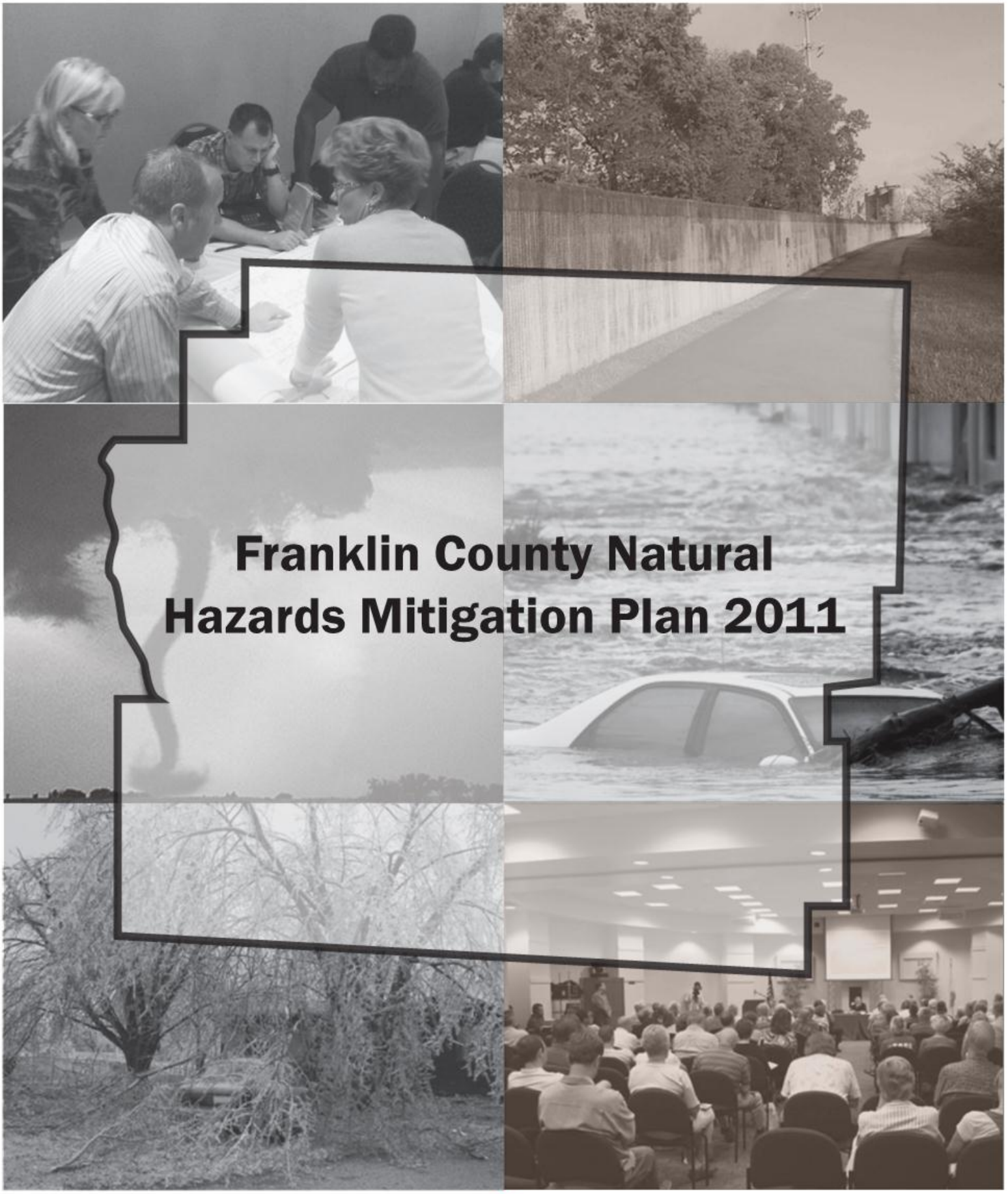

Franklin County Natural Hazards Mitigation Plan 2011

FRANKLIN COUNTY
Emergency Management and Homeland Security
OHIO
Michael R. Pannell, Director

Executive Summary

This plan serves as the official Franklin County Natural Hazards Mitigation Plan for Franklin County and all included jurisdictions. Mitigation planning efforts for Franklin County began in 2005 with the creation of the first Federal Emergency Management Agency approved plan for Franklin County. This 2012 version is the first official update to that plan.

Franklin County is at risk of damage due to flooding, heavy snow or ice, tornadoes, extreme heat, and other natural hazards. This plan provides a long-term approach to reducing the likelihood that a natural hazard will result in severe damage.

The Risk Assessment for Franklin County, which was created in 2010, and this Mitigation Plan represent the work of residents, business leaders, as well as elected and appointed government officials to develop a blueprint for protecting community assets, preserving the economic viability of the community, and saving lives. Endorsed by FEMA as being in compliance with regulations based on the Disaster Mitigation Act of 2000, the plan will help the County to implement mitigation projects so natural hazards do not result in a natural disasters.

The hazard mitigation planning process consisted of gathering and analyzing data available from various sources including the Risk Assessment for Franklin County. The data show that the hazards most likely to result in costly damages are flooding, tornadoes and high winds, and heavy snow and ice.

The plan recommends a number of public education efforts, continued support for flood mitigation buy-outs, and the examination and the potential modification of planning guidance and other development regulations to ensure the risk of damage to new structures is minimized. Many of these recommendations are highlighted in the Mitigation Action section of the plan.

By adopting this plan, Franklin County government, as well as the cities, villages and townships within commit to working with citizens and business owners to make Franklin County safer.

This project was made possible through a Federal Emergency Management Agency grant provided by the Hazard Mitigation Grant Program- Fiscal Year 2010. URS Corporation was contracted to update this plan utilizing this grant funding.

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1.0 *Introduction*

The Franklin County Natural Hazards Mitigation Plan was first developed and adopted for implementation by Franklin County, Ohio in 2007. This version serves as the 2012 update. This plan must be updated and adopted by all participating jurisdictions every 5 years.

Historical information shows that Franklin County is at risk of damage from a variety of natural hazards: flooding, severe winter weather, tornadoes, severe summer storms, drought, and invasive species. This plan explains a rigorous analysis of the potential effects of these natural hazards on the structures and infrastructure within Franklin County and proposes measures to reduce the risk of a natural hazard leading to a disaster including property loss, business disruption, or even loss of life.

Most recently Franklin County has experienced severe winter storms and severe summer storms, but history demonstrates that Franklin County is also susceptible to flooding and damage resulting from high winds or tornadoes. Documented Presidential Disaster Declarations for Franklin County confirm the County's susceptibility to multiple types of natural hazards as seen in Table 1 below. Although it is impossible to predict when these disasters may occur, planning and community cooperation make it possible to minimize the effects of natural disasters.

