmont and North Foothills regions. Elsewhere in northern interior and western sections, ice accumulations ranged from one-quarter to one inch. Numerous motor vehicle accidents were also reported.
- ***January 6, 1996:*** A major winter storm began early on the 6th and continued until the evening of the 7th. Many areas of central North Carolina received a combination of snow, sleet, and freezing rain. Total accumulations of 8 to 12 inches of snow were common near the NC/VA border. To the south, a swath of 4 to 8 inches of snow and ice fell from Davidson County through the Winston-Salem and Greensboro areas, east to Wake County and northeast to Halifax County. in Raleigh, 4 inches of densely packed snow and ice fell, which consisted of at least 2 inches of sleet. Further south, over the Sand Hills and Coastal Plain, mostly freezing rain mixed with sleet fell. Glaze collected on trees and power lines, causing extensive power outages from Laurinburg to Fayetteville to Wilson.
- ***January 11, 1996:*** Freezing rain spread across central North Carolina during the evening hours of the 11th and ended around sunrise on the 12th. Snow fell in the northwest portions of the Piedmont with Forsyth County receiving as much as 4 to 5 inches of new snow. The snow mixed with freezing rain before ending in the northwest. From Anson, Stanly, Davidson, and Guilford counties, east into the Coastal Plain, freezing rain coated trees and power lines, causing significant power outages. A total accumulation of glaze was 1/4 to 1/2 inch. This storm, combined with the previous storm on the 6th and 7th, kept schools and businesses closed for over a week. Temperatures remained well below freezing throughout the period.
- ***February 2, 1996:*** Freezing rain spread across central North Carolina during the early morning hours of the 2nd. The freezing rain tapered off during the late afternoon but another round of heavy freezing rain and sleet moved back over central sections of the state during the evening of the 2nd and continued until around daybreak on the 3rd. Freezing rain accumulated on trees and power lines, causing numerous trees to fall. Power was disrupted to over 300,000 homes with most extensive outages in the Raleigh, Durham, and Chapel Hill areas, extending west to Winston-Salem and Greensboro. Up to 1 inch of glaze accumulated on exposed objects. To the south of this region, from Stanly and Anson counties, eastward to Fayetteville, Clinton and Goldsboro, glaze accumulated between 1/4 and 3/4 of an inch. As even colder air moved into the storm area during the evening of the 2nd, the freezing rain changed to sleet. Sleet accumulations averaged 1/4 to 1/2 inch. The sleet caused travel to come to a standstill. There were several traffic deaths and injuries. The storm clean-up costs for the city of Raleigh totaled $175,000 alone. Estimated costs for the storm area totaled over one million dollars.
- **February 3, 1996:** As the previous storm ended, the coldest air mass in several winters blasted into central North Carolina. Temperatures fell dramatically and many

areas fell to around the morning of the 5th. Raleigh recorded zero degrees, Greensboro one-degree and Fayetteville reached six degrees. For several days, the temperature remained 25 degrees or lower, which was far below normal. The combination of bitter cold and snow/ice cover kept many schools and businesses closed.

- **February 16, 1996:** Snow developed across the northern Piedmont during the early morning hours and continued through the day. Three to five inches of wet snow fell from Forsyth county eastward across Guilford, Alamance, Orange, Durham, northern Wake, Franklin, northern Nash, and Halifax counties. To the south of these counties, the precipitation began as rain as amounts were generally 1 to 3 inches. However, four to eight inches fell across the tier of counties near the NC/VA border.
- ***January 29, 1997:*** A Winter Storm affected the western and central portions of North Carolina. Snow fell over the western piedmont with a mixture of snow, sleet and rain over the central piedmont. Rain fell to the east. Snow developed over the western piedmont of North Carolina just after sunrise and continued through the day. The snow tapered off in the late afternoon. The main rain/snow line set up from near Salisbury northeast to Greensboro and extended northeast to the North Carolina/ Virginia border, just west of Roxboro. Snow fell to the west of this line, while rain fell to the east. Along the narrow transition zone from near Salisbury northeast to Roxboro, a mixture of rain and snow fell, occasionally mixed with sleet. Accumulations of snow were heaviest in the city of Winston-Salem and points west and north of the city. Totals there were from 6 to 8 inches, with 4 to 6 inches of snow in Davidson and Guilford counties, including the cities of Lexington and Greensboro. Near the snow to rain transition line snow accumulations were limited to 1 to 3 inches in a zone from Albemarle in Stanley county northeast through Randolph county including Asheboro and into Alamance and Person counties. Burlington and Roxboro reported around 2 inches of snow. Hundreds of traffic accidents were reported in Davidson, Forsyth, Guilford, Randolph, and Alamance counties. Power outages were also heaviest in Forsyth County.
- ***December 23, 1998:*** An ice storm began during the afternoon of 12/23/98 and continued through the early morning hours on 12/25/98. Most of the precipitation fell in the form of freezing rain across central North Carolina causing power outages to approximately 500,000 people sometime during the period. Nearly 90,000 people were without power in Wake County alone at 2:00pm on Christmas Eve. The most sever ice accumulations were found in a southwest to northeast bad across central North Carolina. This band extended from near Albemarle in Stanly County, northeast through the Asheboro area in Randolph County, and continued northeast to Raleigh-Durham and Halifax. Accumulations from 1/2 to 1 inch of ice occurred in these areas. To the northwest, over the Winston-Salem, Greensboro, and High Point areas, the precipitation began as sleet and then turned to freezing rain. Accumulations of sleet ranged nearly an inch in some areas before changing to glaze. With temperatures in the mid 20's, this made travel conditions nearly impossible on the night of the 23rd. From Fayetteville to Goldsboro including most of the eastern Sand Hills and Coastal Plain region of the state, rain was mixed with freezing rain. Some locations saw 1/4 inch accumulations of glaze on trees and power lines, which caused numerous power outages. Travel conditions were not as severe as in the Piedmont region due to the mix with rain and temperatures ranging between 31 and 35 degrees. Early on Christmas morning, the freezing rain changed

to a period of light snow over the eastern Piedmont. The snow accumulated 1 to 2 inches in spotty locations centered from Pinehurst in Moore County to Fuquay-Varina in Wake County.

- ***January 2, 1999:*** Freezing rain overspread western portions of central North Carolina during the afternoon of 01/02/99. The freezing rain began as sleet over the Winston-Salem and Greensboro areas but changed to freezing rain by evening. The sleet did accumulate up to 2 inches in western and northern Forsyth County before the change to glaze occurred. Elsewhere, glaze accumulated to between 1/4 and 1/2 inch. The eastern extent of the freezing rain extended from near Badin Lake to Burlington to Roxboro. East of this line…some light freezing rain fell before quickly changing to rain as warmer air spread northwest from the Atlantic Ocean. There was quite a temperature gradient with this storm. As warm Atlantic air was pulled into the storm, temperatures warned from the lower 30's at Raleigh at 2pm on the 2nd into the lower 60's overnight on the 3rd. This shrunk the freezing rain coverage over central North Carolina to the far western counties of the Piedmont-Triad. In the freezing rain area, the temperatures warmed from the lower 20's to the lower 30's during the same time. This kept the ice storm going from mid afternoon on the 2nd through the early morning hours on the 3rd. There were numerous reports of downed tree limbs and power lines, which significant power outages in the western Piedmont. There were also hundreds of accidents reported throughout the Piedmont.
- ***January 2000:*** Governor Jim Hunt sought a federal disaster declaration for 26 North Carolina counties because of a winter storm that dumped up to 20 inches of snow in some parts of the state. Alamance County received 14 inches of snow according to the National Weather Service. The storm covered the Piedmont of North Carolina with the greatest snowfall on record for a single event in the last 100 years. State agencies estimate more than $16.5 million responding to damage from the storm. Freezing rain that fell a few days later knocked out power and trees across Alamance County.
- ***January 18, 2000:*** Light snow moved over the Triad area in the early morning hours of the 18th and spread slowly east-southeast, reaching the San hills and Coastal Plain before daybreak. The snow intensified in the morning in the Triad area where 4 to 6 inches of snow fell. The Sand Hills and Coastal Plain received 1 to 3 inches before changing over to sleet and freezing rain in the mid-morning hours. Total accumulations of ice were less than a quarter of an inch. The snow and ice made for slick road conditions across the entire area. Most counties reported numerous accidents, causing major roads to close.
- ***January 20, 2000:*** An average of 2 to 3 inches of snow fell in the northern half of central North Carolina with a few locations near the Virginia border receiving up to 4 inches. The southern counties in central North Carolina received mostly rain with a trace of snow. The snow began around midnight on the 20th over the Northwest Piedmont and moved east. The light snow tapered off to rain and freezing drizzle in the early morning hours. Some secondary roads were reported to be slick while most major roads remained clear.
- ***January 22, 2002:*** Winter storm producing snow and ice moved from west to east across central North Carolina beginning on the evening of the 22nd. The storm produced 2 to 5 inches of snow across the western Piedmont where Stanly and Anson counties reported 4 to 5 inches and the Triad around 2 inches. Amounts less

than an inch covered the ground in the Triangle and Rocky Mount areas while the southern tier counties got I to 3 inches. After a lull in the late night precipitation, sleet and freezing rain developed early on the 23rd. The accumulation of ice was less than a quarter inch in the southern counties where precipitation was mostly rain. In the central counties including Nash, Wake, Chatham, and Randolph, the ice accumulated to around a quarter inch, causing scattered power outages and downed tree limbs. Precipitation in the northern counties remained mostly snow through the event.

- ***January 24, 2000:*** This record-setting snowstorm began with freezing drizzle in the early morning hours of the 24th. Road surfaces quickly froze during this time when the temperature dropped from 32 degrees to 27 degrees. Numerous traffic accidents were reported. By mid-morning, additional precipitation was advancing northward into the southern portions of central North Carolina. During the afternoon of the 24th, rain was falling across southeastern North Carolina while an area of snow was located over the southwest Piedmont to the western Sand Hills. Later that evening the precipitation reached the Triangle area, beginning as mostly sleet before quickly changing to all snow. The snowfall became heavy early on the 25th with snowfall rates estimated at 4 inches per hour. A north-to-south oriented bad of heavy snow remained in place over Moore, Lee, Wake, Franklin, Granville, Vance and Warren counties for several hours. Snowfall amounts exceeded 20 inches in some locations in these counties. The western Piedmont counties recorded 8 to 12 inches of snow, while the Coastal Plain received 4 to 8 inches of snow with light icing at the end of the event. The heavy snow brought central North Carolina to a standstill. Many roads were impassable, and power outages were reported across the entire area. Statewide, an estimated 260,000 people were without power, mostly in the Sand Hills. Strong, gusty winds produced snowdrifts several feet high. At the Raleigh-Durham Airport, the record snowfall from one storm was set at 20.3 inches. The total cost of the storm to the state was estimated at $800 million.
- ***January 28, 2002:*** Sleet and freezing rain began to fall in the western Piedmont of North Carolina on the evening of the 28th. The ice accumulated to a half inch in some locations near the Triad area and along the Virginia border, with most locations in the area receiving around a quarter of an inch of ice. The rest of central North Carolina received a thin coating of less than a quarter inch, creating patchy spots of ice on roads and causing downed trees and power lines. Approximately 30,000 people were without power across the state at the peak of the storm. In eastern portions of the Sand Hills and in the Coastal Plain, the freezing rain in the precipitation from the predawn hours on Sunday until Sunday morning also kept ice accumulation minimal.
- ***November 19, 2002:*** An early season snowfall affected portions of central North Carolina on Sunday, November 19. It was the second earliest date that snow has been measured at Raleigh-Durham Airport and at the Piedmont Triad Airport. Rain began to fall in the late morning hours; then changed to a mixture of rain, sleet, and snow before ending in the evening. The snowfall was heavy at times in some locations, and up to three inches was recorded. Most locations in central North Carolina received around 2 inches of snow on grassy surfaces. The snow and ice created hazardous driving conditions, leading to numerous accidents.
- ***January 3, 2002:*** The first winter storm of the season brought significant snowfall to central North Carolina. An initial round of snow began to fall during the evening of

the 2nd. The snow was heavy at times, and accumulated between 3 and 5 inches. The snow changed to sleet and light freezing rain in the Coastal Plain through the early morning hours of the 3rd. After a period of little or no precipitation on the morning of the 3rd, snow began to fall again across the entire ware, and was heavy at times, adding an additional 4 to 8 inches. Storm total snowfall amounts were over a foot from the Sand Hills northeast across the Piedmont to the Virginia border. The Northwest Piedmont, including the Triad area, received 6 to 10 inches. Snowfall amounts were lower in the Southern and Central Coastal Plain, between 4 and 8 inches, due to the snow mixing with sleet and freezing rain.

