

II. Mitigation Action Plan

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

A. Study Conclusions

With limited financial and staff resources to dedicate to hazard mitigation, it is essential that those hazards with the highest likelihood of occurrence and the greatest potential impact receive the highest investment of County resources. Through hazard identification and analysis and vulnerability assessment, it has been determined that Wake County is susceptible to the impact of certain natural hazards as summarized at the conclusion of Appendix A Hazard Identification and Analysis.

The County is not at risk for coastal erosion, tsunamis, or volcanoes and that there is "low" risk of riverine erosion, dam and levee failures, earthquakes, and landslides/sinkholes, these hazards were not addressed. Six hazards were rated either "moderate" or "high" risk - droughts and heat waves; floods; hurricanes and coastal storms; severe storms and tornadoes; wildfires; and winter storms and freezes.

Moderate and High Hazard Threats

Floods

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

High Winds (Severe Storms/Tornadoes and Hurricanes/Coastal Storms)

Severe storms and tornadoes as well as hurricanes and coastal storms present high wind hazards. This hazard is mainly combated through building codes, building construction and proper placement of trees and tree pruning to reduce the likelihood of damage caused by falling trees and limbs. Enforcement of the current State building code and enhancement of the code in regards to wind resistance will prove the most beneficial in addressing high winds.

Wildfires

Fortunately, wildfires in North Carolina, although frequent, are not normally a serious threat to large areas as is the case in western states where dry weather conditions and large expanses of timber increase the likelihood and extent of the impact of a wildfire. The North Carolina Division of Forest Resources has the responsibility for protecting state and privately owned forest land from wildfires. The program is managed on a cooperative basis with all one hundred counties in the State. The State fire program emphasizes fire prevention

efforts; pre-suppression activities (including extensive training of personnel); aggressive suppression efforts on all wildfires; and law enforcement follow-up.

Droughts and Heat Waves

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

Winter Storms and Freezes

Local governments also look to the State and to private utility companies for leadership in dealing with winter storms/freezes. The typical effects of snow and ice accumulation - loss of electrical power, phone, and cable service and treacherous road conditions - can be only minimally addressed at the local level. (The exceptions would be larger cities which have more snow/ice removal equipment and manpower and governments that own the local electrical distribution system.)

Draft Statement of Commitment to Mitigating Impacts of Natural Hazards

Through the act of developing and adopting a Hazard Mitigation Plan, Wake County is committing to develop and engage in programs, activities and practices that can be implemented at the local government level to help to mitigate the impacts of future natural hazards. The County will place primary emphasis on and dedicate resources, as available, to mitigating the effects of flooding. Secondary emphasis will be placed, as practicable at the local level, on mitigating the effects of high winds.

B. Community Goals

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

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

C. Mitigation Objectives

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

- Objective 1.1** The County will engage in activities and practices that will help mitigate the impacts of natural hazards.
- Objective 1.2** The County will implement a public awareness campaign to educate citizens of the possible hazards associated with locating in floodplains and of measures that can be taken to lessen impacts of future floods.
- Objective 1.3** The County will work to ensure that emergency services are adequate to protect public health and safety.
- Objective 2.1** The County will work with area municipalities to keep infrastructure extensions out of hazardous areas in order not to actively encourage development to occur in known hazardous areas.
- Objective 2.2** The County will regularly monitor hazard mitigation efforts to ensure that adequate progress is being made towards stated goals.
- Objective 3.1** The County will work to ensure future development occurs in such a way as to protect wetlands, floodplains, and other natural features that serve to reduce flood hazard susceptibility.
- Objective 3.2** The County will increase control over development in the floodplain to prevent increases in flood velocities and levels that endanger both people and property.
- Objective 4.1** The County will work to develop in such a way that the built environment does not occur in any known or predictable pathways of a natural hazard. If this is unavoidable, as in the case of hurricane force winds, the County will ensure that new structures are as resilient as possible to the impacts of a natural hazard.
- Objective 4.2** The County will work to limit development in areas that may cause emergency workers to put lives at risk to rescue someone from a structure knowingly built in a hazardous area.