Table 1: Past Presidential Declarations of Major Disaster in Franklin County

Date	Hazard
March 1964	Heavy Rains and Flooding
June 1968	Heavy Rains and Flooding
April 1974	Tornadoes and High Winds
January 1978	Severe Blizzard
June 1989	Severe Storms and Flooding
June 1990	Severe Storms, Tornadoes, and Flooding
August 1992	Severe Storms, Tornadoes, and Flooding
June 1998	Flash Flooding, Flooding, High Winds, and Tornadoes
November 2002	Severe Storms and Tornadoes
March 2003	Ice/Snow Storm
August 2003	Severe Storms, Tornadoes, and Flooding
January 2004	Severe Storms and Landslides
January 2005	Snow Removal and Response
February 2005	Severe Winter Storms, Ice and Mudslides
September 2008	Wind

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This plan utilizes a number of different references to provide a thorough analysis of natural hazards in Franklin County. Real estate parcels located in floodplains and floodways were identified by the Franklin County Auditor, repetitive flood loss data in Franklin County was obtained from the Federal Emergency Management Agency (FEMA), and maps were created using the Franklin County Emergency Management & Homeland Security (FCEM&HS) Geographic Information System (GIS). Several regional development plans served as resources, as well as local jurisdiction floodplain management and zoning standard guidelines. Finally, historical information provided by the National Weather Service, Franklin County publications and local library research were included in the final document.

The *Risk Assessment for Franklin County* serves as the foundation for the hazard and risk data found in this plan. This document details the risks faced by Franklin County including detailed histories and impacts. Please see Attachment # 2 for a copy of this document.

1.1 Purpose of the Plan

As the cost of natural disasters continues to rise, FEMA has implemented programs to identify effective ways to reduce vulnerability from disasters. With FEMA grant assistance, Franklin County has been able to coordinate the creation of natural hazards mitigation plan to assist communities to reduce their risk from natural hazard events. This natural hazards mitigation plan is used to develop strategies for risk reduction and to serve as a guide for all mitigation activities throughout the County.

This plan includes a list of action items developed by the Local Mitigation Core Group to reduce risks from natural hazards through public education and outreach, new and enhanced partnerships and implementation of preventative activities.

Franklin County is a highly urbanized county with a population that exceeds one million people and consists of 15 cities, 9 villages and 17 townships. All Franklin County jurisdictions participated in the development of this plan and are considered throughout.

Although the plan does not establish development requirements, the background information and resources provided in the plan are useful in determining land use strategies in un-developed areas of incorporated and unincorporated parts of Franklin County. All mitigation efforts are local, and the primary responsibility for development and land use policies occurs at the local level.

Adoption of this plan ensures Franklin County and participating jurisdictions continue to remain eligible to apply for and receive Federal mitigation grant funds administered by the State of Ohio on behalf the Federal Emergency Management Agency (FEMA). This plan complies with the requirements set forth in the Disaster Mitigation Act of 2000 and its implementing regulations published in Title 44 of the Code of Federal Regulations (CFR) Section 201.6.

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1.2 Organization of the Plan

1.2.1 Action Plan Strategies

The initial development of the Franklin County Natural Hazards Mitigation Action Plan was in response to the passage of the Disaster Mitigation Act of 2000 (DMA2K). DMA2K is a federal effort to stem the losses from disasters, reduce future public and private expenditures, and to speed up response and recovery from disasters. The act establishes a requirement for local governments to prepare a Natural Hazards Mitigation Plan in order to be eligible for mitigation related funding from FEMA.

The Franklin County Natural Hazard Mitigation Plan was developed to serve as a blueprint for coordinating a countywide planning process that promotes participation from a wide variety of organizations, disciplines and representatives of the community, while complying with the DMA2K. The plan identifies the hazards that can occur in the county and our vulnerability to these events.

The plan includes countywide mitigation goals and strategies as well as local jurisdiction based projects. The next phase of mitigation planning will be to continue working with individual local jurisdictions on developing local mitigation strategies and activities, using the ODNR Structure Inventory to continually update the local risk assessments, and coordinate local mitigation strategies with the Franklin County Natural Hazards Mitigation Plan.

1.2.2 Original Plan Development

This plan was originally completed and adopted in 2007 using a countywide approach. Franklin County has 42 separate jurisdictions, made up of cities, villages, and townships and County government. In 1988 all jurisdictions in Franklin County entered into an agreement establishing a countywide emergency management agency as provided for in the Ohio Revised Code Section 5502.26. This agreement states: "…the Franklin County Emergency Management Agency, being hereby established, shall perform the service of coordinating the emergency management activities of Franklin County and the political subdivisions which enter into this agreement…" and …"the (individual jurisdiction name) desires to enter into this agreement with the Franklin County Board of Commissioners and the Chief Executives of the other political subdivisions within Franklin County.

All jurisdictions were invited to participate in plan development and the creation of the mitigation strategy. The original plan included all Franklin County jurisdictions with the exception of the City of Westerville, which was at the time a Project Impact Community. All participating jurisdictions were asked to adopt the plan and all did- including each township that participated. The Franklin County Natural Hazards Mitigation Plan is the result of a collaborative effort between Franklin County citizens, public agencies, the private sector and regional planning representatives.

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1.2.3 Update Development

Franklin County applied for and received Hazard Mitigation Grant Funding (FY2010) to prepare the FEMA required update of the Franklin County Natural Hazards Mitigation Plan. Work began on this plan update in March of 2011 with the first Core Group Meeting. During the March 2011 Core Group meeting it was decided that a new format would be utilized for greater clarity and organization of the overall Franklin County Natural Hazards Mitigation plan. The FEMA Mitigation Crosswalk was utilized throughout this planning process to ensure that all of the requirements were met. The plan is formatted in such a way that it follows the Crosswalk to make the State and Federal review process easier.

Since the creation of the original plan, the City of Whitehall received Pre-Disaster Mitigation Grant Funding to develop a strategy to evaluate flooding within the City of Whitehall. That document has been incorporated into this plan as **Addendum #3** and will be used by the City in conjunction with this plan to address and mitigate the repetitive flooding issue in the area.

The City of Westerville had a standalone mitigation plan created in 2007, but is included as part of the Franklin County Natural Hazards Mitigation Plan for this update. After this mitigation plan is approved, Westerville will adopt the plan and will be considered part of the Franklin County Natural Hazards Mitigation Plan. The City of Westerville's Hazards Mitigation Plan was used in the update process of this plan and was used in the coordination of Westerville's Action Items.

