

8 MITIGATION STRATEGY

This section of the Plan provides the “blueprint” for Mecklenburg County and participating municipalities to become less vulnerable to natural hazards. It is based on the general consensus of the Hazard Mitigation Planning Team along with the findings and conclusions of the *Capability Assessment* and *Risk Assessment*. The *Mitigation Strategy* section consists of the following four subsections:

- INTRODUCTION
- MITIGATION GOALS
- IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES
- SELECTION OF MITIGATION TECHNIQUES FOR MECKLENBURG COUNTY
(INCLUDING PARTICIPATING MUNICIPALITIES)

INTRODUCTION

The intent of the *Mitigation Strategy* is to provide Mecklenburg County and participating municipalities with the goals that will serve as the guiding principles for future mitigation policy and project administration, along with a list of proposed actions deemed necessary to meet those goals and reduce the impact of natural hazards. It is designed to be comprehensive and strategic in nature.

In being comprehensive, the development of the strategy included a thorough review of all natural hazards and identified policies and projects intended to not only reduce the future impacts of hazards, but also to assist Mecklenburg County and participating municipalities achieve compatible economic, environmental and social goals. The development of this section is also intended to be strategic, in that all policies and projects are linked to established priorities assigned to specific departments or individuals responsible for their implementation and assigned target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the *Mitigation Strategy* includes the identification of countywide mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific, action-oriented tasks listed in each jurisdiction’s *Mitigation Action Plan*. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas), and hazard mitigation projects that seek to address specifically targeted at-risk properties (such as the acquisition and relocation of flood-prone structures). During the 2010 plan update process, each of the countywide mitigation goals established in 2005 were reviewed and discussed with the Hazard Mitigation Planning Team as well as members of the general public and targeted stakeholders. Following these presentations and discussions, the Mitigation Planning Committee reaffirmed the goal statements as currently written and described below in this section.

The second step involves the identification, consideration and analysis of available mitigation measures to help achieve the identified mitigation goals. The identification and evaluation of possible mitigation techniques for Mecklenburg County and its municipalities to reduce the effects of natural hazards is an ongoing process that initially began during the Mitigation Strategy Workshop conducted for the 2005 version of the Plan and has continued with the 2010 and 2015 updates to the Plan.¹ The Plan is designed however, through a regular maintenance and update schedule, to ensure that mitigation goals and additional mitigation measures are reconsidered over time as future risk reduction opportunities are identified, new data becomes available, technology improves and mitigation funding becomes available. This is a long-term, continuous process sustained through the development and maintenance of this Plan

¹ Additional information on the 2005 Mitigation Strategy Workshop is available in Section 2: *Planning Process*.

as described in Section 2: *Planning Process* and Section 10: *Plan Maintenance Procedures*. Alternative mitigation measures will continue to be considered as future mitigation opportunities become identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is updated and maintained over time.

The last step in designing the *Mitigation Strategy* is the creation and maintenance of jurisdictionally specific *Mitigation Action Plans* (MAPs).² The MAPs represent the key outcome of the mitigation planning process. MAPs include a prioritized list of proposed hazard mitigation actions (policies and projects) for Mecklenburg County and the participating municipalities, including accompanying information such as those agencies or individuals assigned responsibility for their implementation, potential funding sources and an estimated target date for completion. The MAPs provide those individuals or agencies responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring progress over time. The collection of actions listed in each jurisdiction's MAP also serves as an easily understood synopsis of activities for local decision makers.

In preparing and updating their own *Mitigation Action Plans*, each jurisdiction considered their overall hazard risk and capability to mitigate natural hazards, in addition to meeting the adopted countywide mitigation goals. Prioritizing mitigation actions for each jurisdiction was based on the following five factors: (1) effect on overall risk to life and property; (2) ease of implementation; (3) political and community support; (4) a general economic cost/benefit review;³ and (5) funding availability. Using these criteria, the representatives from each participating jurisdiction serving on the Mecklenburg County Hazard Mitigation Planning Team were tasked with assigning priority levels for the actions that were being proposed for the 2015 plan update. Each mitigation action was assigned one of the following priority levels (and is included with each jurisdiction's *Mitigation Action Plan* in Section 9):

- **High Priority:** The most immediate, cost-effective and appropriate actions preferably to be accomplished in the short to mid-term (1-2 year) planning horizon.
- **Moderate Priority:** Fairly urgent, cost-effective and appropriate actions but with some possible difficulties associated with implementation. Preferably accomplished in the mid to long-term (2-5 year) planning horizon.
- **Low Priority:** Not urgent, but an action to be considered for implementation at some point over the long-term (5+ years) when implementation is deemed most appropriate.

