

## **Chapter 5**

# **Mitigation Strategies**

### **5.1 Purpose of the Mitigation Strategies**

The mitigation strategies presented in this chapter provide a long-range blueprint for all participating communities within Jefferson County to consolidate their resources and efforts to cooperatively reduce the potential losses identified in the risk assessment. This chapter presents a shared vision and comprehensive, long-range plan of goals, objectives, and available mitigation measures for all participants in the planning process. Those short-range mitigation measures supported by each community over the next five-year planning cycle are presented in Chapter 6 - Community Action Programs.

### **5.2 Steps in Developing the Strategies**

At its organizational meeting, the Hazard Mitigation Planning Committee adopted a mission statement and a shared vision for disaster resistance among all communities within the county. These statements were prepared with *Committee Exercise #1 - Mission/Vision Statements*. (Refer to Section 3.1 - Hazard Mitigation Planning Committee for the Mission Statement.)

At subsequent Committee meetings, each jurisdiction completed risk and capabilities assessments. *Committee Exercise #2 - Hazard Identification* was used to generally identify the hazard threats to each community and the probability or risks of future occurrences. More detailed research and analyses of the risks supplemented the committee exercise, and the committee reviewed the results. The next exercise, *Committee Exercise #3 - Hazard Profiles*, compiled the records of past hazard events. This exercise was completed through evaluation of available data, such as local damage reports, news accounts, and FEMA disaster declaration records, as well as committee members' recollections of past events. *Committee Exercise #4 - Capabilities Assessment* was completed by each jurisdiction to determine existing capabilities to implement mitigation. The committee representatives examined the regulatory tools, staff resources, possible funding, and other capabilities of each jurisdiction.

The statements of "Issues and Opportunities" facing each community's mitigation efforts were derived from the risk and capability assessments, committee discussions, public participation, and interagency coordination activities. These issues and opportunities form the basis for determining appropriate mitigation measures for each community, given their particular risks and capabilities. They are addressed in Section 5.4.

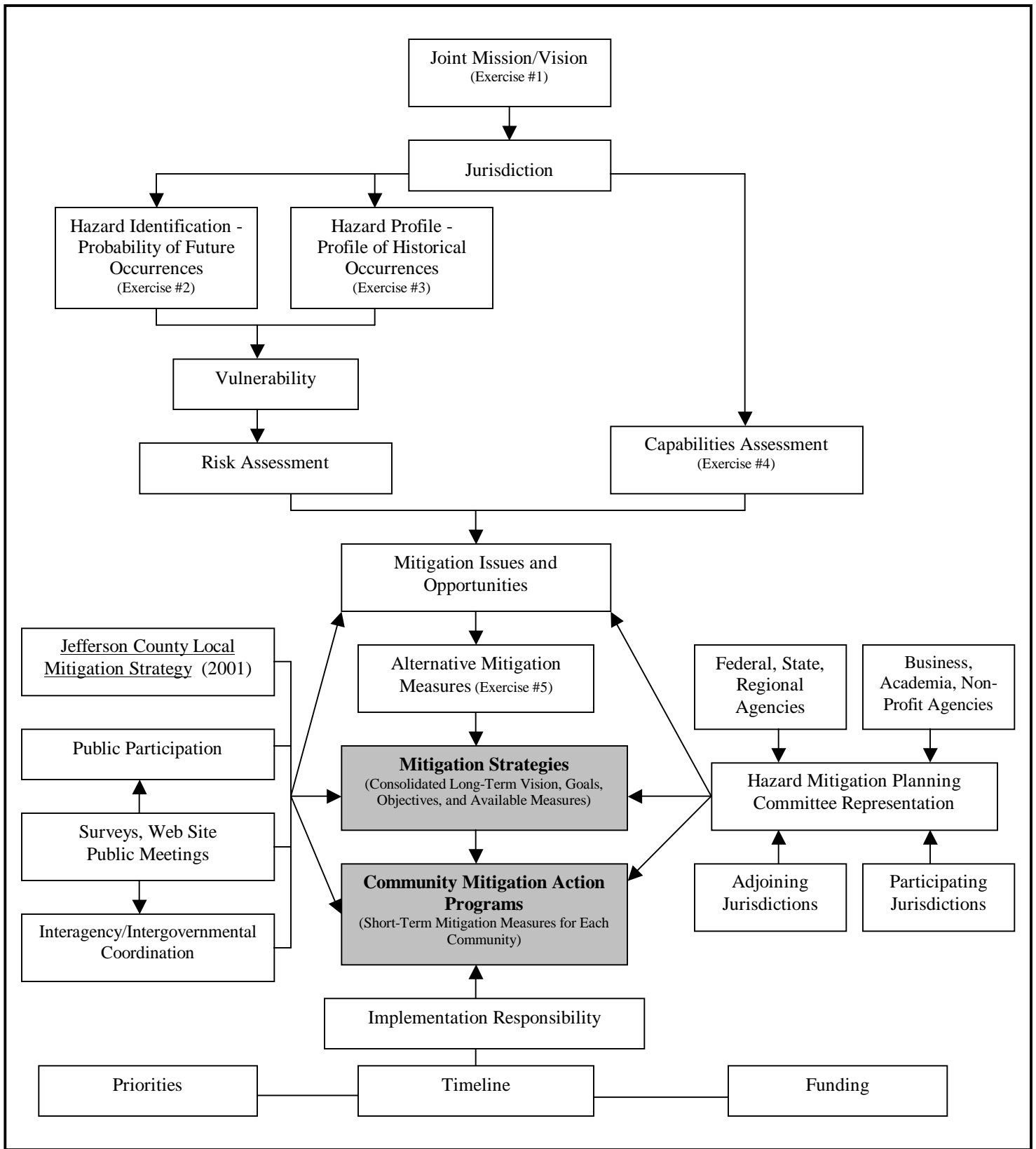
*Committee Exercise #5 - Alternative Mitigation Measures*, was used by the committee to select among the broad range of alternatives that might be available to each community. Goals were established for high-risk hazards and each of the six categories of mitigation activities. Mitigation program objectives define achievable targets that are consistent with goals. The Committee evaluated the alternative mitigation measures that would advance the goal and selected the preferred measures that would best address each issue. The committee