1.2.4 Implementation, Monitoring and Evaluation

The Plan Maintenance Section of this document details the process to keep the Franklin County Natural Hazards Mitigation Plan an active document. Plan revision will occur every five years and changes will be made as necessary. Franklin County Emergency Management & Homeland Security (FCEM&HS) will be tasked with overall plan maintenance, and will work with local government and regional planning agencies to incorporate mitigation strategies into future development plans, capital improvement budgets, and building code standards.

Plan Adoption

Westerville will be the only jurisdiction that will be adopting the Franklin County Natural Hazards Mitigation Plan for the first time. The Franklin County Board of Commissioners and participating jurisdictions will be responsible for re-adopting the Franklin County Natural Hazards Mitigation Plan upon FEMA approval. These governing bodies have the authority to advocate the plan, encourage and promote natural hazard planning, and implement building standards for hazard areas identified within their boundaries.

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Economic Analysis of Mitigation Projects

The Federal Emergency Management Agency's approach to natural hazard mitigation strategies typically involves a benefit/cost analysis. Conducting benefit/cost analysis for a mitigation activity can assist communities to determine whether a project is worth undertaking now to avoid disaster related costs later. Determining the economic feasibility of mitigation projects provides decision-makers with a basis upon which to compare alternative projects.

Public Involvement

FCEM&HS will be responsible for plan maintenance, distribution and public comments. FCEM&HS will continue to include public comments and suggestions into reviews and/or updates of the All Natural Hazards Mitigation Plan. This plan will be housed on the FCEM&HS website for download by the public at any time.

1.2.5 Evaluation of the Plan

Plan Outline

To make the plan easier to follow and to have a more comprehensive analysis of each hazard, this updated plan references the Franklin County 2010 Risk Assessment that was created by Franklin County Emergency Management and Homeland Security. This document is **Attachment #2** to this plan. The Risk Assessment provides a detailed analysis of each hazard facing Franklin County including history and impacts. It also includes a methodology for prioritizing the risks faced by each hazard. This mitigation plan explains all steps of the planning process for each hazard. By organizing the plan by hazards, the potential effect of the hazard, and the actions proposed for mitigating negative effects of that hazard are more obvious.

The sections of this plan are:

- **1.0 Introduction:** Identifies the purposes of this plan and the jurisdictions that have participated in plan development.
- **2.0 Planning Process:** Summarizes the original planning process as well as the process used to update this plan.
- **3.0 Community Profile:** Discusses existing conditions, including development trends and current local government capabilities.
- **4.0 Hazard Identification:** Identifies the natural hazards that may affect Franklin County.
- **5.0-11.0 Risk Assessment Sections for Each Identified Hazard:** Includes a summary of changes since the previous plan was adopted, a profile of each hazard, and an assessment of the potential impact of each hazard.

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- **12.0 Summary of Risk Assessment Findings:** Highlights the conclusions of the previous Risk Assessment Sections.
- **13.0 Mitigation Goals:** Presents planning principles, mitigation goals, and objectives.
- **14.0 Alternative Mitigation Actions:** Explains the status of actions proposed in the previous plan, presents a comprehensive array of possible actions, and explains how actions were evaluated.
- **15.0 Proposed Mitigation Actions:** Explains how actions address existing and future development and continued compliance with the National Flood Insurance Program (NFIP), how actions will be incorporated into other plans, and how actions will be implemented.
- **16.0 Plan Maintenance:** Explains how mitigation actions will be monitored and how the plan will be evaluated and updated.
- **Sources of Information and Acronyms:** Lists websites, publications, and acronyms used to develop this plan.
- **Appendices:** Include sample plan adoption resolutions, public notices about the planning process, and the survey instruments used by participating jurisdictions.
- **Attachments:** Includes a Map Book, the 2010 Risk Assessment, and the City of Whitehall's Mitigation Plan.

1.2.6 Jurisdictions Represented in the Plan

This is a multi-jurisdictional hazard mitigation plan. The jurisdictions that participated in the development of this plan are the same jurisdictions that participated in the development of the initial version of the plan and adopted it, with the exception of Westerville. The 15 cities, 9 villages and 17 townships of Franklin County are represented in this plan. No additional jurisdictions have participated in the development of this plan.

Along with the County government, the following municipalities in Franklin County participated in the mitigation planning process and will adopt this plan and authorize municipal government staff to carry out proposed actions:

Cities:

- Bexley
- Canal Winchester
- Columbus
- Dublin
- Gahanna
- Grandview Heights
- Grove City
- Groveport
- Hilliard
- New Albany
- Reynoldsburg
- Upper Arlington
- Westerville
- Whitehall
- Worthington

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Villages:

- Brice
- Harrisburg
- Lockbourne
- Marble Cliff
- Minerva Park
- Obetz
- Riverlea
- Urbancrest
- Valleyview

Townships:

- Blendon
- Brown
- Clinton
- Franklin
- Jackson
- Jefferson
- Hamilton
- Madison
- Mifflin
- Norwich
- Perry
- Plain
- Pleasant
- Prairie
- Sharon
- Truro
- Washington

1.2.7 Adoption Resolutions

Appendix I provides a sample adoption resolution that participating jurisdictions can use to adopt the mitigation plan after FEMA Region V determines that this plan is approvable pending adoption. An approvable plan meets planning requirements specified in 44 CFR Section 201.6. A plan is fully approved after it is adopted; signed adoption resolutions will be included in **Appendix I** when the plan is submitted for final approval by FEMA Region V.

1.2.8 Project Funding

This project was made possible through grant funding provided through the Hazard Mitigation Grant Program Fiscal Year 2010 and time commitments from members of the Natural Hazards Mitigation Plan Core Group and the staff of Franklin County Emergency Management & Homeland Security.

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2.0 Planning Process

2.1 Planning Process Update

This 2011 plan is an update of the Franklin County Natural Hazards Mitigation Plan that was developed and adopted for implementation by Franklin County, Ohio and participating jurisdictions within the County in 2007.

Both the initial plan and this updated **Franklin County Natural Hazards Mitigation Plan** represent the work of citizens, elected and appointed government officials, business leaders, and volunteers of non-profit organizations in developing a blueprint for protecting community assets, preserving the economic viability of the community, and saving lives.

2.2 Planning Process

2.2.1 Core Group

During 2011, the update of the plan was again led by a Core Group. Each organization from the original Core Group as well as other community leaders were invited in March 2011 by FCEM&HS to actively participate in updating the plan; those who accepted the invitation comprise the current Core Group members, listed further in this section. Meeting minutes, sign-in sheets, and invitations for Core Group meetings and all other meetings are located in **Appendix II**.