² *Mitigation Action Plans* are found in Section 9: *Mitigation Action Plan*. Additional flood mitigation actions are found in watershed-based flood mitigation plans that have been developed prior to this Plan and are incorporated into this document by reference. The specific watershed-based flood mitigation plans are referenced in Section 7: *Capability Assessment*.

³ A general economic cost/benefit review was conducted as part of selecting and prioritizing mitigation actions for each jurisdiction. Mitigation actions with "high" priority were determined to be the most cost effective and most compatible with each jurisdiction's unique needs. A more detailed cost/benefit analysis will be conducted as part of an application for funding, as appropriate.

MITIGATION GOALS

44 CFR Requirement

Part 201.6(c)(3)(i): The mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The goals of the Mecklenburg County Multi-jurisdictional Hazard Mitigation Plan were crafted early in the initial 2005 planning process as part of a facilitated discussion and brainstorming session with the Mitigation Planning Committee. These same goals were again revisited by the Committee at two phases of the 2010 plan update process, including the initial plan update kickoff meeting and again following the completion of the risk and capability assessments (more details provided in Section 2: *Planning Process*), and at the same critical points during the 2015 plan update. Following a presentation and discussion of the results from these two assessments, the Committee reaffirmed each of the goal statements as currently written. Each of these goal statements continue to represent a broad target for Mecklenburg County and participating municipalities to achieve through the implementation of their updated *Mitigation Action Plans*.

- Goal #1** **Mecklenburg County and participating municipalities will identify and implement hazard mitigation projects designed to reduce the impact of future hazard events.**
- Goal #2** **Mecklenburg County and participating municipalities will conduct education and outreach activities intended to better inform people about natural hazards and the steps that can be taken to reduce their impact.**
- Goal #3** **Mecklenburg County and participating municipalities will conduct training and exercises intended to better prepare government officials to respond to, mitigate against and recover from emergencies and disasters.**
- Goal #4** **Mecklenburg County and participating municipalities will improve their ability to warn people of impending hazards and disasters.**
- Goal #5** **Mecklenburg County and participating municipalities will enact planning and policy measures to reduce the impacts of identified hazards.**
- Goal #6** **Mecklenburg County and participating municipalities will implement traffic control procedures intended to reduce injuries and the loss of life before, during and after emergencies and disasters.**

A stated objective of the Disaster Mitigation Act of 2000 is to improve the coordination of risk reduction measures between state and local government authorities. Linking local and state mitigation planning goals is an important first step. It has been determined that the goal statements for Mecklenburg County and its participating municipalities are consistent with the State of North Carolina's current mitigation planning goals as identified in the State Mitigation Plan.

IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

44 CFR Requirement

Part 201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effect of each hazard, with particular emphasis on new and existing buildings and infrastructure. The mitigation strategy must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

This CFR requirement is met in the Capability Assessment, Mitigation Strategy and Mitigation Action Plans sections of this risk assessment.

In formulating Mecklenburg County's *Mitigation Strategy*, a wide range of activities was considered in order to help achieve the countywide goals and the specific hazard concerns of each participating jurisdiction. This includes multiple, detailed discussions of potential mitigation activities with Hazard Mitigation Planning Team members during the initial plan's development in 2005⁴ and also during the 2010 and 2015 plan update processes. In addition, a wide range of publications (including NCEM's "*Decision Tree*," FEMA's "Mitigation Ideas" and relevant CRS planning guidance) and other resources were posted to a dedicated project FTP site for Committee members to review and consider on their own time (further described in Section 2: *Planning Process*). Similar to the initial plan development process in 2005, all activities considered by the committee can be classified under one of the following six broad categories of mitigation techniques:

1. Prevention

Preventative activities are intended to reduce the impact of future hazard events, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are constructed. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning
- Building codes
- Open space preservation
- Floodplain regulations
- Stormwater management regulations
- Drainage system maintenance
- Capital improvements programming
- Shoreline/riverine/fault zone setbacks

2. Property Protection

Property protection measures involve the modification of existing buildings and structures or the removal of the structures from hazardous locations. Examples include:

- Acquisition
- Relocation
- Building elevation

⁴ For more details on the specific activities discussed and considered by the Mitigation Planning Committee during the initial preparation of this Plan, please see the summary of the second committee meeting in 2005 (Mitigation Strategy Workshop) in Section 2: *Planning Process*.