also identified the most critical hazard issues in each jurisdiction and recommended mitigation projects for potential FEMA funding.

Lastly, the committee completed the Mitigation Action Program that schedules the implementation of mitigation measures. The action program for each participating community assigns implementation responsibility, sets a timeline, identifies possible funding sources, and establishes the priority for implementation. (See chapter 6). Figure 5-1, which follows, illustrates the process and components that lead to the Mitigation Strategies and Mitigation Action Program.

The Hazard Mitigation Planning Committee sought participation from the public and coordinated its efforts with other agencies. This was accomplished through open committee meetings, access to the project website (<http://mitigationplan.org>), surveys, public meetings, media announcements and public hearings before the plan's adoption. Results of the exercises and sign-in sheets and minutes from meetings are available in the EMA office.

The surveys, studies, and measures completed by each jurisdiction in developing the Jefferson County Local Mitigation Strategy (2001) were other vital sources in the preparation of the strategies presented here.



**Figure 5-1. Steps in the Development of the Mitigation Strategies and Action Programs**

### 5.3 The Planning Approach

The planning approach presented here follows the six categories of a comprehensive hazard mitigation program. These program categories have been developed by FEMA for managing a successful mitigation program and are used as guidelines for identifying and selecting among alternative mitigation measures.

- 1. Prevention.** Adopting and administering ordinances, regulations, and programs that manage the development of land and buildings to minimize risks of loss due to natural hazards.
- 2. Property Protection.** Protecting structures and their occupants and contents from the damaging effects of natural hazard occurrences, including retrofitting existing structures to increase their resistance to damage and exposure of occupants to harm; relocating vulnerable structures and occupants from hazard locations; and conversion of developed land to permanent open space through acquisition and demolition of existing structures.
- 3. Public Education and Outreach.** Educating and informing the public about the risks of hazards and the techniques available to reduce threats to life and property.
- 4. Natural Resources Protection.** Preserving and restoring the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.
- 5. Emergency Services.** Responding to and recovering from a natural hazard disaster.
- 6. Structural Projects.** Engineering structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of a hazard on a community.

### 5.4 Issues and Opportunities

The mitigation measures of this plan respond to the issues and opportunities listed in this section. These statements summarize the principal hazard issues and mitigation opportunities and are based upon the findings of the risk assessment and capability assessment, participation by members of the HMPC at committee meetings and through planning exercises, the results of the public survey, public participation at community meetings, and coordination among interested agencies.

#### *Prevention*

- A large number of jurisdictions have been competing for limited FEMA grant funds for flood plain acquisitions. This is a priority issue which has yet to be fully coordinated.

- Flooding is the single most threatening hazard to Jefferson County communities - over \$46 million dollars has been spent over recent decades to mitigate the flooding problems.
- Jefferson County Department of Land Development has an active comprehensive planning program, which fully integrates flood hazard mitigation into its plan mitigation measures and zoning ordinances and land development regulations.
- Approximately one-third of Jefferson County's municipalities practice comprehensive planning.
- The Regional Planning Commission and Jefferson County provide professional planning support to small municipalities.
- Flooding problems along the Little Cahaba River affect Dry Creek tributary that floods the downtown and industrial areas of Leeds.
- The County expects a modest growth rate of 6.0% through the years 2000-2025.
- Jefferson County, the Storm Water Management Authority, and the Regional Planning Commission maintain countywide GIS. The City of Birmingham maintains GIS for its jurisdiction.
- A large number of areas depicted on the Flood Insurance Rate Maps are designated "Approximate" zones where no detailed studies and flood elevation data exist.
- Good construction practices and proper code enforcement are critical. The recent damage in Carbon Hill could have been minimized if good construction practices and code enforcement had been utilized. A State Homebuilder's Licensing Board inspector's survey of the damage revealed that many homes had been constructed without proper anchorage to the foundation thereby allowing the structures to shift under wind loads and thereby becoming unstable resulting in major damage.
- The Storm Water Management Authority (SWMA) is limited to water quality concerns and does not address drainage and flooding issues.
- Alabama is one of a few states without a dam safety program.
- The county is within the New Madrid seismic zone. This zone has a greater than 3% potential for earthquakes. No damage has resulted from past earthquakes. Building codes have not addressed this issue.