Core Group members for updating the plan in 2011 were:

- Michael Pannell- Franklin County Emergency Management & Homeland Security- New Member
- Jamie Stout- Franklin County Emergency Management & Homeland Security- New Member
- Jim Williams- City of Gahanna- New Member
- Terry Emery- City of Gahanna- New Member
- Tom Hirschy- City of Dublin- New Member
- Lynn Kelly- City of Columbus- Original Member
- John Carter- City of Columbus- New Member
- Mike. Foster- City of Columbus- New Member
- Tina Mohn- City of Columbus- New Member
- Mark Waite- Franklin County Engineer- New Member
- Zach Woodruff- City of Whitehall- New Member
- Rian Sallee- EMH&T- New Member
- Andy Taylor- Mid-Ohio Regional Planning Commission- New Member
- Dave Reutter- Franklin County Soil and Water Conservation District- New Member
- Matt Brown- Franklin County Economic Development and Planning Department- New Member
- Julie Reed- National Weather Service- Original Member
- Contingency Planners of Central Ohio- New Member

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To aid in the development of the plan, the County contracted the services of URS Corporation, a consulting firm with expertise in hazard mitigation planning.

Officials of Delaware, Licking, Fairfield, Pickaway, Madison, and Union counties were notified and invited to participate in the planning process. While none of these neighboring counties participated in plan development, each is aware of the planning effort. Franklin County has existing mutual aid agreements with each of these adjacent counties and works with representatives regularly. A letter was also sent to these counties on August 11, 2011 to notify them of the planning effort and invite participation and comment. The letter can be found in **Appendix II**.

As part of the update, the Core Group decided to re-organize the plan to make it simpler to follow. Another item that was addressed at this meeting included reviewing the 2010 Risk Assessment. The Core Group utilized the 2010 Risk Assessment to help prioritize the hazards addressed in this plan.

At the second Core Group meeting the group went through all of the short term and long term action items and made reference to the status of each one. Action items were approved to be prioritized based on the existing hazard ranking from the 2010 Risk Assessment. The consensus was that the action items would be prioritized based off the ranking of the hazards. Therefore, all the flooding action items would have the greatest priority since flooding is the highest ranking hazard. The group also discussed current land use trends within Franklin County.

2.2.2 2011 Jurisdictional Participation

During the process of updating the plan, each meeting of the Core Group was open to representatives of participating jurisdictions. Representatives were invited to attend the meetings in person or to send a liaison to address any comments or concerns they may have.

On March 10, 2011, representatives of each organization participated that participated in the previous Core Group, as well as any new organization that would be beneficial to the process were invited by e-mail and certified letter to join a Core Group meeting on April 7, 2011. The meeting included an overview of the Risk Assessment, an explanation of the hazard mitigation process, a description of the Core Group commitment requirements to the plan update, and the update process of the action items. During this meeting the group supported a change to the plan format to increase organization and improve clarity. Meeting minutes as well as a list of attendees for this meeting and all other Meetings are in **Appendix III**.

A meeting for the jurisdictions was held in the morning of May 25, 2011 at the FCEM&HS building. Representatives from each participating jurisdiction were invited by a FCEM&HS official by certified letter, e-mail and telephone to participate in this meetings; a copy of the e-mail invitation, sign-in sheet, and meeting minutes are included in **Appendix III**. The meeting started with an overview of the previous plan and past

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action items. Then the representatives joined in to a discussion on the mitigation action items that have been accomplished and emergency operations plans that have been developed in the past 4 years. FCEM&HS contacted jurisdictions not present at this meeting to ensure countywide participation. Jurisdictions were given the opportunity to update their previous action items and to develop new action items by emailing updates to FCEM&HS by June 24, 2011.

All jurisdictions participated in the planning process even though the majority were not present at the jurisdictional meeting. Jurisdictions participated by phone or email. The City of Westerville has been added to the plan during this update. One jurisdiction was removed from this plan, the Village of New Rome, which was dissolved since the creation of the plan.

2.2.3 2011 Public Involvement

A notice about updating the Franklin County Natural Hazards Mitigation Plan was posted on FCEM&HS's website throughout the planning process which is included in **Appendix IV**. Residents of Franklin County, volunteer watershed groups, and neighboring communities with an interest in the process were invited to contact the Franklin County Mitigation Officer and were invited to participate in the process through plan comment or attendance at meetings. An invitation to the public to review and comment on the draft plan was posted on the home page of Franklin County Emergency Management and Homeland Security's Website on 11/10/11 and remained online throughout the entire process. A screen shot of the Web page is displayed in **Appendix IV**.

FCEM&HS also issued a press release inviting review and comment on the plan on 11/10/11. The press release was sent to all media outlets and all local jurisdictions. A copy of the press release is displayed in **Appendix IV**.

After receiving and addressing public and workgroup comments, the draft of the updated plan was re-posted on the FCEM&HS website for final public comment. Once approved, the plan will be made available to the public in its final form.

Other Planning Mechanisms

During the process of updating the plan, the consultant coordinated with the Franklin County Economic Development and Planning Department and the Core Group by reviewing the existing planning mechanisms to ascertain community capabilities and identify opportunities for implementing mitigation actions. Documents consulted included existing municipal and county zoning and subdivision regulations and flood damage prevention ordinances; the existing comprehensive plans; county building code; and Flood Insurance Rate Maps, which were revised in 2008 during FEMA's Map Modernization Program.

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Gathering New Data

Gathering and analyzing new data about natural hazards and the community was critical to the process of updating the plan. New data used for the plan are identified throughout the plan; however, because flooding is both the most common and the most costly natural hazard that occurs in Franklin County, particular attention was provided to gathering new data about structures that have been damaged repeatedly by flooding.

The first step in the process of gathering data to fully understand the problem of repetitive flood losses was for FCEM&HS to request data about repetitive flood loss properties from the Federal Emergency Management Agency Region V. This data is made available to the local community by FEMA and includes previous flood insurance claim payments made for buildings and contents, the locations of the structures that policies cover, base flood elevations at those locations, as well as information about construction dates, number of floors, type of structure, and amount of money provided previously through insurance claims.

The second step in the process was to review the data provided by FEMA to reconcile any discrepancies between property addresses provided by FEMA and those found in the Franklin County Geographic Information Systems (GIS) information.

A third step was utilize a software developed by FEMA and the National Institute of Building Sciences (NIBS) call HAZUS. HAZUS is a program that is capable of simulating a designed scenario to identify the losses and potential risks associated with hazards on a regional scale.

