

RESOLUTION NO. 24253

A RESOLUTION APPROVING THE ADOPTION OF THE
HAMILTON COUNTY NATURAL HAZARDS MITIGATION
PLAN 2004.

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF CHATTANOOGA,
TENNESSEE, That the Hamilton County Natural Hazards Mitigation Plan 2004, a summary of
which is attached hereto, be and is hereby adopted.

ADOPTED: November 9, 2004

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11-9-04

Hamilton County Natural Hazards Mitigation Plan Summary October 26, 2004

This plan seeks to develop a comprehensive strategy to reduce the impacts of natural hazards in Hamilton County. The rising costs and apparent increase in the rate of occurrence of natural disasters has led to the need to identify additional ways to reduce the County's vulnerability to natural hazards—before the next disaster actually occurs.

This plan is designed to meet the requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000) After November 1, 2004 cities, towns, and counties not having a FEMA approved hazard mitigation plan will be ineligible for certain types of disaster assistance. Under the terms of the DMA 2000, local governments affected by a federally declared disaster are still eligible for emergency aid without having a plan in place. However, those local units would be ineligible for FEMA funds to support hazard mitigation projects that are a part of the normal rebuilding and recovery process.

In addition to post-disaster mitigation funding, local preparation and FEMA approval of a mitigation plan provides participants the opportunity to apply for FEMA administered pre-disaster mitigation project funding. This is a competitive, national grant program designed to reduce over-all risks to the population and structures, as well as reducing the future reliance on federal funding for recovery after a disaster.

What is Hazard Mitigation?

Mitigation refers to the policies and activities that will reduce the area's vulnerability to damage from future disasters. Generally, these measures are ones that can be put in place before a disaster occurs. There are a multitude of different types of mitigation programs that can be put in place. In general, mitigation activities can be broken into two categories, structural and non-structural.

Structural mitigation measures try to minimize the effect of hazards on people, buildings, and infrastructure. This includes actions such as building dams and levees, flood-proofing homes, constructing tornado shelters, and instituting building codes that require wind resistant construction.

Non-structural mitigation measures typically concentrate on identifying hazard-prone areas and limiting their use. Examples include land use zoning, the selection of building sites, tax incentives, insurance programs, relocation of residents to remove them from the path of a hazard, the establishment of warning systems, and planning for at-risk populations.

Natural Hazard Overview

A review of past natural disasters in Hamilton County, and across the State of Tennessee highlights twelve hazards as presenting a significant potential risk to the communities of Hamilton County. These hazards include flood, winter storms, thunderstorms and associated hail, lightning, tornado, and high wind, as well as earthquake, landslide and erosion, drought, wildfire, and fog.

The most significant natural hazard in Hamilton County is flooding. Since 1936, TVA regulation of the Tennessee River has substantially reduced the frequency and magnitude of Tennessee River floods and backwater flooding of local tributaries. However, flooding remains a serious concern. Since 1993, the National Climatic Data Center (NCDC) has documented 28 flood events in Hamilton County producing an annual average of 7.2 million dollars of property damage. A major flood event in May of 2003 was the areas worst flood since 1973 and caused approximately 24 million dollars in property damage.

Thunderstorms and related hail, lightning, and high winds are the most frequent natural hazard to affect Hamilton County. Since 1950, The NCDC has documented 294 significant thunderstorm related weather events causing an average of \$97,440 in annual property damage. Tornadoes are a less frequent natural hazard associated with thunderstorms, but a far more devastating and costly one. The National Weather Service Forecast Office in Morristown, Tennessee provided documentation of nine tornadoes that have affected the County since 1950. The most recent on March 29, 1997 was categorized as an F-3 and caused \$45,000,000 in property damage with 44 injuries.

Although infrequent, winter storms, particularly ice storms, are a serious hazard. Damage associated with winter weather events occurs mainly as traffic accidents, downed utility lines, and fallen trees. The Ice Storm of March 1960 caused approximately 30 million dollars of property damage and shut down the towns of Walden, Signal Mountain, and Lookout Mountain for up to seven days. The "Blizzard of March 1993" dropped up to 3 feet of snow in the upper elevations and caused approximately fifty thousand dollars in property damage.