- ***January 6, 2002:*** A period of freezing rain caused dangerous driving conditions across the Northwest Piedmont on the morning of January 6. Icy roads were reported across the Northwest Piedmont, mainly to the north of Interstate 40. Conditions were made worse by existing snow cover from a snowstorm a few days earlier. The freezing rain fell for a few hours before changing over to rain in the afternoon.
- ***December, 2002:*** Duke Power Company officials say the ice storm is the worst in the company's history. The storm knocked out electric power to two-thirds of Alamance County and much of North Carolina. Portions of the county's main commercial roads were without power. Governor Mike Easley asked for federal money for cleanup. The Federal Emergency Management (FEMA) toured Alamance County to assess the damage.
- ***December 4, 2002:*** One of the worst ice storms to ever hit Central North Carolina began in the late afternoon of December 4, and ended in the early morning hours of December5. Precipitation mainly began as a mix of snow and sleet; then turned to freezing rain. A quarter inch of ice or more covered locations mainly to the west of I-95. The highest precipitation amounts stretched across the Piedmont, from Albemarle to Asheboro to Durham to Warrenton, where a half-inch to one-inch thick layer of ice was reported. 1 to 2 inches of snow also fell in the Triad area and in the counties bordering Virginia with trace amounts elsewhere. Large trees and power lines were downed buy the ice all across the area. The storm caused a record number of power outages, as nearly one million people lost power in Central North Carolina, some for nearly a week.
- ***February 16, 2003:*** Sleet and freezing rain fell across much of central North Carolina. Sleet accumulated between 1 and 3 inches across the Piedmont, mainly west of a line from Southern Pines to Raleigh to Roanoke Rapids. The highest accumulations were near the Virginia border and in the Triad area. Mainly freezing rain fell across the Sand Hills and Coastal Plain, with ice accumulations around a quarter inch along a narrow corridor from Wadesboro to Smithfield to Rocky Mount.
- ***February 27, 2003:*** Freezing rain began in the early morning hours of the 27th, and continued into the afternoon. Ice accumulated to nearly one inch just north of the Triad area. Much of the Piedmont from Raleigh north and west received a quarter to a half-inch of ice. Numerous trees were downed and power outages were widespread across the Piedmont.
- ***December 13, 2003:*** A mix of freezing rain and sleet fell across the northwest piedmont from Roxboro, Burlington, Asheboro and Denton west across the Triad. Accumulation of freezing rain reached a quarter of an inch in addition to as much as an inch of sleet. Numerous traffic accidents were reported due to icy road conditions.

- ***January 26, 2004:*** A winter storm occurred on January 25th and 26th when snow and sleet fell across central North Carolina. The precipitation fell as snow and sleet over much of the area on the 25th, then became freezing rain over the southeastern sections on the 26th. 3 to 6 inches of snow and sleet fell over the Piedmont on the 25th with as much as 1/4 inch of freezing rain reported in the southern coastal plain on the 26th.
- ***February 15, 2004:*** Snow began falling on the evening of the 15th, and ended the morning of the 16th. Bands of snow spread northward across the area, producing between 3 and 6 inches across the northern half of central North Carolina.
- ***February 26, 2004:*** A strong storm arrived on February 26th and continued into the morning of the 27th. This storm hit the area with a one-two punch, affecting southern sections on the 26th, then northern sections late on the 26th and the 27th. The first punch dumped heavy snow over portions of the southern Piedmont and Sandhills. Accumulations totaled 6 to locally 10 inches in areas such as Laurinburg, Hamlet, Fayetteville, and Raeford. Much lighter amounts fell to the north during the day. The second punch arrived in western sections of the area late in the day and shifted northeast across central and eastern portions overnight. The heavy snow was accompanied by thunder and lightning across the western Piedmont. Snowfall amounts ranged between 12 to 18 inches from Albemarle northeast to Greensboro. Other sections of the Piedmont, including the Triangle, received between 3 and 6 inches.
- ***January 29, 2005:*** A mix of snow and sleet moved across the Piedmont on Saturday afternoon. This brought a half inch of sleet to the Winston-Salem area. A lull in the precipitation was followed by a period of freezing rain Sunday morning. A quarter inch of ice accrued in the central and western Piedmont, which created icy roads and caused numerous accidents.
- ***December 15, 2005:*** A mix of freezing rain and sleet fell across the area from 4am to about 10am on December 15th. Precipitation changed over to all rain by noon. Clearing skies with temperatures dropping down to around 30 the next morning resulted in areas of black ice. A 12 year old girl was killed in an automobile accident near Stovall in Granville when the car her grandfather was driving flipped as a combined result of speed and ice.
- ***January 18, 2007:*** Snow moved into Central North Carolina just prior to sunrise on January 18th impacting local schools and morning commuters. Between one to two inches of snow fell across the area resulting in numerous accidents. About eight children were injured in Asheboro when a school bus over turned and two indirect deaths were reported near Goldsboro as a result of a single vehicle accident. Snow changed over all rain by afternoon.
- ***January 21, 2007:*** A light glaze of freezing rain up to a tenth of an inch thick accumulated over the piedmont from 5pm to midnight.
- ***December 7, 2007:*** Light freezing rain during the early morning hours just prior to sunrise resulted in several automobile accidents from black ice on numerous bridges. On Friday, December 7, 2007 a brief period of light freezing rain fell across Central North Carolina from the Triad east to portions of the Triangle and east over the Coastal Plain. Most of the freezing rain accumulation of up to sixteenth of an inch occurred from southern Wake County east to Smithfield and north to Wilson, Rocky Mount and Roanoke Rapids. Portions of Interstate 40 and Highway 70 in

Johnston County were closed due to numerous accidents. Over 150 automobile accidents were reported across Central North Carolina due to icy bridges.

- ***January 17, 2008:*** Around one inch of snow fell countywide with a few locations in the western portion of the county receiving 2 to 3 inches of snow. On January 17, 2008 a weak area of low pressure moved northeast from the Gulf of Mexico dropping around one inch of snow in the Northwest Piedmont and western Sandhills.
- ***January 19, 2008:*** Around one inch of snow fell countywide with a few locations in the western portion of the county receiving 2 to 3 inches of snow. On January 17, 2008 a weak area of low pressure moved northeast from the Gulf of Mexico dropping around one inch of snow in the Northwest Piedmont and western Sandhills.
- ***February 13, 2008:*** Between one-half to one inch of snow fell across Davidson County mainly from Lexington north to Thomasville and the Forsyth county line. During the late evening hours of February 13th several bands of snow showers moved across the Northwest Piedmont resulting in periods of moderate to heavy snow for a few hours. Between one to three inches of snow fell in many locations between 6pm and midnight.
- ***January 22, 2009:*** Between 1 to 2 inches of snow fell across the county resulting in the closing of local schools. Many roads were covered with snow throughout the late morning and afternoon hours. On January 22, 2009 the first major winter storm to strike Central North Carolina since 2004 brought 3 to 7 inches of snow to most of the area. A strong upper level disturbance dropped quickly southeast into the mid-Atlantic followed by a surface of low pressure which developed south of Wilmington. The combination of cold air and moisture surging in from the coast allowed the rain to transition to snow between midnight and 3:00am. Snow lasted until afternoon in many locations and did not taper off in the Interstate 95 corridor until 3:00pm.
- ***March 2, 2009:*** Around five inches of snow fell countywide. Several automobile accidents were reported the mornings following the storm due to the re-freezing of the melting snow overnight. Bands of heavy snow moved across Central North Carolina blanketing the region with 2 to 8 inches of snow. Areas in the piedmont experienced the most snow fall with the Triad reporting up to 8 inches. The heavy snow was the result of a surface low pressure system tracking east out of the Ohio River Valley combining with cold air from the north.

General Information Regarding Winter Storms

A. Close contact is maintained by telephone with the National Weather Service.

B. Alamance County Communication Center has the capability to monitor storms approaching the county, as well as the potential intensity of the storms.

C. NWS issues watches and warnings to the public and government agencies.

D. Public education continues to take place regarding watches and warnings.

E. Weather alert radios have been placed in each school, day care, rest/nursing home and all government agencies.

F. Debris clearance, as required, can be requested from various agencies, including NCDOT.

G. Snow and ice removal methods are in place for the towns/cities and NCDOT.

H. Shelter agreements are in place via Red Cross to provide shelter operations.

Winter Storm Risk Summary

Likelihood of Occurrence	Probable Impact	Vulnerable Area
Likely	Negligible	Entire County

Earthquake

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The severity of the effects depends on the amount of energy released from the fault or epicenter. Alamance County, being in the middle and southeastern area of the state, faces a moderate hazard from seismic activity. Our county is split in the middle by the Haw River and of course has many bridges. If any earthquake should hit our county it would cause major problems in just being able to get anywhere in the county. Interstate-85/40 crosses the Haw River, so if anything occurred to the bridges it would close this main highway. Alamance County is located in the center of the state, so if you closed the interstate, it would have a major impact on commerce for the whole state. However, mitigation planning for earthquake will be of very low priority for our county. The areas that would be impacted by an earthquake would be the whole county. This would be because of the county dependence on bridges over major streams in the county.

An earthquake would cause major property damage and extensive loss of life. The bad thing about an earthquake is that it can occur at any time of day and is not related to weather patterns. The most recent earthquake that occurred in North Carolina was at Statesville on June 5, 1998.

By our county being divided by the Haw River it has made us aware of the need to designate the locations of shelters in the outlying areas of the county. All of our volunteer fire departments have generators that can operate the needed communications if the power was interrupted. Many of these departments have needed supplies to aid our communities in a disaster. With this measure, citizens could stay in their own area and would not have to cross the river if an earthquake would occur and take out the bridges.

General Information Regarding Earthquake

A. Shelter agreements are in place via Red Cross and the Alamance County Department of Social Services to provide shelter operations.

B. Citizens, business owners, and others have been encouraged to develop emergency preparedness plans, emergency response plans and emergency recovery plans.

Hazard Probability

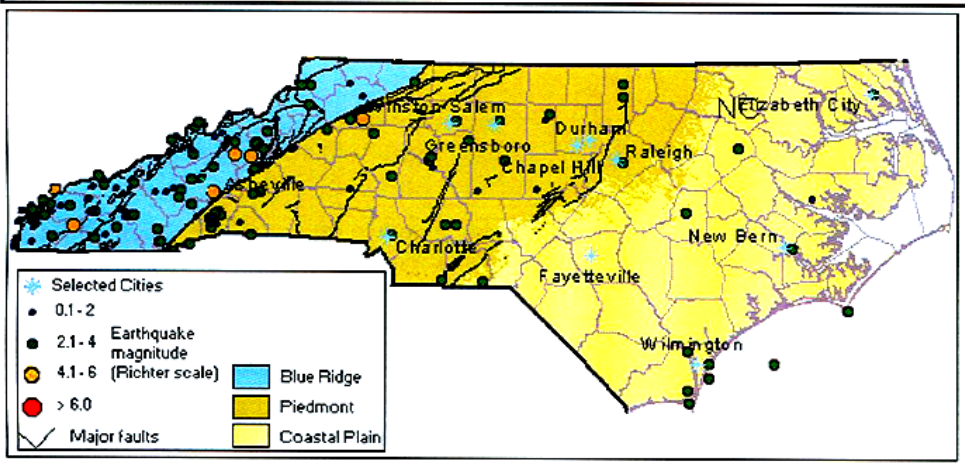
Earthquakes pose minor risk to the piedmont section of North Carolina that Alamance County is located in. Most of the great earthquakes (magnitude8.0 or more) occur along the plate boundaries, not in the piedmont region. On a scale of 1 to 6, relative to conterminous US, earthquake vulnerability in Alamance County is rated at a 1.