#### *Property Protection*

- A large number of buildings (residential and non-residential) throughout the County have been constructed in flood prone areas before the publication of Flood Insurance Rate Maps (pre-FIRM buildings) and are not protected from flooding. In the most recent decade, flood damages have soared, as flooding events have become almost an annual occurrence. Considerable funds and resources have been expended by the City of Birmingham, Jefferson County, and a number of smaller cities and towns throughout the County to mitigate this priority issue. Property acquisition has been the preferred method of permanent protection, although select

cases of structural and other non-structural methods (elevations, relocations, and retrofits) have been found to be appropriate. Since the floods of Hurricane Opal in October 1995, some portion of the County has experienced a “100 year” flood event at least annually.

- In 2000, the County initiated a buyout program to mitigate potential flood hazards. The program has so far involved the purchase and removal of single-family homes located in hazard areas. The County anticipates continuing this program and expanding it to include other types of residential properties and non-residential properties.
- Acquisition of all residential flood-prone buildings throughout the County could exceed \$35 million.
- The City of Trussville has incurred severe damages from sinkholes following drought conditions.
- Standard homeowner and business insurance policies do not cover flood, sinkhole, and earthquake damages.

#### *Public Education and Outreach*

- Real estate agents and property owners have a continuing need for flood map information.
- The public is generally unaware of risks associated with hazards and the mitigation measures available for property protection.
- Real estate agents often neglect to disclose flood plain location of a property before it is listed.
- Local libraries are available to serve as repositories for information on hazards and methods of protection.
- Technical assistance materials are available through FEMA to assist property owners on alternative property protection measures.
- School environmental education programs provide excellent opportunities for public education on hazard mitigation alternatives.
- Local cable offers public service access.
- A multitude of public outreach opportunities and resources are available.
- Public information activities are among the least expensive mitigation measures but often the most effective.

#### *Natural Resources Protection*

- Jefferson County has valuable natural and scenic resources that could be disturbed by growth and development.
- The Cahaba-Warrior Land Trust has been established to preserve critical stream and river protection resources.
- The Storm Water Management Authority (SWMA) has been established to protect stream and river water quality from the effects of urbanization.
- Stream and riverbanks and riparian zones help manage floods and filter runoff.

- Accidental or intentional dumping of household and commercial waste, such as household garbage, tires, shopping carts, and landscape debris, can obstruct flows.
- Storm-damaged trees - resulting from hurricanes, tornadoes, severe thunderstorms, wind storms, winter freezes, and snow storms - can clog streets and access during periods of disaster response; obstruct the natural discharge of flood waters; disrupt utility services; increase debris removal; damage property; and increase disaster recovery costs.

*Emergency Services*

- Modern technology has created new opportunities for monitoring hazard events as they happen or, in some cases, forecast events in advance. Jefferson County EMA maintains an ALERT gage network to cover high-risk flood areas – the Automated Hazard Mitigation Information System (AHMIS). The system shares direct access to gage readings with the NWS and USGS. This comprehensive disaster warning system ties a variety of gages into a single automated network to monitor weather conditions, precipitation, stream stage, and water quality.
- Weather radios in homes and businesses provide inexpensive means for advance warning.

*Structural Projects*

- Regular maintenance of streams and drainage ways is critical to their effective operation for storm water discharge.
- Vestavia Hills has spent \$200,000 for drainage maintenance solutions to address the repetitive flooding of Patton Creek that occurs along Highway 31 in Vestavia.

**5.5 Existing Hazard Mitigation Activities**

This plan expands on and improves existing mitigation activities. To date, Jefferson County and its municipalities have been actively involved in a number of hazard mitigation program activities, including, among other activities, those described here.

**National Flood Insurance Program (NFIP) Participation**

- Jefferson County entered the regular NFIP on February 17, 1982.
- The following municipalities entered the NFIP on the date listed:

<b>Community Name</b>	<b>Date of Entry to the Program</b>
Adamsville	10/10/1990
Bessemer	06/01/1981
Birmingham	03/16/1981
Brighton	01/02/1981

<b>Community Name</b>	<b>Date of Entry to the Program</b>
Brookside	02/18/1981
Cardiff	05/23/2003
Center Point	06/05/2003
Clay	08/18/2003
Fairfield	09/11/1981
Fultondale	05/05/1981
Gardendale	11/21/1980
Graysville	11/21/1980
Homewood	03/30/1973
Hoover	02/04/1981
Hueytown	01/02/1981
Irondale	02/04/1981
Kimberly	06/18/1981
Leeds	01/02/1981
Lipscomb	01/02/1981
Midfield	01/16/1981
Morris	06/03/1986
Mountain Brook	01/02/1981
Mulga	09/19/1980
Pleasant Grove	12/19/1980
Tarrant	01/02/1981
Trussville	11/18/1981
Vestavia Hills	01/02/1981
Warrior	01/02/1981

- West Jefferson and North Johns have been identified as having special flood hazard areas but are not in the NFIP.
- The towns of County Line, Maytown, Sylvan Springs and Trafford do not participate in the NFIP and do not have special flood hazard areas identified.