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3.0 Community Profile

3.1 Planning for Natural Hazards in Franklin County

Natural hazards impact citizens, property, the environment and the economy of Franklin County. Franklin County is susceptible to flooding, high winds, tornadoes, severe winter storms, droughts, periods of intense heat, and earthquakes. Franklin County residents and businesses have been exposed to the economic, as well as the health and emotional costs, associated with natural disasters.

Franklin County continues to experience growth in development, housing and population. The population of Franklin County currently exceeds 1 million people. The inevitability of natural hazards, and the growing population and activity within the county create an urgent need to develop strategies, coordinate resources and increase public awareness to reduce risk and prevent loss from future natural hazard events. Developing strategies to reduce the impact of a hazard event can assist in protecting life and property of citizens and businesses.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance. Discounts on premiums may range from 5% to 45% based on the actions taken in each community. CRS provides credit for adopting, implementing, evaluating and updating a comprehensive floodplain management plan. Currently, only the Village of Obetz in Franklin County is identified as a CRS participating community.

3.2 Historical Hazard Events

Franklin County is susceptible to a variety of natural hazards. The worst flood in Franklin County history occurred in March 1913. A levee break flooded the near west side (Franklinton area) resulting in the flooding of more than 4,000 homes and 95 people lost their lives. In January 1959, high water from heavy rains on frozen ground caused another levee break and flooding on the west and east side of Columbus. Between 1964 and 2011, nine presidential disaster declarations have been declared in Ohio for flooding, high wind damage, tornadoes and severe winter weather.

The late spring and early summer is when Franklin County traditionally experiences high wind and tornado activity. Two deaths have been recorded from tornadoes in Franklin County since 1916. Since 1950, more accurate information regarding injuries to citizens and damage to property has been recorded. Seven injuries were reported from a tornado in Franklin County on February 22, 1971, and nine injuries reported from tornadoes occurring in May 1973.

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In January 1978, Franklin County experienced record cold and snowfall totaling more than 34 inches. The blizzard of 1978 began as rain and changed over to snow, resulting in more than 10 inches of snow. Wind gusts up to 69 MPH contributed to significant blowing and drifting of snow across much of the county. January 1978 holds the monthly snowfall record in Franklin County at 34.4 inches. The coldest winter season (December through February) occurred in 1976/1977, with an average temperature of 20.9 degrees. Prior to 1978, Franklin County had not experienced this level of snowfall since 1910. [2]

Franklin County is predominantly urban, encompasses 543 square miles and consists of 42 jurisdictions. A map of the Franklin County shows the cities, villages and townships in Figure 1. Delaware, Licking, Fairfield, Pickaway, Madison and Union Counties form the border of Franklin County.

Additional information about historical events can be found in the 2010 Risk Assessment, **Attachment #2**.

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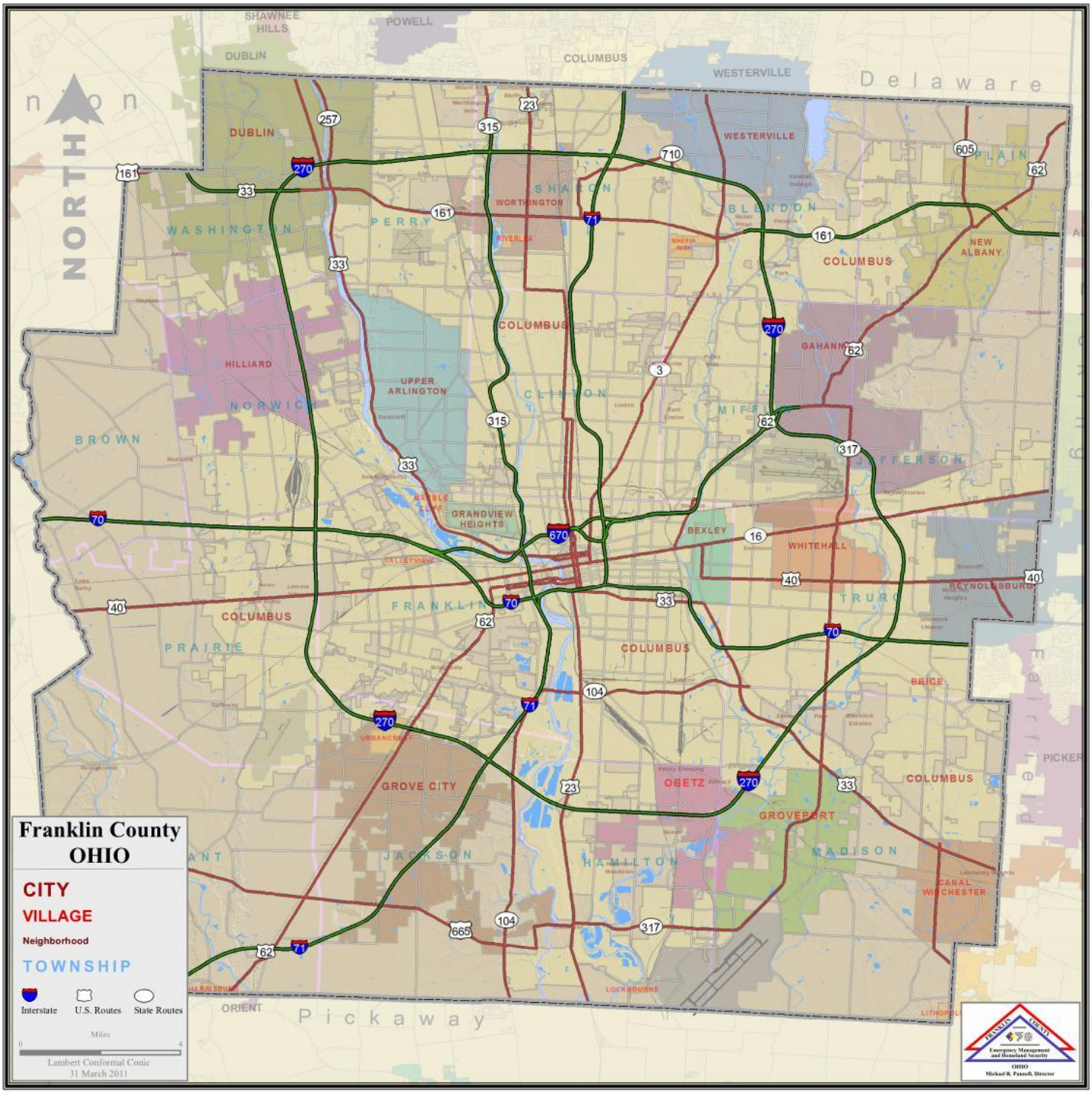

Figure 1: Franklin County Map

3.3 Demographics and Population

Franklin County is a predominantly urban area, consisting of 15 cities, 9 villages and 17 townships. Central Ohio continues to experience steady development, as well as shifts in the distribution of population and jobs in the region. Historically, most growth in central Ohio has occurred in a radial pattern, with population moving outward from the central city, to the inner suburbs and then to outer suburban areas. Between 2000 and 2009 Delaware County, just north of Franklin County, grew by 54.1%, the fastest growth rate of any county in Ohio.