The many hillsides and steep slopes in Hamilton County present areas potentially susceptible to landslide and erosion. Past landslide events have been associated with heavy rain or roadway construction. Area stream banks are also susceptible to severe erosion following heavy rains.

Historic records for earthquake events are very limited in comparison to the geologic time scale. Hamilton County is in the East Tennessee Seismic Zone, the second most active seismic zone east of the Rocky Mountains. On April 29, 2003 a 4.9 magnitude earthquake with an epicenter located in Fort Payne, Alabama was felt in Hamilton County. There is a small but potentially serious risk from earthquake events.

According to the NCDC, Hamilton County averages between 20 to 40 days a year with heavy fog (visibility of ¼ mile or less). Impaired visibility affects traffic, increasing the risk of accidents. Areas located in upper elevations are particularly susceptible to fog.

Finally, the impacts of drought are considered because of the potential for wildfire in the forested areas of Hamilton County. Forested steep slopes and bluff lines are particularly vulnerable to wildfire because of the difficulty of controlling once ignited.

Problem Statements and Goals

The community hazard surveys were collected by the CHCRPA. Results of the community hazard survey are important for the development of problem statements and overall plan goals. The survey also offered respondents the opportunity to identify possible or desired actions to mitigate hazards of concern. Fog was a hazard that was not listed as a potential hazard in the survey, but that was identified by several respondents as a significant hazard. Natural Hazards are prioritized based on hazard impact ranking by each jurisdiction (Table 1).

Table 1

Hamilton County, Tennessee Natural Hazard Risk Assessment Matrix											
	Unincorporated County	Chattanooga	East Ridge	Red Bank	Soddy-Daisy	Collegedale	Signal Mountain	Lookout Mountain	Walden	Lakesite	Hazard Score
100 Year Floodplain	3	3	3	3	3	3	0	0	0	1	19
Flash Flood	3	3	3	2	3	3	1	0	1	1	20
Non flood zone flood	2	3	3	1	1	3	0	0	0	1	14
Ice storm	2	3	2	2	3	3	3	3	2	2	25
High wind	2	3	3	2	2	2	3	2	2	2	23
Winter Storm	2	2	2	2	3	2	2	3	2	2	22
Stream Bank Erosion	3	3	3	3	3	3	1	0	0	1	20
Thunderstorm	2	2	3	0	3	2	2	1	1	2	18
Lightning	1	3	3	2	1	1	2	2	1	2	18
Tornado	2	1	3	2	1	3	1	1	1	2	17
Wildfire	2	0	2	2	1	1	1	3	1	2	15
Landslide	1	1	1	0	2	3	3	0	1	2	14
Hail	1	1	1	2	1	2	1	1	1	2	13
Earthquake	1	1	1	2	1	1	1	1	1	1	11
High/Low Temperature	1	1	1	1	1	1	1	0	0	1	8
Municipal Score	28	30	34	26	29	33	22	17	14	24	25

Risk Scale: Severe=3, Moderate=2, Low=1, None=0

The frequency of occurrence for those hazards that have a documented history was also evaluated in the process of determining priority (Table 2).

Hazard Frequencies for Hamilton County, Tennessee				
Hazard	Total Events	Years in Record	Recurrence Interval	Hazard Frequency
Wind	196	53.25	0.27	3.68
Flooding	29	10	0.34	2.90
Winter Storm	18	10	0.56	1.80
Hail	94	53.25	0.57	1.77
Tornado	10	53.25	5.33	0.19

Source: NOAA National Climatic Data Center

Flooding: Flooding causes the most significant amount of reoccurring damage in Hamilton County. Flooding primarily affects properties located in the Tennessee Valley, although mountaintop communities are susceptible to flash flood events.