**Community Rating System Program of the NFIP (CRS)**

- The City of Birmingham entered the CRS Program on 10/1/94 and on 4/1/01 obtained a class 7 rating.
- The City of Hoover entered the CRS Program on 10/1/91 and obtained a class 9 rating.

- The City of Homewood entered the CRS Program on 10/1/01 and obtained a class 9 rating.

### **Hazard Mitigation Grant Program (HMGP)**

- Upper Shades Creek Flood Mitigation Plan. Grant awarded to Jefferson County. FEMA grant provided 75% of \$492,000 total cost to identify feasible projects for flood mitigation within Irondale, Mountain Brook, Birmingham, and Homewood. The plan was completed in December 2003.
- Village Creek Flood Plain Acquisition Project. The City of Birmingham completed a \$7 million buyout (\$5 million Federal share) of 250 properties.
- Jefferson County Flood Plain Acquisition Project. In FY 2000 Jefferson County received an HMGP grant for flood mitigation. This was supplemented in FY 2002 by additional funds. Total project funding was \$2.25 million with a local match of \$562,736. As of June 2003, 32 repetitive loss single-family houses have been purchased and removed.
- Jefferson County Automated Hazard Mitigation Information System. The FEMA grant funded 75% of the \$750,000 total cost of an automated flood warning system. The project has been completed.
- City of Tarrant Mobile Home Estates Acquisition Project. The City of Tarrant completed a \$1.5 million buyout (75% Federal share) of a 16-acre mobile home park and relocated 77 residents. The project was completed in 2001.
- City of Tarrant Five Mile Creek Acquisition Project. The City of Tarrant completed a \$500,000 buyout of 10 homes. The project was completed in 2001.
- Town of Brookside Five Mile Creek Acquisition Project. The Town of Brookside acquired six homes at a total cost of approximately \$500,000. The project was completed in 2002.
- City of Fultondale Black Creek Acquisition Project. The City of Fultondale has acquired two homes and, as of June 2003, is in the process of completing the \$300,000 project with the acquisition of one additional home.

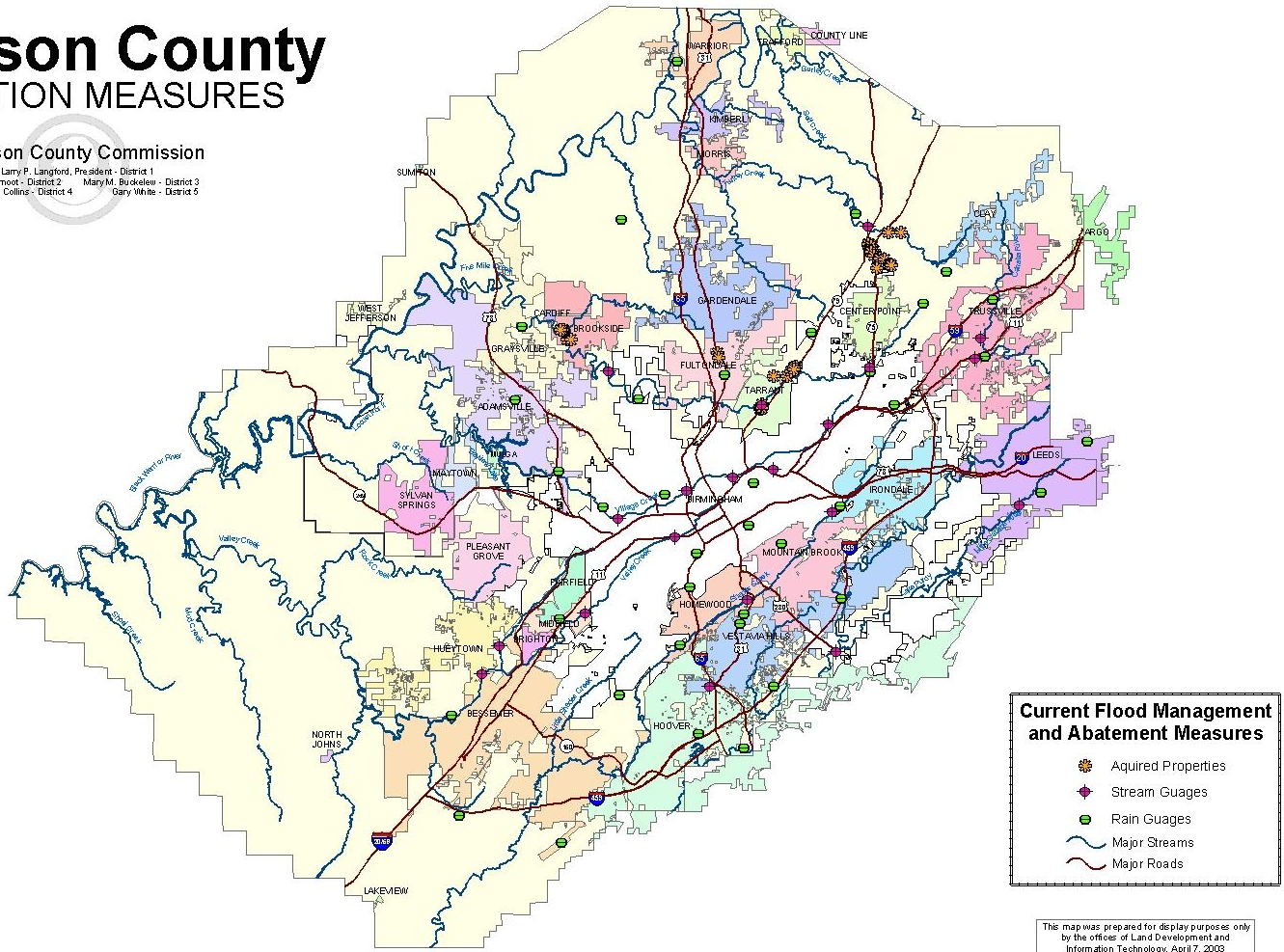
(Map 5-1, Mitigation Measures, shows the location of projects funded through the HMGP as of April 7, 2003).