Earthquake Storm Risk Summary

Likelihood of Occurrence	Probable Impact	Vulnerable Area
Unlikely	Negligible	Entire County

Recent Earthquake history in North Carolina:

March 5, 1958 Wilmington, NC	**Intensity:** V (five) **Magnitude:** 0 **Damage:** Shocks transpired along the coast rolling people and shaking houses.
1987 North Carolina/Tennessee border	**Magnitude** 4.2 Largest to occur in the Southeast that year.
June 14, 1997 Henderson County, NC	**Magnitude** 2.5, Small earthquake **Damage:** None reported
June 5, 1998 Mooresville, NC	**Magnitude** 3.2, Small earthquake **Damage:** None reported



A map showing geological and seismic information for North Carolina.
(Image courtesy: North Carolina Geological Survey)

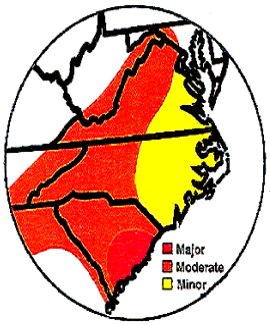
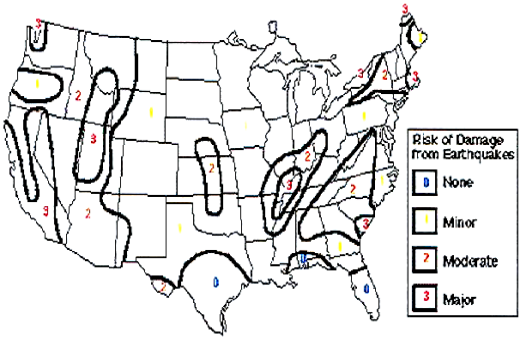


Figure 3.12

Graphic obtained from the National Oceanic and Atmospheric Administration



Modified from Stearns & Miller, 1977)

Figure 3.13

Earthquakes in North Carolina – 1973 to Present

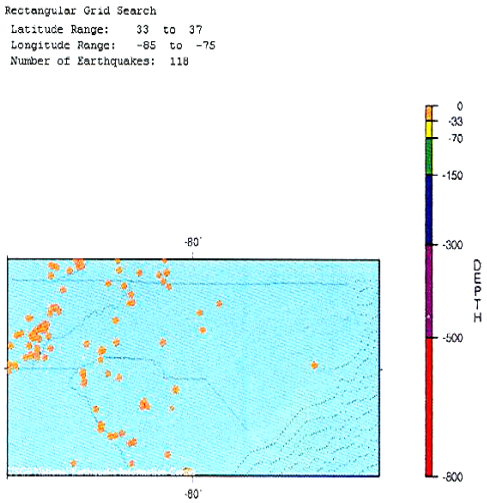


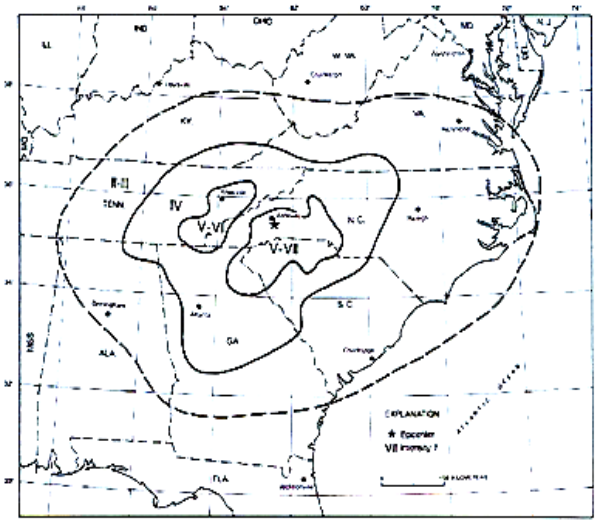
Figure 3.14

Map produced by a query with the National Earthquake Information Center. Data is from 1973 to present.

Modified Mercalli Intensity Scale

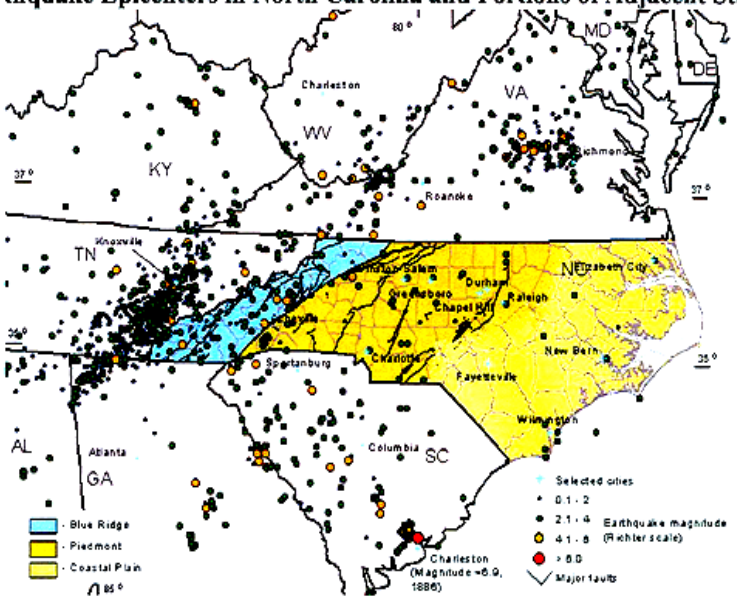
Mercalli Intensity (at epicenter)	Magnitude	Witness Observations
I	1 to 2	Felt by very few people; barely noticeable.
II	2 to 3	Felt by a few people, especially on upper floors.
III	3 to 4	Noticeable indoors, especially on upper floors, but may not be recognized as an earthquake.
IV	4	Felt by many indoors, few outdoors. May feel like heavy truck passing by.
V	4 to 5	Felt by almost everyone, some people awakened. Small objects moved. Trees and poles may shake.
VI	5 to 6	Felt by everyone. Difficult to stand. Some heavy furniture moved and some plaster fell. Chimneys may be slightly damaged.
VII	6	Slight to moderate damage in well built ordinary structures. Considerable damage to poorly built structures. Some walls may fall.
VIII	6 to 7	Little damage in specially built structures. Considerable damage to ordinary buildings, severe damage to poorly built structures. Some walls collapse.
IX	7	Considerable damage to specially built structures, buildings shifted off foundations. Ground cracked noticeably. Wholesale destruction. Landslides.
X	7 to 8	Most masonry and frame structures and their foundations destroyed. Ground badly cracked. Landslides. Wholesale destruction.
XI	8	Total damage. Few, if any, structures standing. Bridges destroyed. Wide cracks in ground. Waves seen on ground.
XII	8 or greater	Total damage. Waves seen on ground. Objects thrown up into air.

Isoseismal Map for the Waynesville, North Carolina, Earthquake of February 21, 1916



Abridged from Seismicity of the United States, 1568 – 1989 (Revised), by Carl W. Stover and Jerry L. Coffman, US Geological Survey Professional Paper 1527, United States Government Printing Office, Washington: 1993. *Figure 3.10*

Earthquake Epicenters in North Carolina and Portions of Adjacent States (1698 – 1997)



Geology from North Carolina Geological Survey, 1985, Geologic Map of North Carolina (Scale 1:500,000). Earthquake data from 1698 – 1992 are from Virginia Polytechnic Institute and State University. Data from 1993 – 1997 are from the U.S. Geological National Earthquake Information Center. Map created by North Carolina Geological Survey *Figure 3.11*

Drought

There is no way to predict when a drought will occur. Drought affects our entire county with the largest impact on the agriculture sections of the county. Tobacco farms have the capability of irrigating their crops, but in a long drought situation, water from farm ponds can't supply enough water. Our municipal water supply for the county is controlled by three large lakes. With the down-sizing of textiles in our area, these lakes have been able to supply water during the past droughts with no water restrictions required. We usually think of a drought occurring in the summer, however, we have had some major droughts in the fall of the year, as we did in 2001 and 2007. We had extreme heat in July of 1998. This affected the dry conditions we were having on the agriculture crops in our county (National Oceanic and Atmospheric Administration). The major effects of drought on our communities have been wells going dry, as well as farm ponds that are used for irrigating crops and water supply for the rural fire departments. The largest cash crop in Alamance County is tobacco, and almost all of these crops are irrigated. However, a long-term drought causes major problems with their water supply. Other crops that have been highly affected are hay and pastures. We have over 20 dairies and over 350 beef cattle operations. We had several residential wells to go dry in the drought of 2001 and 2007. Some of these areas are finding that they must drill much deeper in order to get a good water supply. Our county is very fortunate in having ample water supplies for our towns and cities. Water rationing has not been necessary in the past several years.

General Information Regarding Drought

A. Direct contact and consultation with NC Cooperative extension Service regarding agriculture drought predictions.

B. Monitor reservoirs and reservoir levels during dry periods.

C. Voluntary water conservation practices are put in place as necessary.

D. Maintains contact with the USGS regarding real time drought conditions and drought forecasts.

History of Drought in North Carolina and the U. S.

Year	Description
1980	The drought/heat wave summer of 1980 caused over $20 billion in damages to agriculture and related industries and an estimated 10,000 heat stress-related deaths in the United States
1986	$1 - $1.5 billion in damages and an estimated 100 deaths nationwide.
1993	During June-July 1993 most of the Southeast received less than 50% of normal rainfall along with temperatures 3 – 6 degrees above normal. Eight-nine of the one hundred counties in North Carolina were declared disaster areas. Crop loses for North Carolina were estimated at $165 million. During this period, North Carolina also recorded the second driest summer (June-August) on record (since 1895) with a statewide average precipitation of only 9.43 inches. The Raleigh-Durham area recorded the driest June on record with .33 inches of rain. Estimated damages for the United States exceeded $1 billion in damages to agriculture and at least 16 deaths.
1998	Severe drought/heat wave from Texas/Oklahoma eastward to the Carolinas resulted in $6 - $9 billion in damages to agriculture and at least 200 deaths.
1999	Summer drought/heat wave of 1999 resulted in extensive agricultural losses estimated at over $1.0 billion in damages and an estimated 502 deaths in the United States. The east coast was hardest hit by the drought, with record and near-record short-term precipitation deficits occurring on a local and regional scale resulting in agricultural losses and drought emergencies being declared in several states. Drought was especially severe in the mid-Atlantic states, where local water restrictions were in effect and drought emergencies were declared by several governors. February-August 1999 ranked as the fifth driest such period in the 105-year record.
2000	Severe drought and persistent heat over south-central and southeastern states caused significant losses to agriculture and related industries estimated at over $4.0 billion in damages and 140 deaths
2002	According to the National Climatic Data Center, moderate to extreme drought affected more than 45% of the united States June through August of 2002. Nationwide, the summer of 2002 was the third hottest on record after the summers of 1934 and 1936. The 12 months that ended with August 2002 were the driest on record for North Carolina. Local water restrictions were in effect throughout central and western North Carolina.
2007	The summer and fall of 2007 saw the Southeast region experiencing record drought conditions. Many counties were forced to implement voluntary and mandatory water restrictions. By the end of November 2007, the vast majority of the region was experiencing exceptional drought conditions.

Source: National Climatic Data Center

Drought Severity Classification								
Ranges								
Category	**Description**	**Possible Impacts**	**Palmer Drought Index**	**CPC Soil Moisture Model (Percentiles)**	**USGS Weekly Stream flow (Percentiles)**	**Percent of Normal Precipitation**	**Standardized Precipitation Index (SPI)**	**Satellite Vegetation Health Index**
D0	Abnormally Dry	Going into drought; short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought; some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9	21-30	21-30	<75% for 3 months	-0.5 to -0.7.	36-45
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages, developing or imminent, voluntary water use restrictions requested.	-2.0 to -2.9	11-20	11-20	<70% for 3 months	-0.8 to -1.2	26-35
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-3.0 to -3.9	6-10	6-10	<65% for 6 months	-1.3 to -1.5	16-25
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.	-4.0 to -4.9	3-5	3-5	<60% for 6 months	-1.6 to -1.9	6-15
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies.	-5.0 or less	0-2	0-2	<65% for 12 months	-2.0 or less	1-5
Source: National Drought Mitigation Center, June 18, 2002								

Drought Risk Summary

Likelihood of Occurrence	Probable Impact	Vulnerable Area
Possible	Negligible	Entire County

Wildfire and Forest Fires

Fortunately, wildfires in Alamance County, although frequent, are not normally a serious threat to large areas as is the case in western states where dry weather conditions and large expanses of timber increase the likelihood and extent of the impact of a wildfire. All of the rural sections of our county are affected by wildfires and forest fires. Our fire mostly consists of small 1-5 acre fires, which have been controlled by local resources. Our rural departments have added new equipment to better handle these types of fires. The North Carolina Division of Forest Resources has the responsibility for protecting state and privately owned forest land from wildfires. The State fire program emphasizes fire prevention efforts; pre-suppression activities (including extensive training of personnel); aggressive suppression efforts on all wildfires; and law enforcement follow-up. The financial losses from wildfires/forest fires have been attributed to the timber stands. These losses have been minimal, compared to the total value of timber in Alamance County. Most areas involved in these fires have been less than 5 acres in size.

We have a lot of fields/woods fires each year when a long period of drought occurs. There has never been a large wildfire in our communities. These fires usually involve small acreages of land. A large fire in our county would cover not over 50 acres, with most of the fires only covering less than 25 acres.