- Tributaries of the Tennessee River are prone to backwater flooding.
- Flooding continues to damage properties both inside and outside of the 100-year floodplain.
- Residents often drive through standing floodwater.
- Flooding repeatedly damages some structures in the 100-year floodplain.
- Inadequate infrastructure is unable to handle stormwater in some areas of Hamilton County.
- There is a lack of comprehensive area rain gauging and stream flow monitoring capabilities.
- Flood and flash flood events exacerbate stream bank erosion.
- Drainage basin modeling and the creation of potential flood maps have not been created in most developing areas.
- There is no requirement for stream buffers in local ordinances.
- There is no early warning system to notify flood zone residents of imminent flooding due to headwater rainfall.
- Power failure may shut down sanitary and stormwater pump stations without backup power, increasing the magnitude of flood events.
- Development in Catoosa County, Georgia has the potential to increase the frequency and magnitude of flooding of the South Chickamauga Creek.

Winter Storms: Hamilton County is vulnerable to ice storms, snowstorms, and extreme weather change in the winter.

- The most common effects of winter storms are power and communication outages, and traffic accidents.
- Mountainous areas experience yearly difficulty with winter weather.
- Winter storms cause some areas to become inaccessible for extended periods of time.

- There is not an adequate plan in some jurisdictions to provide shelter for residents that lose power and heat during winter weather events.

GOAL: Reduce potential damages and increase public preparedness.

Severe Storms: Severe storms with high winds, lightening, hail, and heavy rain are possible throughout the year in Hamilton County.

- High winds cause falling limbs and trees that damage power lines and public utilities.
- Heavy rain overwhelms stormwater drainage capacity and leads to flooding of problem areas.
- Lightening has destroyed or damaged buildings by igniting fires.

GOAL: Minimize the impact of severe storms on area property and lives.

Tornadoes: Tornadoes are associated with severe thunderstorms and although infrequent, may cause substantial property damage and loss of life.

- There is no tornado warning system in Hamilton County.
- There are no identified tornado shelters within Hamilton County.
- There is a substantial risk of property damage and loss of life for residents of mobile homes.

GOAL: Save lives, reduce property damage, and increase awareness of the danger of tornadoes.

Landslide/Erosion: Stream banks, steep slopes, and slopes cut for roads have the potential for failure.

- Removal of vegetation in hazard areas increases the potential for landslides.
- Heavy rain increases the probability of slope failure.
- Residents may be unaware of the potential hazard of landslides.
- Severe stream bank erosion in several areas, particularly along North Chickamauga Creek, is threatening property and structures.

GOAL: Identify high hazard areas and identify techniques to minimize risk.

Drought/Wildfire- Wildfire is the main threat associated with drought conditions.

- There is a lack of public awareness of how droughts increase the potential for wildfire.
- No public education exists on how to minimize fire risk to property located in the wildland/urban interface.
- Fire suppression on steep slopes and bluff lines is especially difficult.
- Water capacity of Lookout Mountain, Signal Mountain, and Walden is not sufficient to fight a major wildfire.

GOAL: Reduce the threat of wildfire.

Earthquakes: Earthquakes are common in the East Tennessee Seismic Zone, but rarely noticeable. A major earthquake could result in significant loss of property and life.

- There is a lack of public education on earthquake hazards and preparedness.
- Older buildings and infrastructure may be severely damaged in the event of a significant earthquake.
- Hamilton County contains several critical facilities that increase the potential danger of a major earthquake.
- Steep slopes and hillsides could become unstable in the event of a major earthquake.

GOAL: Save lives, reduce potential property damage and increase public awareness.

Fog: Hamilton County experiences serious visibility reducing fog 20 to 40 days a year.

- Serious traffic accidents have resulted from heavy fog on roadways.
- There are no warning systems or signs to notify drivers of fog hazards.

GOAL: Increase driver awareness and reduce accidents.