# Jefferson County

## MITIGATION MEASURES

Jefferson County Commission

Larry P. Langford, President - District 1  
 Sheila Y. Smoot - District 2    Mary M. Bukekew - District 3  
 Betsy Fine Collins - District 4    Gary White - District 5



Map 5-1. Mitigation Measures

### **Flood Mitigation Assistance Program (FMA)**

- The City of Birmingham completed the acquisition of six repetitive loss homes in the Mountandale area at a total cost of approximately \$1 million over the period 1999 – 2001.
- In 2002, the City of Birmingham received an FMA planning grant for partial funding (approximately \$25,000) of a comprehensive flood mitigation plan. As of April 2004, the project is in progress.
- In 2002, Jefferson County also received an FMA planning grant of approximately \$25,000, which has been applied towards the development of this plan and will fund model flood plain and storm water detention ordinances for Jefferson County and its municipalities.

### **Storm Shelter Program**

Jefferson County has participated in the Alabama EMA storm shelter program since 2001. The County provided 50% match funds for installation of safe rooms in homes, and provided 75% matching funds for community shelters for the City of Graysville and the Town of Brookside.

### **Project Impact**

- FEMA has designated Jefferson County as a Project Impact community.

### **Corps of Engineers**

- Corps of Engineers Project Management Plan (PMP) for Upper Shades Creek Funding. Draft proposal for Corps follow up to qualify projects for funding through Corps program. Draft proposal submitted to the City of Mountain Brook.
- Corps of Engineers Feasibility Phase Study for Village and Valley Creeks. Cost sharing agreement of \$2.6 million executed with City of Birmingham to study feasibility and establish funding of flood mitigation and stream restoration projects. Project is in its sixth year, nearing completion.
- Corps of Engineers Village Creek Acquisition and Flood Warning System. This \$29.6 million project was completed in 1993. The project acquired approximately 650 homes and installed an ALERT flood warning system along Village Creek within the City of Birmingham.

### **2003 Jefferson County Flood Mitigation Strategy**

- On July 1, 2003, the Jefferson County Commission allocated two million

dollars (\$2,000,000) annually to mitigate flood-damaged structures throughout Jefferson County. The catalyst for this bold initiative occurred in May of 2003, when Jefferson County experienced an extensive amount of rainfall in a short period of time which resulted in widespread flooding.

- The flood mitigation program includes:
  - Acquisition or buy-out of structures (primarily located in the floodplain or in close proximity);
  - Promotion of a model flood damage prevention ordinance based on higher regulatory standards for adoption by each NFIP jurisdiction;
  - Correction of floodplain mapping; and
  - Other mitigation measures and improved code enforcement.

### **Birmingham Fire and Rescue**

- Smoke Detector Program. The Birmingham Fire and Rescue Department provides free smoke detectors to citizens. The program is known as *Get Alarm Birmingham*.
- Fire Safety House. The Birmingham Fire and Rescue Department visits schools and other places with a "house" in which a simulated fire drill can be conducted to show the children the proper procedure to escape a fire.
- Hazard House. Similar to the Fire Safety House except it is a tabletop version.
- Citizens Fire Academy. A twelve-week program that citizens may attend to help them gain a better understanding of the inner workings of the Fire Department. Community Emergency Response Team training is included in the 12 week course.
- Learn Not to Burn. General program on fire safety taught in area schools.
- Mass Disaster Evacuation Plan Program. This program is used to educate the corporate community in the development of evacuation plans.
- Community Education. Engine Companies attend Neighborhood Association meetings to provide the community with the most current fire prevention, emergency service, and community services offered by the Department.
- Public Information Program. Education and Informational Moments presented on Cable Channel #4.
- Vigilant Inspection Program. Inspection of fire, haz-mat, new and existing construction and tanks.

## Existing Capabilities

Each jurisdiction participated in Committee Exercise #4, Capabilities Assessment for Mitigation Plan Implementation. Through this exercise, each jurisdiction determined existing capabilities to implement mitigation. A similar exercise was completed for the Jefferson County Local Mitigation Strategy (2001). The committee representatives examined the regulatory tools, staff resources, and funding capabilities of each jurisdiction. The following table illustrates the various plans and regulatory tools each jurisdiction has in place to aid in natural hazard mitigation.