- Critical facilities protection
- Retrofitting (i.e., windproofing, floodproofing, seismic design techniques, etc.)
- Safe rooms, shutters, shatter-resistant glass
- Insurance

3. Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Generally speaking, natural areas may include floodplains, wetlands, steep slopes, barrier islands and sand dunes. Parks, recreation or conservation agencies and organizations often implement these measures. Examples include:

- Land acquisition
- Floodplain protection
- Watershed management
- Beach and dune preservation
- Riparian buffers
- Forest and vegetation management (i.e., fire resistant landscaping, fuel breaks, etc.)
- Erosion and sediment control
- Wetland preservation and restoration
- Habitat preservation
- Slope stabilization
- Historic properties and archaeological site preservation

4. Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environment using a number of construction techniques. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Reservoirs
- Dams/levees/dikes/floodwalls/seawalls
- Diversions/detention/retention
- Channel modification
- Beach nourishment
- Storm sewers

5. Emergency Services

Although not typically considered a “mitigation” technique, emergency services reduce the impacts of a hazard event on people and property. These actions are often taken prior to, during, or in response to an emergency or disaster. Examples include:

- Warning systems
- Evacuation planning and management
- Emergency response training and exercises
- Sandbagging for flood protection
- Installing temporary shutters for wind protection

6. Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures used to educate and inform the public include:

- Outreach projects
- Speaker series/demonstration events
- Hazard mapping
- Real estate disclosure

- Library materials
- School children educational programs
- Hazard expositions
- Inter-governmental coordination

Careful consideration was given to the idea of replacing the six mitigation techniques categories listed above with the four categories currently being recommended in the *Local Mitigation Planning Handbook* published in 2013. However, the planning team felt that changes to the categories at this point would create a series of disconnects related to existing mitigation actions as well as CRS guidance. Therefore the decision was made to keep the categories as-is for the 2015 plan update.

As discussed in Section 2: *Planning Process*, a number of specific hazard mitigation actions were presented and discussed during the March 17th, 2010 meeting of the Mecklenburg County Mitigation Planning Committee. These included the following actions:

Multi-hazard Mitigation Actions

- On an annual basis, coordinate with the Charlotte-Mecklenburg Emergency Management Office to provide information on all natural hazards facing the area to local planning staff and elected officials. This should include a report on the status of local mitigation actions as identified in the Multi-jurisdictional Hazard Mitigation Plan.
- On an annual basis, coordinate with the Charlotte-Mecklenburg Emergency Management Office on a widespread public outreach activity to provide information on all natural hazards facing the area to local residents, including methods for preventing damages from hazardous conditions and how to respond when an imminent hazard threatens.
- Coordinate with Duke Energy (or other local utilities) to conduct public outreach activities that educate property owners on the benefits of proper tree pruning on a routine basis. (Utility bill inserts?)
- Prepare and conduct a survey for critical facilities to help identify structural and/or non-structural deficiencies that may lead to increased vulnerability to natural hazards. Include recommended corrective actions in local capital improvements program.
- Identify and prioritize those critical facilities that still need to be equipped with capability for emergency backup power during and after major disaster events.
- In coordination with CMEMO, help sponsor the creation of a Community Emergency Response Team (CERT).
- Review current zoning and/or subdivision ordinances to ensure that all potential natural hazard areas are considered in future land development decisions. Any known hazard areas should be mapped and considered during site plan review.
- Ensure the consideration of all natural hazards is integrated into local infrastructure and capital improvements planning.
- Require/promote the burying of power lines for new subdivisions.
- Prepare a Post-disaster Recovery Plan and/or Ordinance that specifies the policies and procedures for repair and reconstruction following a major disaster event.
- Prepare a Continuity of Operations Plan (COOP) to ensure the essential functions of government can continue to operate during and after a major disaster event.

Flood Mitigation Actions

- Coordinate with Mecklenburg County Storm Water Services to join FEMA's voluntary *Community Rating System (CRS)*.
- Provide direct links to CMSWS from local town websites

- Prepare and maintain a map of areas that flood frequently, particularly those areas outside of FEMA floodplains.
- Hold informative work sessions for newly elected officials and new appointees to planning commissions and appeals/variance boards, to provide an overview of floodplain management, the importance of participating in the NFIP, and the implications of failing to enforce the requirements of the program or failing to properly handle variance requests.
- Encourage local staff member(s) to pursue CFM certification
- Send information about the flood hazard and promote the availability of flood insurance through regular mailings

Drought Mitigation Actions

- Develop public outreach materials to encourage voluntary water-saving measures by residents during periods of severe or extreme drought.
- Assess current and future water needs to help ensure water storage/supply is adequate and prepare contingency plans for actions required during periods of severe or extreme drought.
- Ensure that future land use and development decisions (and water delivery systems) take potential long-term drought events and water shortages into account.
- Draft/revise water use ordinance to prioritize or control water use during periods of severe or extreme drought.
- Promote the availability of crop insurance to farmers.