D. Mitigation Actions

Wake County has developed the mitigation actions described in Table II-1. Many of these mitigation actions will have a positive effect on mitigating potential damages from most if not all natural hazards. The listed actions do, however, primarily focus on ways the County can act to lessen and, ideally, eventually prevent future flood losses from inappropriate new development.

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

Individual staff departments were responsible for determining:

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

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

1. Prevention (P) Measures
Preventive measures are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or where capital improvements have not been substantial. Examples of prevention measures include:
 - (a) Comprehensive land use planning
 - (b) Zoning regulations
 - (c) Subdivision regulations
 - (d) Open space preservation
 - (e) Building code
 - (f) Floodplain development regulations
 - (g) Stormwater management
2. Property Protection (PP) Measures
Property protection measures protect existing structures by modifying the building to withstand hazardous events, or removing structures from hazardous locations. Examples of property protection measures include:
 - (a) Building relocation
 - (b) Acquisition and clearance
 - (c) Building elevation
 - (d) Barrier installation

- (e) Building retrofit
- 3. Natural Resource (NR) Protection
Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their mitigative functions. Such areas include floodplains, wetlands, and dunes. Parks, recreation or conservation agencies and organizations often implement these measures. Examples include:
 - (a) Wetland protection
 - (b) Habitat protection
 - (c) Erosion and sedimentation control
 - (d) Best management practices (BMPs)
 - (e) Stream dumping
 - (f) Forestry practices
- 4. Emergency Services (ES) Measures
Although not typically considered a mitigation technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:
 - (a) Hazard warning system
 - (b) Emergency response plan
 - (c) Critical facilities protection
 - (d) Health and safety maintenance
 - (e) Post-disaster mitigation
- 5. Structural (S) Projects
Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event. The projects are usually designed by engineers and managed or maintained by public works staff. Examples include:
 - (a) Reservoirs, retention and detention basins
 - (b) Levees and floodwalls
 - (c) Channel modifications
 - (d) Channel maintenance
- 6. Public Information (PI) Activities
Public information and awareness activities are used to advise residents, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques that the public can use to protect themselves and their property. Examples of measures to education and inform the public include:
 - (a) Map information
 - (b) Outreach projects
 - (c) Library
 - (d) Technical Assistance
 - (e) Real estate disclosure
 - (f) Environmental education

Table II-1 Mitigation Action Plan by Action

Explanation of Columns

Action #

Action # corresponds to FEMA mitigation policy categories listed above.

Action

Brief description of each specific action to be undertaken.

Hazard

Hazard which the action addresses.

Objective(s) Addressed

Reference to the numbered objective which the action supports.

Relative Priority

Low, moderate or high priority as determined by the responsible party(ies).

Funding Sources

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

Responsible Party

Staff department responsible for undertaking the action. Note: The County Board of Commissioners has ultimate authority to approve any policy, program or regulation revisions.

Target Completion Date

Date by which the action should be completed.

Abbreviations used in Table II-1:

CO	North Carolina Cooperative Extension
CS	Community Services
DENR-LQ	NC Department of Environment and Natural Resources - Land Quality
DENR-WQ	NC Department of Environment and Natural Resources – Water Quality
EEP	Ecosystem Enhancement Program
EM	Emergency Management
ES	Environmental Services
FEMA	Federal Emergency Management Agency
F-RM	Finance – Risk Management
GIS	Geographic Information Services
GSA	General Services Administration
LARC	Land Acquisition Review Committee (Wake County)
NCSU	North Carolina State University
OSAPAC	Open Space and Parks Advisory Committee (Wake County)
PD	Planning Department
POSE	Partners for Open Space and the Environment
REV	Revenue Department
TJCOG	Triangle J COG
TLC	Triangle Land Conservancy
TPL	Trust for Public Lands
USACE	United States Army Corps of Engineers
USGS	United States Geologic Survey