**Table 5-1. Plans and Regulations by Jurisdiction**

Jurisdiction	Comprehensive Plan	Capital Improvements Plan	Zoning Ordinance	Building Codes
Adamsville			X	X
Bessemer			X	X
Birmingham	Updating	X	X	X
Brighton				
Brookside				
Cardiff				
Center Point	X	X	X	X
Clay	X		X	X
County Line				
Fairfield			X	X
Fultondale			X	X
Gardendale			X	X
Graysville			X	X
Homewood	X	X	X	X
Hoover	In Progress	X	X	X
Hueytown			X	X
Irondale			X	X
Kimberly	X		X	X
Leeds			X	X
Lipscomb				
Maytown	X		X	X
Midfield				X
Morris	X		X	X
Mountain Brook	X		X	X
Mulga				
North Johns				

**Table 5-1: (continued)**

Jurisdiction	Comprehensive Plan	Capital Improvements Plan	Zoning Ordinance	Building Codes
Pleasant Grove			X	X
Sylvan Springs	X		X	X
Tarrant			X	X
Trafford				
Trussville	X		X	X
Vestavia Hills	X	X	X	X
Warrior				
West Jefferson				
Jefferson County	X	X	X	X

**5.6 Vision Statement**

*A Vision for Disaster Resistance*

Jefferson County and its municipalities envision active resistance to the threats of nature to human life and property through publicly supported mitigation measures with proven results. Jefferson County is committed to reduce the exposure and risk of natural hazards to its communities by activating all available resources through cooperative intergovernmental and private sector initiatives, and augmenting public knowledge and awareness.

**5.8 Comprehensive Mitigation Strategies**

This section presents the long-term strategies for mitigation of natural hazards. Each locality within Marshall County derives its five-year mitigation action program (see Chapter 6 - Community Mitigation Action Programs) from the program goals, objectives and available long-term mitigation measures presented here.

- 1 Prevention.** Manage the development of land and buildings to minimize risks of loss due to natural hazards.

**Objectives and Mitigation Measures:**

- 1.1 Comprehensive Plans. Establish an active comprehensive planning program that seeks to mitigate the damaging effects of natural hazards, guide future development according to environmental and natural hazards constraints, and duly consider the vulnerability of areas

exposed to natural hazards and the conservation of their natural and beneficial functions.

*Mitigation Measures:*

*1.1.1 Prepare and adopt a countywide plan which establishes a long-range program for the protection and mitigation of properties from flood damages. The plan should include the following components:*

- a comprehensive inventory of all flood-prone buildings, based on flood zone location and historical flooding;*
- appropriate property protection method(s) for each building - acquisition, relocation, elevation, or flood proofing, in accordance with the “Property Protection” mitigation measures of this plan;*
- prioritization of buildings targeted for mitigation according to pre-defined criteria, such as finish floor elevation in relation to flood elevation, substantial damage, repetitive flood insurance losses, floodway location, critical facility, residential use, etc;*
- detailed cost estimates and a long-term funding plan for implementation; and*
- coordinated implementation of the plan among all participating jurisdictions and interested agencies.*

*1.1.2 Maintain up-to-date comprehensive plans for all municipalities.*

*1.1.3 Integrate the findings and recommendations of this plan into comprehensive plan amendments for jurisdictions with active comprehensive planning programs.*

*1.1.4 Review and amend existing planning documents to be certain the vulnerability and environmental suitability of lands for future development are clearly addressed; local plans should address the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.*

- 1.2 Geographic Information Systems (GIS). Maintain a comprehensive database of hazards locations, socio-economic data, infrastructure, and critical facilities inventories.

*Mitigation Measures:*

- 1.2.1 *Maintain risk assessment data in GIS, including flood zones, tornado tracks, sinkhole threat areas, dam inundation areas, disaster events, and a comprehensive inventory of critical facilities within all jurisdictions.*
- 1.2.2 *Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.*
- 1.2.3 *Document the extents of each flooding event using GIS.*
- 1.2.4 *Combine the GIS resources of Jefferson County, the City of Birmingham, the Regional Planning Commission, and the SWMA to create a natural hazards GIS that is accessible to mitigation planners and emergency management personnel.*

- 1.3 Detailed Studies. Conduct special studies, as needed, to identify hazard risks and mitigation measures.

*Mitigation Measures:*

- 1.3.1 *Seek a countywide update of all FIRMs in digital format, with an emphasis on detailed studies of developed and developing areas with elevations provided and floodways delineated.*
- 1.3.2 *Complete a comprehensive feasibility study of Village Creek within the City of Birmingham to identify non-structural and structural projects eligible for Corps of Engineers funding.*
- 1.3.3 *Complete a comprehensive feasibility study of the City of Mountain Brook sub-basins of the Shades Creek to identify structural projects eligible for Corps of Engineers funding.*

1.3.4 *Carry out detailed planning and engineering studies for sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding.*

1.3.5 *Perform a feasibility study of Dry Creek flooding of downtown and industrial areas of Leeds.*

1.4 **Zoning.** Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.

*Mitigation Measures:*

1.4.1 *Consider large lot size restrictions on flood-prone areas designated on Flood Insurance Rate Maps.*

1.4.2 *Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.*

1.5 **Open Space Preservation.** Minimize disturbances of natural land features and increased storm water runoff through regulations that maintain critical natural features such as open space for parks, conservation areas, landscaping, and drainage.