Mitigation Alternatives

Flooding

Emphasis will be to seek Federal Mitigation Grants and/or other funding sources to:

- ✓ Purchase or relocate repetitive loss structures
- ✓ Educate residents in high-risk areas
- ✓ Notification program for evacuation
- ✓ Educate property owners of responsibility for stream maintenance
- ✓ Increase stream gauging systems and early notification systems
- ✓ Develop map of problem non-flood zone areas
- ✓ Continue to develop basin modeling
- ✓ Apply basin modeling and flood mapping to evaluate the impact of new development projects
- ✓ Improve GIS capabilities to include real time modeling and projections of flood areas
- ✓ Increase capacity of stormwater drainage system in problem areas
- ✓ Evaluate the potential for uniform countywide stormwater and floodplain regulation
- ✓ Evaluate the potential for a countywide stream buffer ordinance
- ✓ Acquire backup power generators for stormwater and sewage pumping stations, where needed
- ✓ Continue public/private collaboration to expand greenway system countywide

Winter Storm

- ✓ Routinely trim tree limbs in the right of way
- ✓ Evaluate feasibility of underground utilities for problem areas and new developments

Severe Storm

- ✓ Early warning system
- ✓ Routinely trim tree limbs in the right of way
- ✓ Evaluate multi-jurisdictional emergency communication system
- ✓ Evaluate feasibility of underground utilities for problem areas and new developments
- ✓ Place weather alert radios in each school and day center as well government agencies

Tornado

- ✓ Identify public buildings for use as tornado shelters
- ✓ Public Service Announcements for mobile home residents
- ✓ Evaluate building codes and enforcement

Landslide/Erosion

- ✓ Develop a countywide map of high risk areas
- ✓ Evaluate regulation of vegetation removal

- ✓ Evaluate the potential for a countywide stream buffer ordinance
- ✓ Continue public/private collaboration for greenway system land acquisition

Drought/Wildfire

- ✓ Evaluate and map urban/wildland interface
- ✓ Public education on responsible water use during severe drought
- ✓ Public education on landscaping and building techniques to reduce property vulnerability to wildfire

Earthquake

- ✓ Retrofit existing buildings which are not compliant with current standards
- ✓ Evaluate critical infrastructure
- ✓ Public education of hazard and preparedness

Fog

- ✓ Warning signs to notify drivers of fog conditions

Objectives and Actions:

Each participating jurisdiction has developed objectives and preferred actions to mitigate natural hazards in its locality. Objectives represent measurable steps towards achievement of overall plan goals. Preferred actions are specific measures implemented to achieve the objectives of the plan. The achievement of objectives and implementation of specific actions in some instances may be contingent upon the future availability of local, state, and federal resources and funding.

Chattanooga:

Objectives

1. Continually review existing ordinances and/or create ordinances to support mitigation plan goals.
2. Increase the capability to monitor rainfall and stream flow.
3. Increase basin modeling and flood mapping capabilities.
4. Protect area streams from the effects of urban development.
5. Decrease the number of repetitive loss structures.
6. Increase scrutiny of proposed developments and monitor development in floodplains and floodways.
7. Reduce flooding of the Rossville Boulevard commercial district.
8. Increase capabilities to warn flood zone residents of imminent flooding due to headwater rainfall.
9. Reduce the impact of power outages on crucial infrastructure.
10. Upgrade inadequate infrastructure.

Preferred Actions

1. Review and revise ordinances necessary to strengthen mitigation efforts.
2. Installation of additional stream flow gauges in N. Chickamauga, Chattanooga, Lookout, Mountain, and Citico Creeks.
3. Implement automatic notification from rain gauges and flow meters to Stormwater Management staff.
4. Continue development of basin modeling and creation of flood mapping in developing areas.
5. Establish requirements for stream buffers.
6. Acquire property for greenway system.
7. Buy outs of properties affected by the May 2003 flood.
8. Installation of floodgates and pump stations at the confluence of Dobbs Branch and Chattanooga Creek to protect the Rossville Boulevard commercial district.
9. Installation of early warning systems to notify flood zone residents of imminent flooding due to headwater rainfall.
10. Seek grants to purchase homes in all floodways.
11. Improve GIS capabilities to include real-time modeling and better projections of flood areas.
12. Mountain Creek flood zone restoration.
13. Citico Creek WPA channel removal and natural stream restoration.
14. Dual power sources or onsite generators for all sanitary and storm water pump stations.