Types of Wildfires and Forest Fires

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

Source: National Weather Service

General Information Regarding Wildfires and Forest Fires

A. Direct contact with the District Forestry office that issues "fire potential" reports daily by radio.

B. Education by fire marshals and fire departments, as well as the Department of Environment and Natural Resources has greatly reduced outdoor burning of trash, reducing the number of forest fires.

C. Aggressive training and response by local fire departments and state forestry have diminished acreage consumed by forest fires.

D. All fire departments are equipped with specialized equipment to help fire wildfires/forest fires.

E. Fire safety education is conducted by the Fire Marshal's Office and is coordinated with each participating fire department.

F. NC Forestry responds to all reports of forest (or brush) fires and can therefore coordinate the response of Forestry resources directly, as needed.

Alamance County Forest Fire Five Year Summary of Fires By Cause										
	Lighting	Campfire	Smoking	Debris	Incendiary	Machine Use	Railroad	Children	Misc.	Total # of Fires
2005	0	0	0	6	0	1	0	4	1	11
Avg. #/5 years	0	0	1.2	10.2	0	1	0	2.2	1.4	16
Source: Department of Forest Resources, North Carolina Forestry Facts, June 2002										

The wildfire risk maps at the end of the plan illustrate the land cover in Alamance County that has an increased risk of wildfire. Areas in red are patches of southern yellow pine forest and indicate areas of high risk to wildfire. Medium risk areas are indicated by orange which are mixed hardwoods and evergreens. The maps show that the county has patchy and widely distributed forests, most of which are mixed hardwoods and evergreens of medium risk. There are only a few small stands of southern pine in any one of the incorporated areas of the county.

Wildfire Risk Summary

Likelihood of Occurrence	Probable Impact	Vulnerable Area
Likely	Negligible	Substantial Area

Multi-Jurisdiction Risk Conclusions

ALAMANCE COUNTY

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire County	Medium-High
Tornado	Likely	Limited	Entire County	Medium
Severe Winter Storm	Likely	Negligible	Entire County	Medium
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire County	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire County	Low

TOWN OF ELON

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Limited	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

TOWN OF OSSIPEE

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Possible	Negligible	Entire Area	Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

Multi-Jurisdiction Risk Conclusions, continued

VILLAGE OF ALAMANCE

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

TOWN OF GREEN LEVEL

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Possible	Limited	River Floodplains	Medium
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

TOWN OF SWEPSONVILLE

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

Multi-Jurisdiction Risk Conclusions, continued

TOWN OF HAW RIVER

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

CITY OF MEBANE

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Possible	Negligible	Wildland-Urban Interface	Low
Earthquake	Unlikely	Negligible	Entire Area	Low

CITY OF GRAHAM

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

CITY OF BURLINGTON

THREAT/HAZARD INDEX	Likelihood of Occurrence	Probable Impact	Vulnerable Area	Risk Conclusion
Thunderstorm, Wind and Lighting	Highly Likely	Limited	Entire Area	Medium-High
Tornado	Likely	Limited	Entire Area	Medium
Severe Winter Storm	Likely	Negligible	Entire Area	Medium-Low
Hurricane/Flooding	Likely	Limited	River Floodplains	Medium-High
Drought	Likely	Negligible	Entire Area	Low
Wildfire	Likely	Negligible	Wildland-Urban Interface	Medium-Low
Earthquake	Unlikely	Negligible	Entire Area	Low

CAPABILITY ASSESSMENT

A. EXISTING MITIGATION EFFORTS

Limiting risks can be the less expensive method in the long run for mitigating for hazards. One of the measures that have been used is to purchase homes and land that have been flooded many times in the past few years. (Ex. Rice Property, Horner Property).

Another cost-effective mitigation method for especially flood prone areas is to restrict building in these areas. The local government bodies have flood plain ordinances to help with limiting building in these areas. Alamance County and all municipalities are participating in the National Flood Insurance Program. Under this program, anyone who owns property, runs a business or nonprofit organization or lives in a participating community may purchase flood insurance coverage, even for properties not located in mapped floodplains provided the structure or contents are insurable. Insurance provides relief not available from federal disaster aid. Flood insurance also means that owners of flood prone properties pay more of their share toward flood relief.

For critical facilities already located in the flood prone area, current mitigation strategies include establishing minimum elevation, retrofitting, flood proofing of utilities and infrastructure, and access requirements to enable them to better withstand flood damage and to facilitate emergency operations. Critical facilities include schools, hospitals, nursing/rest homes, daycare centers, fire stations, water treatment plants, water and sewage pumping stations and other public or quasi-public facilities.

Alamance County and its jurisdictions are working to improve local drainage to control increased runoff that might increase the danger of flood to other properties. Furthermore, current ordinances prohibit within any floodway hazardous facilities, such as liquid and gas fuel tanks, chemical manufacturing and storage facilities, research laboratories testing infectious biological agents, explosive manufacturing and warehousing, toxic waste facilities and landfills, can present significant environmental and public health problems caused by leaks, spills, or ruptures resulting from flood damage. Such facilities should be located in more suitable areas with less risk.

The down side of purchasing land to stop building in these areas is the loss of tax revenue and the short-term cost of purchasing the land. Other areas of cost would be the upkeep of the land; however, the benefits well out number these problems.

Our larger towns Haw River, Mebane, Graham, Elon and Burlington have purchased a limited number of generators. Some of the functions of these generators are to power major intersections to help with traffic patterns in these very congested areas. Another reason these generators are used for is the power for vital facilities, (ex. Sewage pump-stations, water and waste treatment plants, maintenance buildings, fueling stations for government vehicles, etc.). Since our most severe problem has

been with power outages, these generators have proven to be a great asset for these communities. Our smaller towns do not have water and sewer treatment facilities; they depend on the cities of Burlington, Graham and Mebane for these services. As the towns become more financially able, other generators will certainly be purchased.

Strengthening Building and Facilities

Another method is strengthening the building codes. Codes should apply equally to new and pre-existing structures. Building codes apply primarily to new construction or buildings undergoing substantial alteration. Changes in the codes are often difficult to enact and can be expensive for homebuilders to implement. The latter issue is of specific concern to the owners of manufactured housing. Adherence to existing codes and standards is essential to maintaining public safety and promoting an effective local mitigation program. When this standard cannot be met, new construction should not be allowed. These include efforts to armor property against wind, rain and earthquakes. Public facilities, such as sewage collection lines, water and power distribution lines and roads, should be strengthened and made less vulnerable to the elements.

Mobile and manufactured homes are common in our communities. Due to their relatively fragile construction and tenuous grip on their foundations, they can be far more susceptible to natural hazards than traditional construction. Manufactured housing has also been shown to be very susceptible to wind damage.

Wind proofing will not protect structures from tornadoes. These homes make up much of the low income housing in our county. Many of these homes are located in the flood prone areas of the county.

Alamance County Emergency Management will promote advanced training for local building inspectors to gain experienced, meticulous and multi-talented staff on the local inspection teams. Well-trained inspectors are more likely to recognize building practices that are suspect with regard to hazard resilience, and can pass on their expertise to junior staff, thereby fostering a tradition of sustainable education within the inspections departments.

General Authority

Under the authority of the North Carolina General Statutes (N.C.G.S.), a county or municipality can adopt an ordinance/s to prohibit, regulate, or abate acts, omissions, or conditions, detrimental to the health, safety or welfare of its citizens, and the peace and dignity of the county, and may define and abate nuisances.

REGULATIONS

Legal Power: North Carolina General Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate, or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances).

Land Use: Through various land use regulatory powers, a local government can control the amount, timing, density, quality and location of new development. Land use regulatory powers include the power to engage in planning, enact and enforce zoning ordinances, floodplain ordinances and subdivision controls.

Zoning: Zoning is a tool available to local governments to control the use of land. Land "uses" controlled by zoning includes the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for uses such as lot size, building height and setbacks, and density of population. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text. We have several building ordinances that have been adopted by our local municipal bodies.

Flood Plain Regulation: The Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3 and 4 of Article 18 of Chapter 153A; and Article 6 of Chapter 153A of the North Carolina General Statutes, delegated the responsibility to local governmental unities to adopt regulations designed to promote the public health, safety and general welfare of its citizenry.

Local governments are empowered to grant permits for the use of the floodways, including the placement of any artificial obstruction in the floodway. No permit is required for certain uses, including agriculture, wildlife and related uses.

Planning

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.

Subdivision Regulation

Subdivision regulations control the building of developments on certain parcels of land. They prohibit the building of subdivisions on land that is in the flood plain. They require that subdivision plans be approved prior to the sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land or minimum specifications for structures. The subdivision does not include the division of land into parcels greater than 10 acres where no street right-of-way dedication is involved.

Community Capabilities

The communities/jurisdictions have adopted a building code to protect, property and public welfare by controlling the design, location, use or occupancy of all buildings and structures through the regulated and orderly development. All provisions of the code shall apply to the construction, addition, alteration, moving, repair and use of any building, structure, parcel of land, except work located primarily in a public way, public utility towers and poles and public utilities unless specifically mentioned in the code.

In fulfilling these purposes, this code is intended to benefit the public as a whole and not any person or class of persons. Although the implementation and enforcement of this code, benefits and detriments will be enjoyed or suffered by specific individuals, such is merely a by-product of the overall benefit to the whole communities/jurisdictions.

Each community/jurisdiction included in this plan has adopted a flood plain ordinance to restrict building in the 100-year flood plain.

The objectives of the ordinances are:

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

FLOOD MITIGATION ORDINANCE

PROVISIONS FOR FLOOD HAZARD REDUCTION

SECTION A. GENERAL STANDARDS

In all areas of special flood hazard the Flood Plain Ordinance are required:

(1) All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure;

(2) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage;

(3) All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages;

(4) Electrical, heating, ventilation, plumbing, air conditioning equipment and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

(5) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;

(6) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters;

(7) On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding; and,

(8) Any alteration, repair, reconstruction, or improvements to a structure, which is in compliance with the provisions of this ordinance, shall meet the requirements of "new construction" as contained in this ordinance.

(9) Non-Conforming Buildings or Uses. Non-conforming buildings or uses may not be enlarged, replaced, or rebuilt unless such enlargement or reconstruction is accomplished in conformance with the provisions of this ordinance. Provided, however, nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the Floodway Zone, provided that the bulk of the building or structure below base flood elevation in the Floodway Zone is not increased and provided that such repair, reconstruction or replacement meets all of the other requirements of this ordinance.

SECTION B. SPECIFIC STANDARDS.

In all areas of special flood hazard where base flood elevation data has been provided by the Federal Emergency Management Agency in its flood insurance study dated October 1, 1980.

(1) Residential Construction. New construction or substantial improvement of any residential structure (including manufactured homes) shall have the lowest floor, including basement, elevated no lower than two (2) feet above the base flood elevation. Should solid foundation perimeter walls be used to elevate a structure, openings sufficient to facilitate the unimpeded movements of floodwaters shall be provided.

(2) Non-Residential Construction. New construction or substantial improvement of any commercial, industrial, or non-residential structure (including manufactured homes) shall have the lowest floor, including basement, elevated no lower than two (2) feet above the level of the base flood elevation. Structures located in A-zones may be flood proofed in lieu of elevation provided that all areas of the structure below the required elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy.

A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the official as set forth in Article 4, Section B(7).

(3) Manufactured Homes.

(a) Manufactured homes that are placed or substantially improved on sites (i) outside a manufactured home park or subdivision; (ii) in a new manufactured home park or subdivision; (iii) in an expansion to an existing manufactured home park or subdivision; or, (iv) in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood, must be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated no lower than two (2) feet above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

(b) Manufactured homes that are to be placed or substantially improved on sites in an existing manufactured home park or subdivision that are not subject to the following:

(i) Outside a manufactured home park or subdivision;

(ii) In a new manufactured home park or subdivision;

(iii) In an expansion to an existing manufactured home park or subdivision; or,

(iv) In an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" is the result of a flood, must be elevated on permanent foundation such that the lowest floor of the manufactured home is elevated no lower than two (2) feet above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

(c) Manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement. For the purpose of this requirement, manufactured homes must be anchored to resist flotation, collapse, or lateral movement in accordance with the Regulations for Mobile Homes and Modular Housing adopted by the Commissioner of Insurance pursuant to NCGS 143.143.15. Additionally, when the elevation would be met by an elevation of the chassis at least 36 inches or less above the grade at the sight, the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength. When the elevation of the chassis is above 36 inches in height, an engineering certification is required.