Table II-1: Wake County Mitigation Action Plan – Ordered by Action #

Action #	Action	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
Preventive (P)							
P-1	Maintain the recently adopted amendments to the Flood Hazard Areas Section 1-1-26 of the Zoning Ordinance to prohibit the placement of any new residential or commercial structures or the introduction of fill in the floodway or floodway fringe. Certain exceptions allowed; ie: boat docks or roads.	Flood	1.1 2.1 3.1 3.2 4.1 4.2	High	Local	PD ES	Ongoing (Amended May 19, 2003)
P-2	Maintain the recently adopted Zoning Ordinance amendments to Section 1-1-31 to require 100-foot buffers to perennial streams in water supply watersheds, and study the possibility of increasing the protection of other watercourses and drainageways in Wake County.	Flood	1.1 3.1 4.1	Medium	Local	PD ES	Ongoing (Amended May 19, 2003)
P-3	Study the possibility of establishing either a stormwater utility or some other permanent dedicated funding source for stormwater and floodplain programs.	Flood	1.1 1.2 2.2 3.2 4.1	High	Local	ES GIS F-RM REV	2005-2006
P-4	Institute NPDES Phase II Stormwater Program as required.	Flood Drought	1.1 3.1	High	Local	ES PD	2003-2008
P-5	Create development regulations to encourage use of low impact development site planning principles to help control stormwater volume impacts.	Flood	1.1 3.1	Moderate	Local	ES PD	2006-2007
P-6	Study the possibility of revising the zoning ordinance to include impervious surface standards that help minimize impervious surface coverage in priority and healthy watersheds.	Flood	1.1 3.1	Moderate	Local	ES PD	2005-2006
P-7	Study the possibility of charging offset fees for development that exceeds set impervious surface ratios in priority watersheds. Use funds to purchase open space or to otherwise help control stormwater runoff volumes.	Flood	1.1 3.1	Moderate	Local	ES PD	2006-2007
P-8	Continue to ensure good site planning by carefully reviewing development plans, meeting with	Flood	1.1 3.1	High	Local	ES	Ongoing

Action #	Action	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
	developers and making site inspections to ensure existing soil erosion and sedimentation control regulations are being implemented properly.						
P-9	Update the design manual for erosion control to include the newest, most effective site design technologies. Train staff on new techniques.	Flood	1.1 3.1	High	Local	ES	2004-2005
P-10	Continue the stream monitoring program and seek to maximize efforts through coordination with other organizations.	Flood	1.1 3.1	High	Local Regional State Federal	ES Municipalities DENR-WQ USGS EEP	2004-2005
P-11	Maintain an open space prioritization and acquisition program to ensure maximum success with limited funds.	Flood	1.1 3.1	High	Local Regional State Federal	LARC OSAPAC Contractors Municipalities TJCOG TPL TLC	Ongoing
P-12	Partner with other governmental units and other interested parties to jointly identify and acquire 30,000 acres of open space lands.	Flood	1.1 3.1	High	Local Private State Federal	Municipalities State of NC NCSU POSE TPL TLC	Ongoing (2000 Bonds)
Property Protection (PP)							
PP-1	The County has in the past (Hurricanes Fran and Floyd) utilized Federal and State grant resources to either acquire and remove from the floodplain; or renovate, retrofit and/or elevate structures flooded after a President or State declared disaster. County will continue to use these resources when available.	Flood	1.1	Moderate	Federal State Local	ES F-RM GSA	Ongoing
PP-2	Continue to provide service to inform and advise citizens of the actions they may take to improve drainage, halt erosion, and to relocate, renovate or retrofit structures being flooded.	Flood	1.1 1.2	Moderate	Local Private	ES	Ongoing
Natural Resources (NR) Protection							
NR-1	Continue local program to enforce Erosion and Sedimentation Control Standards. Cross train ES	Flood	3.1 4.1	High	Local	ES	2004 & Ongoing