Based on U.S. Census figures, Franklin County has experienced steady population growth and can expect continued development and population growth. After the 1990 and 2000 U.S. Census, Franklin County's population totaled 961,437 and 1,068,978, respectively. Based on 2010 U.S. Census figures, the county's population surpassed 1,163,414, an 8.1 percent increase. This growth rate is comparable to the 10 percent growth between 1990 and 2000. Other notable information related to population in Franklin County is the fact that the age group from 20-24 years is the largest. The large number of residents in this category can most likely be attributed to the presence of The Ohio State University. The county also continues to experience an increase in the number of residents aged 62 or older. In terms of race and culture, Franklin County is experiencing steady increases in population from all minority groups, most notably the Hispanic and Somalian communities.

Populations listed below, in Table 2-4, are based on 1990, 2000, and 2010 U.S. Census figures and are broken down into cities, villages and townships located in Franklin County:

Table 2: Cities

CITY	1990 POPULATION	2000 POPULATION	2010 POPULATION	% CHANGE 2000-2010
Bexley	13,088	13,203	13,057	-1.1%
Canal Winchester	2,617	4,478	7,101	58.6%
Columbus	632,270	711,470	787,033	10.6%
Dublin	16,366	31,392	41,751	33.0%
Gahanna	27,791	32,636	33,248	1.9%
Grandview Hts.	7,010	6,695	6,536	-2.4%
Grove City	19,661	27,075	35,575	31.4%

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CITY	1990 POPULATION	2000 POPULATION	2010 POPULATION	% CHANGE 2000-2010
Groveport	2,948	3,865	5,348	38.37%
Hilliard	11,796	24,230	28,435	17.4%
New Albany	1,621	3,711	7,724	108.1%
Reynoldsburg	25,748	32,069	35,893	11.9%
Upper Arlington	34,128	33,686	33,771	0.3%
Westerville	29,092	35,318	36,120	2.3%
Whitehall	20,572	19,201	18,062	-5.9%
Worthington	14,869	14,125	13,575	-3.9%

More than 90% of the population of Franklin County lives in an incorporated area, leaving the other 10% of the population in unincorporated areas. Population in incorporated areas is occurring at a much greater rate than in unincorporated areas. Densely populated housing developments created on land that was previously used for agricultural purposes have appeared in most areas of Franklin County. Many of these developments are located in flat, low-lying areas.

Table 3: Villages

VILLAGE	1990 POPULATION	2000 POPULATION	2010 POPULATION	% CHANGE 2000-2010
Brice	109	70	114	62.9%
Harrisburg	340	332	320	-3.6%
Lockbourne	173	280	237	-15.3%
Marble Cliff	633	646	573	-11.3%
Minerva Park	1,463	1,288	1,272	-1.1%
New Rome	111	60	Dissolved	
Obetz	3,167	3,977	4,532	14.1%
Riverlea	503	499	483	-3.21%
Urbancrest	862	868	960	10.6%
Valleyview	604	601	620	3.2%

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Table 4: Townships

TOWNSHIP	1990 POPULATION	2000 POPULATION	2010 POPULATION	% CHANGE 2000-2010
Blendon	11,194	9,193	9,069	-11.3%
Brown	1,825	2,031	2,293	12.9%
Clinton	4,579	4,294	4,109	-4.5%
Franklin	14,757	11,798	10,271	-12.9%
Jackson	25,265	32,625	40,608	24.5%
Jefferson	3,983	5,322	10,972	106.2%
Hamilton	9,746	7,950	8,260	3.9%
Madison	18,749	21,243	23,509	10.7%
Mifflin	28,449	35,787	35,710	-0.2%
Norwich	15,960	27,488	31,807	15.7%
Perry	5,933	4,087	3,637	-11.0%
Plain	4,366	5,926	9,829	65.9%
Pleasant	6,678	7,030	6,671	-5.1%
Prairie	16,945	17,118	16,498	-3.6%
Sharon	17,493	16,455	15,969	-3.0%
Truro	26,265	27,151	26,837	-11.2%
Washington	13,090	1,412	1,549	9.7%

The Township population figures above may not reflect the population living only within the unincorporated areas of the township. Population projections for Franklin County are not available at the time of this update due to the newly released census data.

3.4 Land Use and Development Trends

The purpose of including an analysis of land use and development trends in this mitigation plan is to identify the potential for future structures to be at risk of damage due to natural hazards.

3.4.1 Land and Development

Incorporated areas of Franklin County are subject to planning and zoning requirements set forth in local ordinance and are enforced at the local level. Unincorporated areas are subject to zoning regulations adopted by the Franklin County Board of Commissioners or local townships, and are enforced by the Franklin County Economic Development and Planning Department or township zoning officials.

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Most of the new development in central Ohio is occurring near or outside of the I-270 outer-belt. Despite significant development in the downtown area, rapid suburban development has reduced the central city's "market share" of regional population and jobs. In addition, the "inner ring" suburbs (Upper Arlington, Bexley, Whitehall and Grandview Heights) are losing their market share of non-residential tax base to new development in the newer city and suburban county. An analysis of the population statistics in Table 2 reflects an enormous amount of growth during the last 10 years in younger municipalities in Franklin County, most notably the Cities of New Albany, Dublin and Grove City. With the exception of the City of Columbus, most of the older, land-locked municipalities have experienced little to no growth.

This trend is also reflected in the population of unincorporated township areas of Franklin County in Table 4. Although significant growth has occurred in many of the unincorporated townships, the decrease of population in these areas results from annexation of the unincorporated areas to a municipality. An example of this is reflected in the 89% decrease in population of Washington Township between 1990 and 2000. Large portions of Washington Township were annexed to the City of Dublin during this 10 year period. Significant housing development and construction in the City of Dublin during this period contributed to a 40% increase in its population. More information on annexation can be found in the next section.

3.4.2 Community Development & Annexation

The stable, yet diverse economy of Franklin County has contributed to the strong business and residential growth it has experienced over the past decade. As home to Ohio's Capital, government employment accounts for approximately 16% of the workforce in Franklin County. The stability of the local economy combined with low interest rates has contributed to a strong real estate market.