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

(4) Recreational Vehicles. A recreational vehicle is ready for highway use if it is on wheels or jacking system, is attached to the site only by quick-disconnect type utilities and security devices, and has no permanently attached additions. Recreation vehicles placed on sites shall either:

(a) be on site for fewer than 180 consecutive days and

(b) be fully licensed and ready for highway use or meet requirements of "Flood Prevention Ordinance".

(5) Elevated Buildings. New construction or substantial improvements of elevated buildings that include fully enclosed areas that are usable solely for the parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to preclude finished living space and be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.

(a) Designs for complying with this requirement must either be certified by a professional engineer or architect or meet the following minimum criteria:

(i) Provide a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;

(ii) The bottom of all openings shall be no higher than one foot above grade; and,

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

(b) Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment used in connection with the premises (standard exterior door) or entry to the living area (stairway or elevator).

(c) The interior portion of such enclosed area shall not be partitioned or finished into separate rooms, except to enclose storage areas.

(6) Temporary Structures. Prior to the issuance of a development permit, for a temporary structure, the following requirements must be met:

(a) All applicants must submit to the local administrator prior to the issuance of the development permit a plan for the removal of such structure(s) in the event of a hurricane or flash flood warning notification. The plan must include the following information:

(i) a specified time period for which the temporary use will be permitted;

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

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

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

(v) designation, accompanied by documentation, of a location outside the floodplain to which the temporary structure will be moved.

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

(7) Accessory Structure. When accessory structures (sheds, detached garages, etc.) with a value of $3,000 or less, are to be placed in the floodplain the following criteria shall be met:

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

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

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

(d) Accessory structures shall be firmly anchored to prevent flotation, collapse, or lateral movement of the structure;

(e) Service facilities such as electrical and heating equipment shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

(f) Openings to relieve hydrostatic pressure during a flood shall be provided below base flood elevation.

(8) Floodways. Located within areas of special flood hazard established in the Federal Emergency Management Agency flood insurance study dated October 1, 1980, are areas designated as floodways. The floodway is an extremely hazardous area due to the velocity of floodwaters, which carry debris and potential projectiles, and has erosion potential. The following provisions shall apply within such areas:

(a) No encroachments, including fill, new construction, substantial improvements and other developments shall be permitted unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood. Such certification and technical data shall be presented to the local administrator.

(b) All Provisions of the "Flood Hazard Reduction of the Flood Prevention Ordinance" must be satisfied on all new construction and substantial improvements.

(c) No manufactured homes shall be permitted, except in an existing manufactured home park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring and the elevation standards of the "Flood Hazard Reduction of the Flood Prevention Ordinance" are met.

SECTION C. STANDARDS FOR STREAMS WITHOUT ESTABLISHED BASE FLOOD ELEVATIONS AND/OR FLOODWAYS.

Located within the areas of special flood hazard established in the "Flood Prevention Ordinance", are small streams where no base flood data has been provided or where no floodways have been identified. The following provisions apply within such areas:

If the "Flood Prevention Ordinance" is satisfied and base flood elevation data is available from other sources, all new construction and substantial improvements within such areas shall comply with all applicable flood hazard ordinance provisions and shall be elevated or flood proofed in accordance with elevations established in accordance with the ordinance. When base flood elevation data is not available from a Federal, State, or other source, the lowest floor, including basement, shall be elevated at least two (2) feet above the highest adjacent grade.

SECTION D. STANDARDS FOR SUBDIVISION PROPOSALS.

(1) All subdivision proposals shall be consistent with the need to minimize flood damage;

(2) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage;

(3) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood hazards; and,

(4) Base flood elevation data shall be provided for subdivision proposals and other proposed development if part or all of a lot or tract is within an A-zone.

SECTION E. STANDARDS FOR AREAS OF SHALLOW FLOODING (AO ZONES).

The areas of special flood hazard identified by the Federal Emergency Management Agency in its flood insurance study October 1, 1980, are areas designated as shallow flooding. These areas have special flood hazards associated with base flood depths of one (1) to three (3) feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and indeterminate. The following provisions shall apply within such areas:

(1) All new construction and substantial improvements of residential structures shall have the lowest floor, including basement, elevated to the depth number specified on the Flood Insurance Rate Map, in feet, above the highest adjacent grade. If no depth number is specified, the lowest floor, including basement, shall be elevated at least two (2) feet above the highest adjacent grade.

(2) All new construction and substantial improvements of non-residential structures shall:

(a) have the lowest floor, including basement, elevated to the depth number specified on the Flood Insurance Rate Map, in feet, above the highest adjacent grade. If no depth number is specified, the lowest floor, including basement, shall be elevated at least two (2) feet above the highest adjacent grade; or,

(b) be completely flood proofed together with attendant utility and sanitary facilities to or above that level so that any space below that level is water tight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

Preparedness

A. All towns/cities and county have adopted a flood plain ordinance.

B. The following towns have Building Inspections Departments: Burlington, Graham, Gibsonville and Mebane. The other towns Elon, Haw River, Green Level, Town of Alamance, Town of Ossipee and Swepsonville, are under the building code enforcement of Alamance County. All of the above municipalities were involved either in the writing and/or approval of this plan. All the standards listed in the flood plain ordinances are imposed through these building code enforcement agencies.

SECTION F. CAPABILITY ASSESSMENTS

1. Fiscal Capability

The legal authority for municipalities in North Carolina to develop and implement measures to minimize the impact of natural hazards is diverse. The North Carolina General Statutes gives communities the power to adopt ordinances and regulations to further reasonably defined goals and objectives.

General Police Powers (NCGS 160A, Art. 8): The North Carolina General Statutes allow local governments broad regulatory powers through the "general police powers". General police powers allow local governments to enact and enforce ordinances to protect the health, welfare, and safety of the general public. Hazard Mitigation activities fall within this broad provision allowing local governments to enact ordinances to prohibit conditions or activities that make people or property more vulnerable to natural hazards.

Zoning Regulations (NCGS 160A-381): Provisions have been established which allow for the governing board, planning agency, board of adjustment, and planning staff to establish regulations governing land use. These regulations attempt to proactively manage development patterns. Zoning allows for the division of land use activities according to the use, such as residential, commercial, and industrial, and intensity. Land use controls can also include lot sizes, building heights, setbacks, and density.

Subdivision Regulations (NCGS 160A-371): Allows for regulations for the land subdivision and the organizational structure for plat approval. These regulations can be used to steer development away from dangerous or unsuitable building environments.

Building Codes and Inspections (NCGS 160A-19): Provides for inspectors to enforce State and local laws relating to construction, repair, and maintenance of buildings or other roles as specified by the City Council. Inspections Departments play a critical role in the protection of the public. The state building code includes measures for constructing and retrofitting structures to better protect them from the impacts of natural hazards.

Floodplain and Floodway Regulations: The NCGS allows for the delineation of waterways and flood-prone areas by either the State or local government. The purpose of these designations is to minimize the extent of flooding by preventing obstructions to floodways, which could increase flood heights and flood losses.

Taxation: The North Carolina legislature has granted local governments the power to levy taxes and special assessments to promote and support local functions. Included with the power of taxation is the ability to reduce the tax burden on property that is unsuitable for development as an incentive to discourage development. Special assessments allow for local governments to place the burden of targeted investments on the property owners that are receiving the services.

North Carolina Department of Environment and Natural Resources: NCDENR provides a wide range of oversight activities that include but are not limited to wetlands protection, erosion and sediment control, dam safety, mining, environmental health, air quality, and hazardous waste management.

Based on the legal capabilities listed above there are a variety of methods for funding hazard mitigation efforts and programs. Additional resources are also available at the State and Federal level through different funding mechanisms. Some sources of Local, State, and Federal funding may be limited based on budgetary constraints. The programs listed below do not cover all of the potential funding sources, but is merely a compilation of some of the more prominent programs. Additional programs are also listed on the

North Carolina Emergency Management website at www.ncem.org/Mitigation/additional_funding.htm.

Local Funds: Local funding in North Carolina is primarily raised through property taxation. Other sources of local funds include motor vehicle taxes, privilege license taxes, and local franchise taxes. To defray the cost of public infrastructure construction and maintenance, user fees and special assessments can be charged for services such as water, sanitary sewer, storm sewer, solid waste collection, parking, public transportation, cemeteries, and recreational facilities.

State Funds: At the State level funds are distributed to municipalities through several sources. Included in these sources are franchise taxes, gasoline taxes, intangibles taxes, and beer and wine taxes.

Hazard Mitigation Grant Program (HMGP): The HMGP provides post-disaster funding on a cost-share basis. Funding is only available in federally declared disaster areas. The HMGP provides 75% federal and 25% state cost-sharing for mitigation measures. These funds are typically used in conjunction with other federal, state, and local funding sources when appropriate.

Flood Mitigation Assistance Program: Provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). Unlike the Hazard Mitigation Grant Program, which is only available after a federally declared disaster, FMAP grants are available annually to communities that participate in the National Flood Insurance Program.

Public Assistance Program (PA): The PA Program is a post-disaster grant program to cover costs associated with the reconstruction or repair of state, local, and non-profit facilities. Funding is available under the following categories: debris removal, emergency work, repair and/or replacement of facilities, and community disaster loans.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970: Provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally listed programs. Whenever acquiring real property for a program or project by a Federal agency results in displacing anyone, the agency shall reimburse and provide relocation planning, assistance coordination, and advisory services.

Community Development Block Grant (CDBG): CDBG grants are administered through the U.S. Department of Housing and Urban

Development (HUD) and provide funding to improve urban neighborhoods. Funding is also available for immediate and long-term post-disaster recovery activities. At least 70% of funded activities must benefit low and moderate-income persons.

Clean Water Management Trust Fund: To enhance or restore degraded waters, protect unpolluted waters, and/or contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational needs.

Small Business Administration Disaster Assistance Program (SBA): The SBA administers the Disaster Assistance Program to provide physical disaster loans to businesses for uninsured losses. The assistance is through direct loans of up to $1.5 million. Loans are also available to homeowners or renters to cover uninsured losses for real estate and personal property.

Parks and Recreation Trust Fund: To provide matching funds for local recreation and parks purposes, including the development of public recreation areas and facilities.

2. Federal Programs

US Army Corps of Engineers The Corps of Engineers has several programs that help communities deal with floods and flood-related problems before, during and after a flood. Cost sharing for all projects (structural, nonstructural, and hurricane/storm damage reduction) involves a 35% contribution from local sponsors, including 5% cash. As a part of their share of the costs, the local sponsors must provide lands, easements, rights-of-way, relocation/disposal sites and maintain the project after it is implemented under the Corps' Continuing Authorities Program.

Emergency support is provided to augment state and community lifesaving or live protecting efforts during and after a major or catastrophic flood disaster. This support is provided only after the state and community have exhausted their resources.

During the flood, it includes advice on flood emergency preparations, personnel and materials for flood fighting, search and rescue operations, emergency repairs to flood damage reduction projects, and an emergency supply of clean drinking water to places where water sources are contaminated. After the flood, support includes debris clearance and temporary construction of emergency access such as streets, roads, bridges, airfields and any other facilities necessary for passage of rescue personnel. Support also includes emergency restoration of critical public services and facilities for water supply, electric power, firefighting, technical assistance, damage assessment, safety inspection, stabilization and demolition of damaged structures.

The Corps also, upon request, will rehabilitate publicly sponsored flood damage reduction projects. The rehabilitation is limited to repair or restoration to pre-disaster conditions and must be justified with the local sponsor providing 20% of the total costs.

Federal Emergency Management Agency (FEMA) FEMA administers two programs that provide funds to local communities for implementing measures to prevent future damage from natural hazards.

The Hazard Mitigation Grant Program provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster.

The purpose of the program is to reduce future loss of life and property due to natural disasters and to enable mitigation measures to be implemented during immediate recovery from a disaster. A local government must apply for the HMGP through the state, because the state is responsible for administering the program.

US Department of Agriculture (USDA) The USDA offers landowners financial, technical and educational assistance to implement conservation practices on privately owned land. With the help offered by USDA, farmers and ranchers can carry out land, wetlands and wildlife habitat. Incentives offered by USDA agencies promote sustainable agricultural practices, which protect and conserve valuable farmland for future generations. USDA assistance also helps individuals and communities restore natural resources after floods, fires or other natural disasters.

The following programs are managed by the USDA's Farm Service Agency and Natural Resources Conservation Service:

Emergency Conservation Program (ECP) provides financial assistance to farmers and ranchers for restoring farmland damaged seriously enough by natural disaster to impede normal farming operations. ECP also helps with funds for carrying out emergency water conservation measures during periods of severe drought. Emergency conservation assistance is available for removing debris and restoring permanent fences, dams, ponds, irrigation systems, and other installations. Conservation problems that existed before a disaster are not eligible.