East Ridge:

Objectives

1. Reduce flood damage in the Spring Creek and South and West Chickamauga Creek flood zones.
2. Reduce the amount of property damage due to stream bank and tributary erosion during flash flooding and flood events.

Preferred Actions

1. Acquire funds for street maintenance and funds to flood proof existing homes in the floodplain via in-place elevation.
2. Redirect or intercept the high flow of Spring Creek at the Anderson Avenue outlet and divert into South Chickamauga Creek.
3. Improve current storm water infrastructure to handle 2, 5, and 10-year events while minimizing erosion (especially along the John Ross/Bennett/Laredo and Marlboro Drainage System).
4. Evaluate the possibilities of dredging creeks to improve drainage capacity.

Soddy-Daisy:

Objectives

1. Protect stream banks from erosion.
2. Minimize future damage to North Chickamauga Creek banks and bridges.

Preferred Actions

1. Establish requirements for stream buffers as well as review and revise ordinances necessary to strengthen mitigation efforts.
2. Acquire funding to protect area stream banks from erosion according to recommendations provided by the NRCS.
3. Map channel migration hazard areas and implement development restrictions in susceptible areas.
4. Remove trees and debris from creek to prevent back up flooding onto residential properties.

Walden:

Objectives

1. Reduce the occurrence of power and communication outages.
2. Reduce traffic accidents associated with fog.
3. Reduce the occurrence of mudslides and erosion.

Preferred Actions

1. Evaluate the feasibility of underground utilities
2. Acquire warning signs for area roads to warn of fog conditions.
3. Identify and map areas susceptible to landslide.

Lookout Mountain:

Objective

1. Increase the capability to mitigate the effects of drought, wildfire, fog, and winter storms.

Preferred Actions

1. Acquire backup source of electricity for water pumps to supply storage tanks.
2. Establish emergency communication procedures for interagency coordination.
3. Establish a fireplug and hose drop for wildfire suppression on mountainside.

4. Coordinate wildfire control on steep slopes with the City of Chattanooga, the National Park Service, the Tennessee Division of Forestry, and the Town Fire Department.
5. Acquire warning signs for area roads to warn of fog conditions.

Signal Mountain:

Objectives

1. Reduce the occurrence of power and communication outages.
2. Reduce traffic accidents associated with fog.
3. Reduce the occurrence of mudslides and erosion.

Preferred Actions

1. Evaluate the feasibility of underground utilities
2. Acquire warning signs for area roads to warn of fog conditions.
3. Identify and map areas susceptible to landslide.

Unincorporated County:

Objectives

1. Alleviate Middle Valley Road flooding between Eagle Drive and Thrasher Pike.
2. Erosion protection along sections of several creeks in the northern area of Hamilton County.

Preferred Actions

1. Raise Roberts Mill Road from Levi Road east to the Bens in Falling Water Creek
2. Mackey Branch culvert replacement and detention from Standifer Gap Road to Shallowford Road.
3. Raise Hunter Road in the 5800 address area.
4. Acquire funds to buy and remove or relocate homes along creeks prone to flooding or stream bank erosion.
5. Map channel migration hazard areas and implement development restrictions in susceptible areas.

Collegedale:

Objectives

1. Improve flow capacity at the Wolftever Creek/Tallant Road bridge.
2. Reduce flooding on Apison Pike at Wolftever Creek.

Preferred Actions

1. Routinely clean debris from support bracings under bridges.
2. Raise State Route 317 at McKee Plant #2 to alleviate roadway flooding.

Red Bank

Objective

1. Reduce flood damage associated with Stringers Branch and tributaries

Preferred Action

1. Buy out repetitive loss properties

Lakesite

Objective

1. Increase safety on area roads that are susceptible to frequent and heavy fog.

Preferred Action

1. Acquire signs for area roads to warn of fog conditions.