*Mitigation Measures:*

1.5.1 *Update zoning regulations to include mandatory open space provisions for planned residential developments.*

1.5.2 *Update zoning regulations to include maximum impervious surface standards for non-residential developments.*

1.5.3 *Update zoning regulations to protect hazardous slopes, thereby preventing landslides and preserving vegetation to filter runoff for water quality protection.*

1.6 **Flood Plain Management Regulations.** Effectively administer and enforce local floodplain management regulations.

*Mitigation Measures:*

- 1.6.1 *Train local flood plain managers through programs offered through the State Flood Plain Manager and FEMA's training center in Emmitsburg, Maryland.*
  - 1.6.2 *Maintain a library of technical assistance and guidance materials to support the local flood plain manager.*
  - 1.6.3 *Obtain membership for local flood plain managers in the Association of State Flood Plain Managers.*
  - 1.6.4 *Promote the adoption of a uniform flood hazard prevention ordinance with higher regulatory standards that discourage flood plain development and seek to maintain the natural and beneficial functions of flood plains.*
- 1.7 Building and Technical Codes. Review local codes for effectiveness of standards to protect buildings and infrastructure from hazard damages.

*Mitigation Measures:*

- 1.7.1 *Promote good construction practices and proper code enforcement to eliminate most structural problems during natural hazard events.*
  - 1.7.2 *Adopt the International Code Series.*
  - 1.7.3 *Evaluate building code standards for roof construction to assure protection against wind damage from hurricanes, tornadoes, and windstorms. Require installation of "hurricane clips."*
- 1.8 Community Shelter and Safe Room Requirements. Ensure the protection of communities from tornadoes, hurricanes, and windstorms.

*Mitigation Measures:*

- 1.8.1 *Enact local ordinances to require community storm shelters within sizeable mobile home parks and subdivisions.*

- 1.8.2 *Require the construction of safe rooms within new public buildings, such as schools, libraries, community centers, and other public buildings where feasible.*
- 1.8.3 *Continue programs to subsidize safe room construction in existing homes.*
- 1.8.4 *Construct free-standing public safe rooms in vulnerable locations.*
- 1.8.5 *Encourage the construction of safe rooms in existing construction.*
- 1.8.6 *Distribute FEMA Publication 320 - Taking Shelter From the Storm: Building a Safe Room in Your House - through building permit and inspection offices.*

- 1.9 Landscape Ordinances. Establish minimum standards for planting areas for trees and vegetation to reduce storm water runoff and improve urban aesthetics.

*Mitigation Measures:*

- 1.9.1 *Require parking lot landscaping standards in zoning ordinances to encourage infiltration of rainwater where there are large expanses of impervious surfaces.*

- 1.10 Storm Water Management. Manage the impacts of land development on storm water runoff rates and to natural drainage systems.

*Mitigation Measures:*

- 1.10.1 *Promote the adoption of a uniform storm water management ordinance that maintains pre-development runoff rates.*
- 1.10.2 *Investigate the possibility of enlarging the role of the Storm Water Management Authority to address storm water drainage and flooding issues.*

- 1.11 Dam Safety Management. Establish a comprehensive dam safety program.

*Mitigation Measures:*

*1.11.1 Maintain a comprehensive inventory of dams and failure inundation areas within GIS.*

*1.11.2 Promote legislation to establish a State dam safety program.*

- 1.12 Community Rating System Program (CRS). Increase participation of NFIP member communities in the CRS Program.

*Mitigation Measures:*

*1.12.1 Apply for and maintain membership in the CRS Program.*

*1.12.2 Improve ratings of existing CRS communities.*

*1.12.3 Encourage CRS communities to conduct joint public outreach programs.*

- 2 Property Protection.** Protect structures and their occupants and contents from the damaging effects of natural hazards.

**Objectives and Mitigation Measures:**

- 2.1 Building Relocation. Relocate buildings out of hazardous flood areas to safeguard against damages and establish permanent open space.

*Mitigation Measures:*

*2.1.1 Provide financial assistance to relocate buildings out of hazardous flood areas; emphasis is on pre-FIRM historical residential buildings.*

- 2.2 Acquisition. Acquire flood prone buildings and properties and establish permanent open space.

*Mitigation Measures:*

*2.2.1 Provide financial assistance to acquire flood prone buildings and properties; emphasis is on pre-FIRM residential buildings and critical facilities. Buildings to be considered are those where large sections of neighborhoods are affected by flooding and selective acquisitions would render the neighborhood non-viable*

- all contiguous properties in that neighborhood would be considered.

- 2.3 Building Elevation. Elevate buildings in hazardous flood areas to safeguard against damages.

*Mitigation Measures:*

2.3.1 2.3.1 *Provide financial assistance to elevate buildings for protection against flood damage. Emphasis is on certain buildings, where acquisition or relocation is not feasible and on buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings). Elevation is preferred over flood proofing, where feasible.*

- 2.4 Flood Proofing. Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.

*Mitigation Measures:*

2.4.1 *Provide financial assistance to flood proof buildings; emphasis is on non-residential buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings).*

- 2.5 Building Retrofits.