Emergency Watershed Protection Program (EWP) is designed to reduce threats to life and property in communities ravaged by natural disasters. It provides technical assistance and cost sharing to restore watersheds. Assistance includes installing or repairing conservation measures that prevent flooding and soil erosion. Measures include establishing vegetative cover, gully control and stream bank protection devices; removal of debris and sediment from channels; and repairing existing water control structures. In subsequent storms, EWP projects protect homes, businesses, highways and public works from further damage. In addition, the Secretary of Agriculture may purchase floodplain easements under EWP.

Flood Risk Reduction Program authorizes voluntary contracts that provide one lump-sum payment to producers with contract acreage on a farm with land that is frequently flooded. The payment will equal 95% of 7-year market transition payments and other

payments to offset estimated federal outlays on frequently flooded land. In return the producer agrees to comply with applicable wetlands and highly erodible land requirements and to forego commodity loans, crop insurance, conservation program payments and disaster payments.

Small Watershed Program assists farmers and small communities by addressing natural resource and related economic problems on a watershed basis. Participants must have a government sponsor. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, fish and wildlife habitat enhancement, wetlands creation and restoration and public recreation in watersheds of 250,000 or fewer acres. Cost sharing is paid to establish structural and management quality and create or improve water supplies, wildlife habitat, wetlands and public recreation.

Several other agencies also provide various assistance to localities for flooding and floodplain management. These include:

- US Department of Commerce, National Weather Service
- US Environmental Protection Agency
- US Department of Housing and Urban Development

The local, state or regional office of these agencies may be contacted to determine the types of assistance they offer the County.

NON FEDERAL SOURCES

Local governments may also engage in their own "fund-raising" efforts to pay for mitigation programs that benefit the community at large. In North Carolina, local governments are granted limited powers to raise revenue for public purpose. The General Assembly has conferred upon cities, towns and counties the power to levy property taxes for various purposes. Those purposes include: "ambulance services, rescue squads, and other emergency medical services; flood and hurricane protection; civil defense; drainage projects or programs; fire protection; hospitals; joint undertakings with other county, city or political subdivisions; planning; sewage; solid waste; water; water resources; watershed improvement projects. " N.C.G.S. 160A-209. These statutes' enumerated purposes make it clear that local governments are empowered to finance certain emergency management activities, including mitigation activities, with property taxes.

City councils are also empowered to establish Municipal Service Districts. Such districts are designed for (among other purposes): flood and hurricane protection works, drainage projects and watershed improvement projects. The use of taxes and bonds for these purposes is also authorized." (N.C.G.S. 160A-536). Through this authorization, cities may delineate an area or areas in the community, which are particularly vulnerable to the impact of natural hazards. Below are other relevant North Carolina laws:

153A-189. State participation in improvement projects. If a county proposes to undertake a project that would benefit land owned by the State of North Carolina or a board, agency, commission or institution of the State and to finance all or a part of the project by special assessments, the Board of Commissioners may request the Council of State to authorize the State to pay its ratable part of the cost of the project, and the Council

of State may authorize these payments. The Council of State may authorize the Secretary of Administration to approve or disapprove requests from counties for payment pursuant to this section, but a county may appeal to the Council of State if the Secretary disapproves a request.

The Council of State may direct that any payment authorized pursuant to this section be made from the Contingency and Emergency Fund of the State of North Carolina or from any other available funds. Except as State payments are authorized pursuant to this section, state-owned property is exempt from assessment under this Article.

153A-255. Authority to provide social service programs. Each county shall provide social service programs pursuant to Chapter 108A and Chapter 111 and may otherwise undertake, sponsor, organize, engage in and support other social service programs intended to further the health, welfare, education, employment, safety, comfort and convenience of its citizens.

152A-376. Community development programs and activities. Any county is authorized to engage in, to accept federal and state grants and loans for, and to appropriate and expend funds for community development programs and activities. In undertaking community development programs and activities, in addition to other authority granted by law, a county may engage in the following activities: (1) programs of assistance and financing of rehabilitation of private buildings principally for the benefit of low and moderate income persons, or for the restoration of preservation of older neighborhoods or properties, including direct repair, the making of grants or loans, the subsidization of interest payments on loans and the guaranty of loans; (2) programs concerned with employment, economic development, crime prevention, child care, health, drug abuse, education and welfare needs of persons of low and moderate income.

153A-440.1. Watershed improvement programs; drainage and water resources development projects. (a) A county may establish and maintain a county watershed improvement program pursuant to G.S. 139-41 or 139-41.1 and for these purposes may appropriate funds not otherwise limited as to use by law. A County watershed improvement program or project may also be financed pursuant to G.S. 153A-301, G.S. 153A-185 or by any other financing method available to counties for this purpose. (b) A county may establish and maintain drainage projects and water resources appropriate funds not otherwise limited as to use by law. A county drainage project or water resources development project may also be financed pursuant to G.S. 153A-301, G.S. 153A-185 or by any other financing method available to counties for this purpose.

Local Funding: There is currently no local funding specifically earmarked for hazard mitigation activities.

Conclusion: While federal and national programs carry out the bulk of disaster relief programs that provide funds for mitigation, local governments are encouraged to open the search field as widely as possible, and include alternative funding sources to supplement the local hazard mitigation budget. Local businesses and organizations will frequently support projects that benefit customers or employees. Other groups or individuals may be willing to donate "in-kind" services, eliminating the need for cash. Often in-kind and

volunteer services of local community members can be counted toward the local share that is needed to match an outside source of funds.

Fiscal Capabilities by Natural Hazard

The table below lists the funding sources identified in section 4.3 and their applicability to the natural hazards that impact our County. A check mark has been placed under the natural hazard that could benefit from the funding source.

Potential Funding Sources	Description	Hazards Identified and Addressed in Plan					
		Flooding	Severe Storms	Winter Storms	Tornadoes	Wildfires	Droughts
Local Funds	Local funding in North Carolina is primarily raised through property taxation. Other sources of local funds include motor vehicle taxes, privilege license taxes, and local franchise taxes. To defray the cost of public infrastructure construction and maintenance, user fees and special assessments can be charges for services such as water, sanitary sewer, storm sewer, solid waste collection, parking, public transportation, and recreational facilities.	√	√	√	√	√	√
State Funds	At the State level funds are distributed to municipalities through several sources. Included in those sources are franchise taxes, gasoline taxes, intangibles taxes, and beer and wine taxes.	√	√	√	√	√	√
Hazard Mitigation Grant Program (HMGP)	The HMGP provides post-disaster funding on a cost-share basis. Funding is only available in Federally declared disaster areas. The HMGP provides 75% federal and 25% state cost-sharing for mitigation measures. These funds are typically used in conjunction with other federal, state, and local funding sources when appropriate.	√	√	√	√	√	√
Flood Mitigation Assistance Program	Provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). Unlike the Hazard Mitigation Grant Program, which is only available after a federally declared disaster, FMAP grants are available annually to communities that participate in the National Flood Insurance Program	√	√				

Potential Funding Sources	Description	Hazards Identified and Addressed in Plan					
		Flooding	Severe Storms	Winter Storms	Tornadoes	Wildfires	Droughts
Public Assistance Program (PA)	The PA Program is a post-disaster grant program to cover costs associated with the reconstruction or repair of state, local, and non-profit facilities. Funding is available under the following categories: debris removal, emergency work, repair and/or replacement of facilities, and community disaster loans.	√	√	√	√	√	√
Uniform Relocation Assistance and Real Property Acquisition Policies Act	Provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally listed programs. Whenever acquiring real property for a program or project by a Federal agency results in displacing anyone, the agency shall reimburse and provide relocation, planning, assistance coordination, and advisory services.	√	√	√	√	√	√
Community Development Block Grant (CDBG)	CDBG grants are administered through the U.S. Department of Housing and Urban Development (HUD) and provide funding to improve urban neighborhoods. Funding is also available for immediate and long-term post-disaster recovery activities. At least 70% of funded activities must benefit low and moderate-income persons.	√	√	√	√	√	√
Clean Water Management Trust Fund	To enhance or restore degraded waters, protect unpolluted waters, and/or contribute toward a network or riparian buffers and greenways for environmental, educational, and recreational needs.	√	√	√			√
Small Business Administration Disaster Assistance Program (SBA)	The SBA administers the Disaster Assistance Program to provide physical disaster loans to businesses for uninsured losses. The assistance is through direct loans of up to $1.5 million. Loans are also available to homeowners or renters to cover uninsured losses for real estate and personal property.	√	√	√	√	√	√
Parks and Recreation Trust Fund	To provide matching funds for local recreation and parks purposes, including the development of public recreation areas and facilities.	√	√	√	√	√	√

SUMMARY OF JURISDICTION CAPABILITIES

Alamance County

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	Notes
		√	Zoning	
	√		Land Development Plan	
√			Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
	√		Subdivision Regulations	
		√	Drought Management Policies	
√			Emergency Response Plan	
		√	Tree preservation program	
√			Stream Buffer ordinance	
√			GIS Capability	On-line GIS shows 100-year flood plain and land parcels
√			Permitting System	
√			Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political

Alamance County is a fiscally conservative county that supports the efficient use of government services. The rate of population growth has brought increased competition for expenditures for infrastructure and services. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

The following charts show an updated risk assessment for each participating jurisdiction and shows each jurisdiction's progress with the various policies, plans, regulations, etc.

Elon

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
√			Land Development Plan	
		√	Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
		√	Drought Management Policies	
√			Emergency Response Plan	
√			Tree preservation program	
√			Stream Buffer ordinance	
√			GIS Capability	
√			Permitting System	
		√	Well Protection Program	
		√	Alamance County Watershed Interlocal Agreements	

Political Elon is a university town with limited tax revenues. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Green Level

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
		√	Land Development Plan	
√			Watershed Protection Program	
√			Storm Water Management	
	√		National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
		√	Drought Management Policies	
√			Emergency Response Plan	
		√	Tree preservation program	
√			Stream Buffer ordinance	
√			GIS Capability	
		√	Permitting System	
		√	Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Green Level is a small town of around 2,100 people. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Haw River

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
		√	Land Development Plan	
√			Watershed Protection Program	
	√		Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
		√	Drought Management Policies	
	√		Emergency Response Plan	
		√	Tree preservation program	
√			Stream Buffer ordinance	
		√	GIS Capability	
√			Permitting System	
		√	Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Haw River is a small town of about 2,000 people with limited tax revenues. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Mebane

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
√			Land Development Plan	
√			Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
√			Drought Management Policies	
√			Emergency Response Plan	
√			Tree preservation program	
√			Stream Buffer ordinance	
√			GIS Capability	
√			Permitting System	
		√	Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Mebane is a city of about 10,600 people that grew by 53% from 1990 to 2000. Hazard mitigation is supported and well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Ossipee

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
	√		Zoning	
		√	Land Development Plan	
		√	Watershed Protection Program	
		√	Storm Water Management	
√			National Flood Insurance Program	
		√	Floodplain Ordinance	
	√		Subdivision Regulations	
		√	Drought Management Policies	
	√		Emergency Response Plan	
		√	Tree preservation program	
		√	Stream Buffer ordinance	
√			GIS Capability	
		√	Permitting System	
√			Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Ossipee has a population of about 500 with limited tax revenues. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Swepsonville

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
		√	Zoning	
		√	Land Development Plan	
		√	Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
		√	Drought Management Policies	
	√		Emergency Response Plan	
		√	Tree preservation program	
		√	Stream Buffer ordinance	
√			GIS Capability	
		√	Permitting System	
		√	Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Swepsonville is a small town of about 1,000 people that grew by over 100% from 1990 to 2000. Tax revenues are limited. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Village of Alamance

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
	√		Land Development Plan	
√			Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
		√	Drought Management Policies	
	√		Emergency Response Plan	
		√	Tree preservation program	
		√	Stream Buffer ordinance	
√			GIS Capability	
√			Permitting System	
		√	Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Alamance is a small village of about 350 people with limited tax revenues. Hazard mitigation is supported but not well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

City of Graham

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
√			Land Development Plan	
√			Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
√			Drought Management Policies	
√			Emergency Response Plan	
√			Tree preservation program	
√			Stream Buffer ordinance	
√			GIS Capability	
√			Permitting System	
√			Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Graham is a town of about 14,000 people. Hazard mitigation is supported and well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

City of Burlington

Yes	In Progress	No	Capability: Plans Policies, Ordinances and Regulations in place	
√			Zoning	
√			Land Development Plan	
√			Watershed Protection Program	
√			Storm Water Management	
√			National Flood Insurance Program	
√			Floodplain Ordinance	
√			Subdivision Regulations	
√			Drought Management Policies	
√			Emergency Response Plan	
√			Tree preservation program	
√			Stream Buffer ordinance	
√			GIS Capability	
√			Permitting System	
√			Well Protection Program	
√			Alamance County Watershed Interlocal Agreements	

Political Burlington is a city of about 50,000 people. Hazard mitigation is supported and well understood. Public information and hazard awareness will be key to building support for hazard mitigation.