The average sales price of a residential home in Franklin County during 2008 was $153,700. This figure has decreased over the past five years with residential properties showing a 3% decrease over that time. There are currently more than 388,994 real estate parcels in Franklin County and more than 4,500 manufactured homes. According to the Franklin County Auditor, the 2008 assessed value of residential real estate in Franklin County totals $54.7 billion. Commercial and industrial properties were values at $19.1 billion and $4.04 billion, respectively, for a total assessed value of $77.84 billion.

The Franklin County Economic Development and Planning Department serves as a representative of the Board of Commissioners on community and economic development issues. This office coordinates Housing and Urban Development (HUD) and Community Development Block Grants (CDBG) for the county to assist with home buyer counseling and down payment assistance. The office also focuses on strengthening business/industry growth in Franklin County by establishing community reinvestment areas and the use of incentives such as tax abatements for expanding businesses. Nearly every municipality located in Franklin County employs a community and economic development official, dedicated to focusing on the growth of their community. Ohio's home-rule statute has

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contributed to many municipalities' ability to plan and prepare for growth in their community.

Annexation has had a significant impact on development in Franklin County. The City of Columbus has expanded into developing areas that are more typically in suburban areas. In 1950, Columbus covered 39.9 square miles. By 2007, the city exceeds 213 square miles. During the period covering 1992-98, the City of Columbus acquired 48% of the 22,103 acres annexed in Franklin County. The Village of New Albany annexed 20%; Grove City annexed 10%; and Hilliard annexed 5% of all land annexed in the county during this period.

The City of Columbus also has a very strong historic preservation community. There are currently 19 historic districts, and 34 individual properties listed on the Columbus Register of Historic Places which are overseen by the Historic Resources Commission. The four primary historic districts formally recognized by City Council include the Brewery District, German Village, Italian Village and Victorian Village.

3.4.3 New Development

Active development has occurred in newer areas of the City of Columbus. During the period of 1993 to 1998, more than half of all new single-family housing units in Franklin County were located within the newer city. Comparatively, only 4% were for homes located in the older city of Columbus. Multi-family housing development continues to be concentrated in the newer city. Much of this development has been located near other newer city development, including Tuttle Mall, Mill Run and Easton.

Mid-Ohio Regional Planning Commission (MORPC) has prepared development forecasts for the Columbus urbanized area. MORPC projects the majority of growth in retail and office development will occur in the northern tier of the region, while new industrial warehouse and distribution centers will be located in the southern half of the county. Although the recent economic slowdown has caused most new development to slow or completely halt, it has been projected that the southeast portion of the county is expected to be one of the fastest growing residential areas in the future, because residential development is occurring at greater densities than in the higher cost northwest and northeast areas.

Although the recession has played a big part in slowing development over the past years in Franklin County, the new casino slated for construction on the west side of the County is expected to encourage further development in that area. Construction on the $400 million casino has already begun and is expected to finish by the end of 2012. The casino alone is expecting to create 2,000 jobs.

3.4.4 Franklin County Greenways Plan

The Franklin County Greenways Plan provides a comprehensive view of river and stream management, focusing on ecological, environmental and conservation interests.

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However, several recommendations made in the Greenways Plan are consistent with the goals and objectives established in the Franklin County Natural Hazards Mitigation Plan.

Recommendations from the Franklin County Greenways Plan that are consistent with the objectives of this plan include:

- A more consistent, regional approach to river related development including subdivision, stormwater management, erosion, and sediment control regulations.
- Encourage countywide participation in the Community Rating System (CRS) of the National Flood Insurance Program (NFIP). Currently, only the Village of Obetz participates in the Community Rating System.
- Implementation of a regulatory floodplain for Franklin County.
- Lower tax rates for floodplain properties to encourage owners to leave the floodplain in a natural state.

3.5 Capability Assessment

The purpose of the Capability Assessment is to identify strengths and weaknesses that will affect the ability of the County and participating jurisdictions to implement mitigation actions. Capabilities include a variety of regulations, existing planning mechanisms, and administrative capabilities provided through established agencies or authorities.

3.5.1 Regulatory Capabilities

A **zoning ordinance** specifies the types of development that can occur in particular locations. The Franklin County Zoning Resolution applies to unincorporated land in Blendon, Brown, Clinton, Franklin, Hamilton, Madison, Mifflin, Norwich, Pleasant, Sharon and Truro Townships. The remaining 6 townships all have adopted township zoning: Jackson, Jefferson, Perry, Plain, Prairie and Washington Townships. S**ubdivision regulations** further specify how land can be divided. Franklin County and all 16 cities have adopted Subdivision Regulations. The Franklin County Subdivision Regulations apply to unincorporated land in all townships.

The Franklin County Special Resolution NFIP Regulation applies to unincorporated land in all townships. Most of the municipalities in Franklin County participate in the NFIP and have adopted a **floodplain management ordinances** to regulate development in the floodplain. Greater detail of the participating communities and regulatory compliances are located in the flooding section, Section 5.0.

Stormwater management regulations provide for the conveyance of stormwater to decrease flooding. Stormwater Management requirements are covered in the Franklin County Subdivision Regulations, Franklin County Zoning Resolution, the township zoning resolutions, and the Franklin County Stormwater Drainage Maual. Stormwater

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regulations can vary from jurisdiction to jurisdiction, however most have adopted some form of stormwater regulation.

Adoption and enforcement of **building codes** ensure that both residential and commercial structures are safe. Every municipality in Franklin County has adopted the 2009 International Code Council (ICC) Family of Model Codes including the 2009 International Residential Code (IRC).

A local **historic district ordinance** enables a community to regulate development in a specific, designated area of historic significance.

Table 5 identifies planning mechanisms for Franklin County and summarizes the regulatory tools used in Franklin County and participating jurisdictions. These regulations support the goals of this hazards mitigation plan and provide opportunities for further mitigating the potentially negative effects of natural hazards through regulation.