Wildfire Mitigation Actions

- Encourage the practice of defensible space for structures determined to be at high risk to wildfire.
- Coordinate with the North Carolina Division of Forestry (NCDFR) to identify fire districts with high potential risk to wildfire.
- Coordinate with NCDFR to prepare Community Wildfire Protections Plans for identified high risk communities.
- Promote the national *Firewise Communities* program to those neighborhoods or areas with high potential risk to wildfire.
- For confirmed high risk wildfire areas, revise zoning ordinance to encourage cluster development patterns in defensible areas and away from areas of high risk, such as steep slopes.
- Review and identify the need to revise local ordinances with regard to burning restrictions.

Earthquake Mitigation Actions

- Conduct an inventory of unreinforced masonry buildings and non-ductile concrete facilities in the community that are vulnerable to ground shaking.
- Educate property owners of identified at-risk structures on the potential risk of earthquake damages and methods available to reduce or eliminate that risk.
- Coordinate with NCDOT on the identification of structurally deficient bridges that are more likely to sustain damage from future earthquake events and that should be addressed through future retrofit projects or bridge replacement.
- Identify potentially at-risk fuel pipelines or hazardous material facilities that could cause major fires or hazmat releases following an earthquake event; evaluate and recommend possible mitigation actions.

Dam Failure Mitigation Actions

- Coordinate with State Dam Safety staff on routine inventory and inspection process
- Coordinate with dam owners/operators on preparation and maintenance of Emergency Action Plans (EAPs)
- Coordinate with CMEMO on development of dam failure notification and evacuation procedures

- Prohibit new development and/or the provision of new capital improvements to areas downstream or in mapped dam failure inundation zones

Mitigation Actions Related to Climate Change

- Preserve large, intact forestland through the acquisition and/or dedication of park lands and open space as well as through the zoning and subdivision regulations.
- Conduct a carbon footprint analysis for publicly-owned and operated facilities to better evaluate current policies and identify strategies to reduce greenhouse gases through energy conservation and behavioral change.
- Develop an energy plan to include the pursuit of alternative energy sources, purchasing policies, the sale of carbon credits for forested lands and other community-based strategies to reduce carbon emissions.

During the 2015 plan update, as documented in Section 2: *Planning Process*, significant discussion was devoted to the idea of adding geomagnetic (or solar) storms to the 2015 version of the Plan. The Hazard Mitigation Planning Team agreed to address this new natural hazard in Section 4: *Hazard Identification* and also in Section 9: *Mitigation Action Plans*. The two specific actions the team decided to adopt throughout the *Mitigation Action Plans* were:

- Public outreach and education on the issue of solar events.
- Host a conference on the impacts of solar events (to raise awareness to a higher level such as the State and National levels).

SELECTION OF MITIGATION TECHNIQUES FOR MECKLENBURG COUNTY

In order to determine the most appropriate mitigation techniques for Mecklenburg County and participating municipalities, local government officials reviewed and considered the findings of the *Capability Assessment* and *Risk Assessment*. Other considerations included each mitigation action's effect on overall risk reduction, its ease of implementation, its degree of political and community support, its general cost-effectiveness and funding availability.⁵

FEMA guidance for meeting the planning requirements of the Disaster Mitigation Act of 2000 also specifies that local governments should prioritize their mitigation actions based on the level of risk a hazard poses to the lives and property of a given jurisdiction. In response to this requirement, the Mecklenburg County Hazard Mitigation Planning Team completed a Mitigation Technique Matrix (**Figure 8.1**) to make certain they address, at a minimum, those hazards posing the greatest threat.

The matrix provides the committee with the opportunity to cross-reference each of the priority hazards (as determined through the *Risk Assessment*) with the comprehensive range of available mitigation techniques, including prevention, property protection, natural resource protection, structural projects, emergency services, and public education and awareness. It is important to note that Mecklenburg County's individual *Mitigation Action Plans* include an array of actions targeting multiple hazards, not just those classified as either high or moderate risk.

⁵ Mitigation actions may or may not require external funding to accomplish. For example, the modification of a given policy to better address identified hazard concerns may require staff time and internal resources, whereas the large-scale acquisition of flood-prone properties may necessitate seeking state or federal funding assistance.

Figure 8.1: Mitigation Technique Matrix

MITIGATION TECHNIQUE	HIGH RISK HAZARDS					MODERATE RISK HAZARDS		
	FLOOD	WINTER STORM	HURRICANE AND TROPICAL STORM	SEVERE THUNDER-STORM	TORNADO	DROUGHT	EARTHQUAKE	WILDFIRE
PREVENTION	✓	✓	✓	✓	✓	✓	✓	✓
PROPERTY PROTECTION	✓	✓	✓	✓	✓			
NATURAL RESOURCE PROTECTION	✓							
STRUCTURAL PROJECTS	✓	✓	✓	✓	✓		✓	
EMERGENCY SERVICES	✓	✓	✓	✓	✓	✓	✓	✓
PUBLIC EDUCATION & AWARENESS	✓	✓	✓	✓	✓	✓	✓	✓