Mitigating Natural Hazards in Alamance County

Existing Mitigation in Alamance County

In carrying out our hazardous mitigation plans, Alamance County has several techniques already in place at our disposal, including acquisition of structures, regulation of land use and the enforcement of building codes. New construction is governed by the NC State Building Code, Sub-division Regulations-NCGS 160A-371, and Planning and Community Development as well as the County's Comprehensive Land Use Plan. Our municipal government organizations have also worked on identifying vital municipal facilities in flood prone areas. Some of these facilities have been relocated out of the flood plain areas. Each of the ordinances discussed here with the exception of the Emergency Management Ordinance, are considered implementation tools for the County/Municipal Land-Use Plan. The first goal of the land-use plan is the conservation and protection of the County's natural and cultural environments. By enforcing these established regulations, the County will benefit from a balanced program that addresses not only flooding, but also other community problems. No action prohibited in one ordinance should be allowed under another. Where conflicts exist between County and state or federal design standards, the more restrictive shall govern.

Acquisition

The highest priority of the DEM's Hazard Mitigation Grant Program is acquisition and/or elevation of primary residences. North Carolina legislation empowers cities, towns and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain. Alamance County has obtained funding to acquire houses that have been flooded in the past through the Hazard Mitigation Grant Program.

Local Mitigation Strategies – Development and Prioritization

As the plan was reviewed, deficiencies were identified for the county and each municipality. This section contains a list of specific programs, policies, ordinances and regulations that were identified through the planning process. For each recommendation, tables with the following format have been used: Rank, Goal Statement, Mitigation Policy, Category, Responsible Department and proposed Completion Date.

Prioritization is needed to identify in what order project strategies should be implemented. The prioritization of strategies is critical to implementation of a Community-Based hazard Mitigation Plan. A community can only implement the measures adopted in a manner consistent with the resources available to that community. Therefore, the mitigation measures in the Alamance County Hazard Mitigation Plan are prioritized in accordance with the community's capability and the likelihood of implementation.

A process for prioritization of identified hazard mitigation strategies was performed. The hazard mitigation advisory committee used the following criteria as the primary 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. The priority rankings of **High, Medium**, and **Low** are largely based on benefits that are maximized according to a review of the mitigation policies and their associated costs. Other considerations for ranking these actions and policies include: social impact, technical feasibility, administrative capabilities, political and legal effects and environmental issues.

Time frames for the completion of the projects were also taken into account when ranking the mitigation policies. A policy that takes less time to complete receives a higher ranking. Many strategies, especially those that will take multiple years to complete will require the project manager to establish an individual timeline where benchmarks can be used to monitor the progression of the strategy.

The mitigation strategies were developed from the Mitigation Planning Guidebook, "Keeping Natural Hazards from Becoming Disasters". After going through the strategies mentioned in the workbook, the Hazard Mitigation Advisory Committee had to decide which ones were appropriate. After careful study it was decided to include Prevention, Property Protection, Natural Resource Protection and Public Information for the strategies that best suited all of Alamance County. A description of each strategy follows.

Prevention: Preventive activities are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where new development has/is occurring or capital improvements have been substantial. Preventive actions will include:

- Planning
- Zoning and subdivision
- Open space preservation
- Floodplain regulations
- Storm water management
- Drainage system maintenance
- Capital improvements programming

Property Protection: Property protection measures protect existing structures by modifying the building to withstand hazardous events or removing structures from hazardous locations. Actions which will include:

- Relocation
- Acquisition
- Building elevation
- Critical facilities protection
- Wind proofing
- Flood proofing
- Sewer backup protection
- Insurance
- Seismic Retrofit
- Safe rooms

Natural Resource Protection: Natural resource protection activities reduce the impacts of natural hazards by preserving or restoring natural areas and their mitigation functions. Such areas include floodplains, parks, recreation areas or conservation agencies and organizations often implement preventive actions such as:

- Floodplain protection
- Fire resistant landscaping
- Fuel resistant landscaping
- Fuel breaks
- Erosion and sediment control

Public Information: Public information activities are used to advise residents, business owners, potential property buyers and visitors about hazards, hazardous areas and mitigation techniques they can use to protect themselves and their property. Preventive actions to educate and inform the public will include:

- Outreach projects hazard map information
- Real estate disclosure
- Warning systems
- Library
- Technical assistance
- School children education

Mitigation Goals:

Through meetings conducted by the Planning Group the following goals were conducted after the identification of local hazards and conducting both the vulnerability and capability assessments. These statements also reflect input following the local hazardous mitigation public meetings.

Goal Statement#1

Minimize the loss of life, damage to property, and disruption in commerce and governmental services posed by flooding and other natural hazards-particularly severe storms and winter storms.

Goal Statement#2

Increase public awareness of hazard mitigation activities and strategies, again with a heavy emphasis on flooding, severe storms and winter storms.

Goal Statement#3

Review and update development regulations to better prepare government agencies to plan and respond to natural hazards and disasters.

Strategies	Hazard	Jurisdiction	Responsible Party	Priority	Benchmark	Funding Source	Target Date
Consider directing each county office or agency to assess how it can better incorporate hazard mitigation goals into its planning and implementation of its duties.	All hazards	County	Alamance EM	Low	Written Assessment	Self Funded	Completed
Encourage builders, developers and architects to become familiar with the NFIP land use and building standards by attending annual workshops presented by the NC Division of Emergency Management (DEM). This can be accomplished by creating a mailing list and providing it to DEM to use for its announcements. This task can be further supported by distributing copies of DEM's announcements from the county's Inspections Department when builders and developers apply for permits.	All hazards	County	Inspections Departments	Medium	Create mailing list	Self Funded	Completed
Encourage citizens and businesses/industries to develop emergency preparedness plans.	All hazards	County	Alamance EM	Medium	Public Announcements on web and cable TV	Self Funded	Completed
Encourage homeowners to review insurance policies as part of an overall family disaster plan.	All hazards	County	Alamance EM	High	Public Announcements	Self Funded	On-going
Increase awareness of the natural hazards potentials to local officials, the general public and private industry.	All hazards	County	Alamance EM	High	Public Announcements	Self Funded	Completed
Maintain contact with NC Cooperative Extension Service through our local County Agency regarding problems relating to agriculture damage.	All hazards	County	Alamance EM	High	Review annually	Self Funded	Immediate/Ongoing
Maintain hazard mitigation plan and flood plain information on the County Website (www.alamance-nc.com)	All hazards	County	Alamance EM	Medium	Review annually	Self Funded	Completed/Ongoing
Maintain shelter agreements with Red Cross.	All hazards	All Jurisdictions	Alamance EM	High	Review annually	Self Funded	Continuous

Strategies	Hazard	Jurisdiction	Responsible Party	Priority	Benchmark	Funding Source	Target Date
Review methods of school construction to ensure that all new schools are constructed to the maximum cost feasible standards of wind resistance, flood resistance and access so that they can be used as shelters for evacuees during and after natural hazard events.	All hazards	Local School Boards	Assistant Superintendent, Alamance-Burlington School System	High	Annual report or memo from school board on construction techniques considered	State and self funded	Continuous
Review the subdivision regulations and make appropriate changes to encourage alternatives to placing lots in flood prone areas and to minimize imperious surface coverings, if necessary.	Flood	County	Administration, Planning and Inspection Depts. Of Alamance Co.	High	Review memo	Self Funded	Continuous
Discourage the public and developers from developing property in flood zones.	Flood	County	Alamance Co. Planning Dept.	High	Annual report of structures added and removed from floodplain.	Self Funded	Continuous
Look for opportunities to acquire or relocate structures vulnerable to floods.	Flood	County	Alamance Co. Planning Dept.	High	Annual report of structures added and removed from floodplain.	Self Funded	Continuous
Monitor structures affected by flood. Track damages and repair costs. If damages and repair costs are high relative to value of structure, consider mitigation including elevation, acquisition, or flood proofing	Flood	County	Alamance Co Planning Dept.	High	Annual report of flood plain updates.	Self Funded	Continuous

Strategies	Hazard	Jurisdiction	Responsible Party	Priority	Benchmark	Funding Source	Target Date
Consider adopting a policy prohibiting the development of critical public facilities in the 100-year flood plain in cases where viable alternatives exist. Presently most critical facilities located in the flood plain are waste pump stations because they must be located at low elevations because they handle gravity flowing sewage.	Flood	County	Alamance Co. Planning Dept.	High	Draft ordinance and take before board	Self Funded	Immediate/Completed
Consider expanding its Geographic Information Systems (GIS) capabilities to include maintaining elevation certificates in a computer database.	Flood	County	Administration, Planning Dept. of Alamance Co.	High	Implementation	Self Funded	Completed
Continue Alamance County's participation in the National Flood Insurance Program, so citizens are eligible for flood insurance.	Flood	County	Alamance Co Planning Dept.	High	FEMA Community Status Book	State, Federal, Self Funded	Continuous
Join the National Flood Insurance Program (NFIP)	Flood	Green Level	Mayor/Clerk	High	FEMA Community Status Book	Self Funded	Completed
Join the Community Rating System (CRS)	Flood	County, Elon, Alamance, Haw River, Ossipee, Swepsonville, Green Level, and Mebane, Burlington, Graham	Mayor/Manager	High	Submit CRS application; Join CRS: CRS Rank Achieved.	Self Funded	Ongoing
Develop specific regulations that prohibit dumping in the County's watersheds.	Flood	County	Alamance Co. Planning Dept.	High	Draft ordinance and take before board	Self Funded	Completed
Maintain documents about flood insurance, flood protection, floodplain management, and natural and beneficial functions of floodplains at the local libraries and government offices.	Flood	All jurisdictions	Clerks and Alamance Co. administration	Medium	Continuous	Self Funded	Completed

Strategies	Hazard	Jurisdiction	Responsible Party	Priority	Benchmark	Funding Source	Target Date
Maintain GIS system at www.alamance-nc.com. From this site anyone from a private citizen, builder, insurance company, etc. can see if any property is located in the 100-year flood plain.	Flood	County	Alamance Co. Planning Dept.	Medium	Continuous	Self Funded	Completed
Monitor recreational facilities located in the flood plain and evaluate flood resistance of county structures. (See Attached Map).	Flood	County	Alamance Co. Rec. and Public Works	Medium	Continuous	Self Funded	Completed
Monitor reservoirs, lakes, and streams for potential flooding problems. Note any unexpected flooding issues.	Flood	County	NCDEMNR, Public Works, Planning, Emergency Mgn.	High	Continuous	Self Funded	Completed
Provide local real estate agents with handouts that will advise potential buyers to investigate the flood hazard for the property they are considering purchasing.	Flood	County	Alamance Co. Inspections Dept.	High	Continuous	Self Funded	Completed
Educate citizens to listen for the watches and warnings issued by the National Weather Service.	Flood, hurricane, thunderstorm and tornado.	County	Emergency Management of Alamance Co.	High	Continuous	Self Funded	Completed
Maintain Alamance County Communications' capability to monitor weather conditions and advise all emergency services regarding watches and warnings.	Flood, hurricane, thunderstorm and tornado.	County	County Warning Point	High	Continuous	Self Funded	Completed
Put a weather alert radio in each school, day care, nursing home, rest home and government building.	All hazards	All jurisdictions	Emergency Management	High	Continuous	Federal, State, local funds	Completed, continue to update
Review all fire districts coverage to ensure that there are adequate quantities of water for firefighting purposes and that all water points are maintained on a regular basis.	Wildfire	All jurisdictions	Alamance Co. Fire Marshal's Office	High	Continuous	State funded	Annually

Strategies	Hazard	Jurisdiction	Responsible Party	Priority	Benchmark	Funding Source	Target Date
Meet annually with State forester for Alamance County to improve coordination of wildfire control and response.	Wildfire	All jurisdictions	Fire Marshall and local Fire Department Chiefs	Medium	Continuous	Self Funded	Annually
Coordinate with NCDOT to maintain adequate and effective snow and ice removal plans by the towns/cities and NC DOT. "Adequate" means that all major thoroughfares are cleared and remain clear within 12 hours of last snowfall.	Winter Storms	All jurisdictions	Public Works	High	Continuous	Self Funded	Annually
Develop full dam hazard assessment and add to county hazard mitigation plan.	Dams	County	NCDEMNR	High	Plan document	State and local funding	Completed
When the county land use plan is complete, create a land use map with an overlay of flood hazards and any other natural hazards that can be mapped.	Floods	County	Alamance Co .GIS Dept.	Medium		Self Funded	Completed

Plan Progress: After meeting and reviewing the current plan, the plan committee realizes that the above information in the chart(s) have been completed for the most part. Ongoing procedures will still apply in some areas such as NFIP for example. One identifiable action item for each jurisdiction for the new plan update for the next five (5) years will be for each jurisdiction to pursue joining the Community Rating System (CRS). This would include Alamance County, Village of Alamance, the Towns of Haw River, Elon, Ossipee, Swepsonville, Green Level and the cities of Burlington, Mebane, and Graham. The jurisdiction, responsible dept., funding sources, etc. can be found on the above chart(s).