Action #	Action	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
	employees in other disciplines to improve efficiency. Eight full time positions dedicated to this program.						
NR-2	County employs a variety of regulated Best Management Practices (BMPs) in the Stormwater Program to reduce peak flows, provide groundwater recharge, etc. One-year and (sometimes) 10-year storm event design required. 100-year spillway capacity always required.	Flood	4.1	Moderate	Local	ES	Ongoing
NR-3	Enact regulations to regulate clear-cutting to help control erosion from construction sites.	Flood	1.1 3.1	Moderate	Local	PD ES CS	2006-2007
NR-4	Maintain the County's cluster subdivision regulations and recreation land dedication ordinance to enhance conservation efforts.	All	1.1 3.1	High	Local	PD ES CS	Ongoing
NR-5	Study the possibility of developing a conservation subdivision, or open space subdivision, ordinance to help preserve significant natural features.	All	3.1 4.1	Moderate	Local	PD ES CS	2006-2007
Emergency Services (ES) Measures							
ES-1	Identify priority County facilities and provide access to one main entrance. Restore life safety and building systems as needed.	All	1.1	High	Local FEMA	GSA	Ongoing
ES-2	Develop a Business Continuity Plan that is the primary document housing all disaster related plans and procedures including Hazard Mitigation Plan, Debris Management Plan, Multi-Hazard Plan as well as disaster response plans for all County departments.	All	1.1 1.3	High	Local	F-RM	6/30/05
Structural (S) Projects							
S-1	Inspection and maintenance of Crabtree Creek flood control structures.	Flood	1.1	High	Local	GSA ES	Ongoing
S-2	Channel Maintenance - Possibility of private property owner assistance program to be investigated as part of stormwater utility feasibility study.	Flood	1.1 3.2	High	Local	ES	2004-2005

Action #	Action	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
S-3	Wake County will continue to actively pursue stream restoration projects and will look for ways to expand the program through partnerships with various entities.	Flood	1.1 1.3	High	Local Regional State Federal	ES CS DENR-WQ EEP USACE	Ongoing
Public Information (PI) Activities							
PI-1	County provides technical assistance to private property owners who are subject to structural flooding. Environmental engineer will do site inspection and report recommending retrofit to reduce flood damage hazard.	Flood	1.1 1.2 4.2	Moderate	Local	ES	Ongoing
PI-2	Stormwater staff provides flood zone information through call-in or e-mail program to any inquirer. County requires showing flood zone information on all plats recorded in County planning jurisdiction.	Flood	1.2 4.2	High	Local	ES	Ongoing
PI-3	County maintains a web site to answer citizen questions about flood hazards, flood safety, availability of flood insurance, stormwater regulations, and other information.	Flood	1.2	Moderate	Local	ES	Ongoing
PI-4	The County is partnering with the City of Raleigh to utilize the "Communicator" application that will utilize GIS technology to develop automated call lists to warn property owners of impending flood events. This is especially important below Falls Lake, which must periodically make large prolonged discharges.	Flood	1.1 1.2	High	Local	EM GIS	2004-2005
PI-5	Environmental Network Hotline – County maintains an environmental hotline. Citizens may report flooding problems, pollution issues, erosion problems, infrastructure damage, littering, etc.	Flood	1.1 1.2	Moderate	Local	ES	Ongoing
PI-6	When available, the County will incorporate and use new flood maps. Information will be available to the public. Furthermore, the maps will be reviewed by staff and all structures in the floodplain identified. Property owners will then be notified of the risk and the availability of flood insurance. List forwarded to Emergency Management.	Flood	1.1 1.2 1.3 4.1 4.2	High	Local	ES	2004-2005
PI-7	Continue to maintain flood elevation certificates and make copies available to the public.	Flood	1.1	Moderate	Local	ES CS	Ongoing

Action #	Action	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
PI-8	Continue to update flood hazard maps to reflect new subdivisions, changes in corporate limits, and any new DFIRM data.	Flood	1.1 3.2	Moderate	Local	ES	Ongoing
PI-9	Continue to use the State of NC Residential Property Disclosure Statement that includes check off on whether or not the property being offered for sale is within a Federally-designated floodplain.	Flood	1.1	Moderate	State	State of NC Realtors	Ongoing
PI-10	Continue to make flood protection educational materials available in all branches of the Wake County public library system.	Flood	1.1 1.2	Moderate	Local	ES	Ongoing
PI-11	Provide environmental education classes for development community and residents using Clearwater Contractor Education Program as model.	Flood	1.1 3.1	High	Local State	ES DENR- LQ CS Municipalities	2004-2005