*Mitigation Measures:*

2.5.1 *Provide technical assistance to owners of vulnerable buildings to advise on available building retrofits to protect against natural hazards damages, including flooding, high winds, tornadoes, hurricanes, severe storms, and earthquakes.*

- 2.6 Insurance. Maintain insurance riders for flood, sinkhole, and earthquake damages.

*Mitigation Measures:*

2.6.1 *Promote the purchase of insurance coverage by property owners and renters for flooding, sinkhole, and earthquake damages in high-risk areas.*

- 3 Public Education and Outreach.** Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.

**Objectives and Mitigation Measures:**

- 3.1 Map Information. Increase public access to Flood Insurance Rate Map (FIRM) information.

*Mitigation Measures:*

- 3.1.1 *Publicize the availability of FIRM information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.*

- 3.2 Outreach Projects. Conduct regular public events to inform the public of hazards and mitigation measures.

*Mitigation Measures:*

- 3.2.1 *Continue the Jefferson County annual Community Awareness Day in conjunction with the NWS.*

- 3.2.2 *Identify other environmental awareness events to integrate public information on hazard exposure and protection measures.*

- 3.3 Real Estate Disclosure. Encourage real estate agents to disclose flood plain locations for property listings.

*Mitigation Measures:*

- 3.3.1 *Arrange with the Multiple Listing Service (MLS) to require flood plain location disclosure as a condition for each real estate listing.*

- 3.3.2 *Consider the enactment of a local ordinance or state law to require flood plain location disclosure when a property is listed for sale.*

- 3.4 Library. Use local library resources to educate the public on hazard risks and mitigation alternatives.

*Mitigation Measures:*

3.4.1 *Obtain free publications from FEMA, NWS, USGS, and other federal and state agencies and deposit these materials with local libraries.*

3.4.2 *Maintain local library repositories with the latest available publications.*

3.5 **Environmental Education.** Use school resources for public education on hazards and mitigation measures.

*Mitigation Measures:*

3.5.1 *Distribute hazard mitigation brochures to area schools for distribution to students.*

**4 Natural Resources Protection.** Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.

**Objectives and Mitigation Measures:**

4.1 **Open Space Easements and Acquisitions.** Preserve significant natural resources and highly vulnerable areas in permanent open space.

*Mitigation Measures:*

4.1.1 *Continue to acquire open space, purchase easements, and accept donations of lands within significant stream protection corridors through the Land Trust.*

4.1.2 *Consider Land Trust acquisitions of other vulnerable land areas for protection as open space, such as sinkhole areas, natural drainage systems, and landslide hazard areas.*

4.1.3 *Coordinate the activities of the Land Trust with the acquisition of flood hazard areas.*

4.2 **River/Stream Corridor Restoration and Protection.** Restore and protect river and stream corridors within urban areas.

*Mitigation Measures:*

4.2.1 *Enforce dumping regulations.*

4.2.2 *Enforce erosion and sedimentation control regulations.*

4.2.3 *Support Land Trust programs for stream corridor restoration and protection.*

4.2.4 *Support the development of a countywide system of public greenways and linear parks along rivers and streams, particularly along Shades Creek, Five Mile Creek, and Village Creek. Coordinate the acquisition of greenway corridors with flood plain acquisition projects and Land Trust acquisitions.*

4.3 **Urban Forestry Programs.** Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.

*Mitigation Measures:*

4.3.1 *Seek technical assistance through the Alabama Cooperative Extension System with Best Management Practices (BMP) for channel and drainage system maintenance.*

**5 Emergency Services.** Improve the efficiency, timing, and effectiveness of response and recovery efforts for natural hazard disasters.

**Objectives and Mitigation Measures:**

5.1 Disaster Warning. Improve public warning systems.

*Mitigation Measures:*

5.1.1 *Enhance the (Automated Hazard Mitigation Information System) AHMIS with the following components:*

- *add gages to monitor icy bridges and roads;*
- *add additional stream gages and weather stations at strategic locations;*
- *link data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas in high hazard locations;*
- *add critical facilities inventories;*

- *add natural hazards inventories, including topographic data, flood records, records of tornado tracks, landslide susceptible areas, sinkhole susceptible areas, dam failure inundation areas, and wildfire events;*
- *add video cameras to select gage sites; and*
- *open up parts of the system to public access through the internet.*

5.2 Weather Radios. Improve public access to weather alerts.

*Mitigation Measures:*

5.2.1 *Support the Alabama Skywarn Foundation efforts to distribute weather radios to low-income households, especially in rural areas outside of siren coverage areas.*

5.2.2 *Promote the use of weather radios in households and businesses.*

**6 Structural Projects.** Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where feasible, cost effective, and environmentally suitable.

**Objectives and Mitigation Measures:**

6.1 Reservoirs, Channel/Drainage Modifications. Control flooding through structural measures, where feasible.

*Mitigation Measures:*

6.1.1 *Identify feasible structural projects to reduce flood damages along Village Creek, Shades Creek, and their tributaries, and implement projects through Corps of Engineers funding programs.*

6.1.2 *Evaluate the feasibility of publicly-owned and maintained detention facilities to retard storm water flows in critical sub-basins of severe flood hazard areas.*

6.2 Drainage System Maintenance. Improve maintenance programs for streams and drainage ways.

*Mitigation Measures:*

- 6.2.1 Prepare and implement standard operating procedures for drainage system maintenance.*