Alamance County Emergency Operations Communications/Notification and Warning

Alamance County operates a Central Communications Center located in the County Office Building. The Communications Center has emergency backup generator power. In case of a major disaster at this building, the City of Burlington's Communication Center has the capability to handle the emergency dispatch for the county agencies.

Local Mitigation Techniques

In addition to those activities in place under County jurisdiction, all of the towns/cities have adopted flood plain ordinances.

The following towns/cities have adopted Flood ordinances: Ossipee, Gibsonville, Elon, Burlington, Graham, Alamance, Green Level, Mebane, Haw River and Swepsonville.

Flood Damage Prevention Code - The purpose of this ordinance is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas. The provisions designed to meet these objectives are as follows:

1. Restrict or prohibit uses which are dangerous due to water or erosion hazards or which result in damaging increases in erosion or in flood heights or velocities.

2. Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction.

3. Control the alteration of natural floodplains, stream channels and natural protective barriers, which are involved in the accommodation of floodwaters.

4. Control filling, grading, degrading and other developments, which may increase erosion or flood damage.

5. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

6. The towns, cities and county will work to assure that good building practices are observed and that only well built structures are constructed in the county. With most of our small towns having a very limited budget, they will be unable to finance any large mitigation efforts. With the GIS system in place, these small communities will be able to make certain that no homes or businesses will be located in flood prone areas. Each year this plan needs to be reviewed, especially the flood maps, to make certain

with the construction going on in the county that new flood prone areas are not being created.

The objectives of the ordinance are:

1. To protect human health and life.

2. To minimize expenditure of public money for costly flood control projects.

3. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public. To minimize prolonged business interruptions.

4. To minimize damage to public facilities and utilities, such as water and gas mains, electric, telephone and sewer lines, streets and bridges in flood plains.

After formal adoption, the planning committee will meet annually to discuss all aspects of the Plan. The meetings will be organized by the Alamance Co. Emergency Management Coordinator, and the committee members will discuss mitigation strategies that have been addressed as well as those that have encountered difficulties. In addition, the committee will also re-evaluate the community's vulnerability and capabilities. During these meetings, the committee will use the following questions as a general guide for evaluation:

- 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, or coordination issues with other agencies?
- Have outcomes occurred as expected?
- Did the agencies and other partners participate as proposed?

For the plan to be successful, it will require a concerted effort by all of the parties mentioned above. However, the single most important component for success will come from raising public awareness of natural hazards and gaining public support for policy approval and adoption. Public awareness can be accomplished by keeping the public involved through timely articles on the county website, in the newspaper and other media outlets. These same public articles will also serve as feedback generators from the public to the planning committee. Together with periodic public meetings, continued public participation in the hazard mitigation planning process will be ensured. With public support, the Alamance County Hard Mitigation Plan is envisioned to transform Alamance County into a resilient community that is well prepared to meet any natural hazard disaster.

Revisions and Updates:

At a minimum, the plan will be reviewed annually and then updated every five (5) years, starting in the summer of 2011. It is expected that during review meetings some responsibilities will be reassigned to different departments based on facts that arise during policy development. Instances will also occur where mitigation strategies may not be met as envisioned in this document, and revised goals and objectives will need to be designated. Throughout this process, the planning committee will make final recommendations to the participating jurisdictions who will then have these revisions and updates presented to the County Commissioners for final approval.

Alamance County Multi jurisdictional Hazard Mitigation Plan
Evaluation and Monitoring

Part 1. Flood mitigation monitoring

Jurisdiction	#of new structures built in floodplain	Percent Increase or decrease in floodplain development	Percent Increase/decrease in flood insurance policies in force	Flood damage information recorded and mapped for jurisdiction	# structures in SFHA damaged from flood event /Damage cost estimate	# structures flood damaged outside of SFHA/Damage cost estimate	# of Repetitive Damage Structure	Latest flood prevention ordinance adopted?	NFIP Member	Based on new knowledge of actual occurrence of flood events and damage, recommend further review of plan and revise or amend as necessary
County										
Elon										
Green Level										
Haw River										
Mebane										
Swepsonville										
Village of Alamance										
Ossipee										
Graham										
Burlington										

Comments and Recommendations:

Alamance County Multi jurisdictional Hazard Mitigation Plan
Evaluation and Monitoring

Part 2. Other Hazards

	Number of wind damaged structures damaged	Average cost of damage	Generators needed	Generators procured	Problems or Considerations
County					
Elon					
Green Level					
Haw River					
Mebane					
Swepsonville					

Village of Alamance					
Ossipee					
Graham					
Totals:					
% increase in # of high hazard dams (HHd)					
% of HHd Emergency Plans on file with County EM					
% increase in # of Intermediate hazard dams					
% increase in # of low hazard dams					

Has there been progress toward attainment of the Hazard Mitigation goals of the Strategy? Yes No

Part 3: Conclusions and Recommendations
Summary of Findings:
Recommendations:

This is a monitoring tool to analyze the progress of Alamance County and its municipalities have made in implementing hazard mitigation strategies to protect property and persons from the impacts of Natural Hazards. This evaluation will be sent to each Jurisdiction for use and consideration in their annual review of municipal hazard mitigation plans.

This evaluation was conducted by _____ Date: _____

PROCLAMATION OF A
STATE OF EMERGENCY

The following Proclamation is issued by the Mayor of the City/Town of _____.

Pursuant to the City/Town _____ State of emergency Ordinance and Chapter 166A of the General Statues and Article 36A Chapter 14 of the General Statutes, I have determined that a State of Emergency as defined in the City/Town of _____.

I, therefore, proclaim the existence of a State of Emergency Ordinance exists in the City/Town of _____.

No Alcoholic Beverages. There shall be no sale, consumption, transportation, or possession of alcoholic beverages during the State of Emergency in the Town/City of _____ except possession or consumption is allowed on a person's own premises.

No firearms, Ammunition, or Explosives. During the State of emergency, there shall be no sale or purchase of any type of firearm or ammunition, or any possession of such items along with any type of explosive off owner's own premises.

I, therefore, proclaim the existence of a State of Emergency in the Town/City of _____.

I hereby order all city/town employees subject to my control to cooperate in the enforcement and implementation of the provisions of the city/town, county emergency ordinances which may be set forth.

This proclamation shall become effective immediately. Proclaimed this the _____ day of _____, 20 ____, at _____(am)(pm).

_____

_____, (Mayor)

TERMINATION OF
STATE OF EMERGENCY

WHEREAS, ON _____, at

_____ (a.m./p.m.), I determined and proclaimed a local state of emergency

for the City/Town of _____; and

WHEREAS, I have determined that a state of emergency no longer exists in

the City/Town of _____.

NOW THEREFORE, I thereby terminate the above-referenced proclamation of

a local state of emergency and all of the restrictions and orders therein.

This proclamation is effective immediately.

Proclaimed this the _____ day of _____, 20_____, at _____(a.m./p.m.)

_____

Mayor, City of _____

Appendix A
Resolutions

ALAMANCE COUNTY BOARD OF COMMISSIONERS

RESOULTION

REQUESTING THAT THE ALAMANCE COUNTY BOARD OF COMMISSIONERS ADD THE CITY OF BURLINGTON TO THE ALAMANCE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, on October 30, 2000, the President of the United States signed into law the Disaster Mitigation Act of 2000 to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 to reinforce the importance of pre-disaster mitigation planning to help reduce disaster losses; and

WHEREAS, North Carolina Senate Bill 300 requires all local governments to have an approved Hazard Mitigation Plan in order to receive state public assistance funds; and

WHEREAS, the Alamance County Multi-Jurisdictional Hazard Mitigation Plan (Plan) was approved in 2005 by the Federal Emergency Management Agency (FEMA) and the North Carolina Division of Emergency Management (NCEM) and includes the unincorporated areas of Alamance County, the City of Mebane, the Town of Elon, the Town of Green Level, the Town of Haw River, the Town of Ossipee, the Town of Swepsonville, the Village of Alamance, and the City of Graham; and

WHEREAS, the City of Burlington has requested to merge their Hazard Mitigation Plan with the Alamance County Multi-Jurisdictional Plan in accordance with guidance provided by FEMA and NCEM.

NOW THEREFORE, BE IT RESOLVED that the Alamance County Board of Commissioner hereby allows the City of Burlington to merge their Hazard Mitigation Plan with the Alamance County Multi-Jurisdictional Hazard Mitigation Plan.

Adopted this the 1st day of February, 2010.

Linda Massey
Chair

Commissioner

Vice Chair

T. D. Sutton
Commissioner

Commissioner

ALAMANCE COUNTY BOARD OF COMMISSIONERS

RESOLUTION

REQUESTING THAT THE ALAMANCE COUNTY BOARD OF COMMISSIONERS ADD THE CITY OF GRAHAM TO THE ALAMANCE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, on October 30, 2000, the President of the United States signed into law the Disaster Mitigation Act of 2000 to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 to reinforce the importance of pre-disaster mitigation planning to help reduce disaster losses; and

WHEREAS, North Carolina Senate Bill 300 requires all local governments to have an approved Hazard Mitigation Plan in order to receive state public assistance funds; and

WHEREAS, the Alamance County Multi-Jurisdictional Hazard Mitigation Plan (Plan) was approved in 2005 by the Federal Emergency Management Agency (FEMA) and the North Carolina Division of Emergency Management (NCEM) and includes the unincorporated areas of Alamance County, the City of Mebane, the Town of Elon, the Town of Green Level, the Town of Haw River, the Town of Ossipee, the Town of Swepsonville and the Village of Alamance; and

WHEREAS, the City of Graham has requested to merge their Hazard Mitigation Plan with the Alamance County Multi-Jurisdictional Plan in accordance with guidance provided by FEMA and NCEM.

NOW THEREFORE, BE IT RESOLVED that the Alamance County Board of Commissioner hereby allows the City of Graham to merge their Hazard Mitigation Plan with the Alamance County Multi-Jurisdictional Hazard Mitigation Plan.

Adopted this the 17th day of August, 2009.

Linda Massey
Chair

William Bill Lashley
Commissioner

Eddie Bernard
Vice Chair

Ben Vaughan
Commissioner

T. J. Sutton
Commissioner

A RESOLUTION ADOPTING
ALAMANCE COUNTY
HAZARD MITIGATION PLAN

WHEREAS, the North Carolina General Assembly passed Senate Bill 300 "An Act to Amend the Laws Regarding Emergency Management as Recommended by the Legislative Disaster Response Commission" in June of 2001 that among other provisions requires local governments to have a hazard mitigation plan approved prior to August 1, 2002 in order to receive state public assistance funds;

WHEREAS, in October of 2000 the President of the United States signed into law the "Disaster Mitigation Act of 2000" (PL 106-390) to amend the "Robert T. Stafford Disaster Relief and Emergency Act of 1988" which among other provisions requires local governments to adopt a mitigation plan in order to be eligible for hazard mitigation funding;

WHEREAS, the North Carolina Division of Emergency Management is assisting local governments in the formulation of hazard mitigation plans;

WHEREAS, the North Carolina Division of Emergency Management has established rules and criteria that allow municipalities to adopt their county's approved hazard mitigation plan through resolution;

WHEREAS, the Citizens of Alamance County supports Hazard Mitigation Planning as a logical means toward protecting people and property from the potential devastating effects of natural hazards;

NOW, THEREFORE, BE IT RESOLVED THAT THE ALAMANCE COUNTY BOARD OF COMMISSIONERS desire to participate in planning for the mitigation of effects caused by natural hazards;

1. Assign staff representation as determined by the County Manager to work to implement and update hazard mitigation planning activities;
2. Adopt, by way of this resolution, the "Alamance County Hazard Mitigation Plan" as approved by the North Carolina Division of Emergency Management.

This the 18th day of January, 2011.

SIGNATURES

Linda Massey
Chair

Commissioner

William Bill Lashley
Vice Chair

Commissioner

Commissioner