Table 5: Regulatory Capabilities

Jurisdiction	Zoning Ordinances	Subdivision Regulations	Floodplain Management Regulations	Stormwater Management Regulations	Building Codes	Historic Preservation Ordinance
Bexley City	✓	✓	✓	✓	✓	✓
Canal Winchester City	✓	✓	✓		✓	
Columbus City	✓	✓	✓	✓	✓	✓
Dublin City	✓	✓	✓	✓	✓	✓
Gahanna City	✓	✓	✓	✓	✓	
Grandview Heights City	✓	✓	✓	✓	✓	✓
Grove City	✓	✓	✓	✓	✓	
Groveport City	✓	✓	✓	✓	✓	
Hilliard City	✓	✓	✓	✓	✓	
New Albany City	✓	✓	✓	✓	✓	✓
Reynoldsburg City	✓	✓	✓	✓	✓	✓
Upper Arlington City	✓	✓	✓	✓	✓	✓
Westerville City	✓	✓	✓	✓	✓	✓
Whitehall City	✓	✓	✓	✓	✓	✓
Worthington City	✓	✓	✓	✓	✓	✓
Brice Village			✓		✓	

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Jurisdiction	Zoning Ordinances	Subdivision Regulations	Floodplain Management Regulations	Stormwater Management Regulations	Building Codes	Historic Preservation Ordinance
Harrisburg Village	☐	☐	✓	☐	✓	✓
Lockbourne Village	☐	☐	✓	☐	✓	☐
Marble Cliff Village	☐	☐	✓	☐	✓	☐
Minerva Park Village	☐	☐	✓	☐	✓	☐
Obetz Village	☐	☐	✓	☐	✓	☐
Riverlea Village	☐	☐	✓	✓	✓	✓
Urbancrest Village	☐	☐	✓	✓	✓	✓
Valleyview Village	☐	☐	✓	✓	✓	✓
Blendon Twp	✓	✓	✓	✓	✓	☐
Brown Twp	✓	✓	✓	✓	✓	☐
Clinton Twp	✓	✓	✓	✓	✓	☐
Franklin Twp	✓	✓	✓	✓	✓	☐
Hamilton Twp	✓	✓	✓	✓	✓	☐
Jackson Twp	✓	✓	✓	☐	✓	☐
Jefferson Twp	✓	✓	✓	☐	✓	☐
Madison Twp	✓	✓	✓	✓	✓	☐
Mifflin Twp	✓	✓	✓	✓	✓	☐
Norwich Twp	✓	✓	✓	✓	✓	☐
Perry Twp	✓	✓	✓	✓	✓	☐
Plain Twp	✓	✓	✓	✓	✓	☐
Pleasant Twp	✓	✓	✓	✓	✓	☐
Prairie Twp	✓	✓	✓	☐	✓	☐
Sharon Twp	✓	✓	✓	✓	✓	☐
Truro Twp	✓	✓	✓	✓	✓	☐
Washington Twp	✓	✓	✓	✓	✓	☐

3.5.2 Critical, Facilities & Infrastructure

Critical Facilities are defined as locations necessary to coordinate response activities. These include emergency operations centers, 911 communication centers, police and fire stations, public works facilities, sewer and water plants, and hospitals. These are facilities that, if damaged, could cause serious secondary impacts.

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Infrastructure generally refers to services necessary to respond to and recover from the hazard such as power lines, gas lines, bridges, highways, roads, railroads and airports.

A list of the number and types of critical infrastructure is shown in Table 6. The locations of many critical facilities and infrastructure are considered protected information under state law so they are listed below in general terms.

Table 6: Critical Facilities or Infrastructure

Type of Infrastructure	Number of Facilities
Hospitals	11
Fire Stations	71
Police Stations	50
Red Cross Shelters	243
Dialysis Centers	24
Nursing Home	58
Assisted Living Facilities	37
Independent Senior Living Facilities	135
Schools	461
Government Buildings	97
Correctional Facilities	11
Water Treatment Plants	11
Waste Water Treatment Plants	11
Class I Dams	5
Electrical Substations	81
Fuel Terminals	13

A map book has been developed to identify critical facilities and some infrastructure within Franklin County and can be found as **Attachment #1** to this plan. These maps within the book are broken down into 42 sections for ease of use when making critical decisions and conducting planning before or after a hazard occurs. It also allows the user to view each section in greater detail.

There are currently 11 hospitals within Franklin County. It is important to note that Mt. Carmel West was originally located in the 100 year floodplain. However, with the completion of the Franklinton Floodwall, the hospital is no longer located in the floodplain.

3.5.3 Planning Capabilities

A variety of planning mechanisms are used in Franklin County and participating jurisdictions. Other plans can support the goals of this hazards mitigation plan and provide opportunities for integrating actions that will mitigate the potentially negative effects of natural hazards with actions designed to achieve other goals. The Mitigation

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Core Group, which has many representatives involved in the planning mechanisms denoted in this plan, suggested a process for incorporating mitigation alternatives and strategies into other existing planning efforts. The process includes coordination between the agencies involved in the developing the planning mechanisms for Franklin County and the participating jurisdictions. As part of their continued commitment to be on the Mitigation Core Group, each member will evaluate the mitigation alternatives, short and long term and the jurisdictional alternatives to potentially add to their existing plans. Many of the plans already denote the Franklin County Mitigation Plan as reference for the County and jurisdictions. As part of the Mitigation Plan monitoring and evaluation efforts the Mitigation Core Group will then validate the incorporation of key mitigation alternatives into the planning mechanisms during the Mitigation Plan updating process.

The **Columbus Comprehensive Plan** was completed and adopted in 1993. A comprehensive plan is a policy document identifying community goals and objectives for future growth and development. The Plan is intended to serve as a guide with which to protect and enhance the quality of life in Columbus. It accomplishes this by fostering orderly, manageable, and cost-effective growth and establishing a framework for future land use decisions.

FCEM&HS was established according to Ohio Revised Code (ORC) Section 5502.26 governing countywide emergency management. The countywide agreement between all 42 jurisdictions in Franklin County establishing FCEM&HS as the emergency management agency for the entire county was signed in 1988 and is on file at the offices of FCEM&HS. This **Franklin County Emergency Operations Plan (EOP)** serves as the legally required all hazards emergency operations plan for all 42 jurisdictions within Franklin County and is produced by FCEM&HS. The Franklin County EOP addresses Franklin County's planned response to extraordinary emergency situations associated with all hazards such as natural disasters, technological emergencies and acts of civil hostility. When confronted with a minor emergency, local agencies routinely carry out their responsibilities independent of other agencies or with pre-existing mutual aid agreements. However, large-scale emergencies and disasters often create situations requiring planned, coordinated responses by multiple agencies and jurisdictions. Such disasters and emergencies pose major threats to life and property and have long-term economic, political, and/or environmental implications.

Emergency Action Plans have been prepared according to state law for high hazard dams located in Franklin County as well as those for which the inundation area includes parts of Franklin County. Each Emergency Action Plan addresses ways to safeguard lives and reduce property damage within the inundation area; procedures for effective dam surveillance; procedures for prompt notification of emergency management officials; warning and evacuation procedures; and emergency response actions that will be taken in the event of potential or imminent failure of the dam. Plans have been prepared, reviewed by Franklin County officials, and are on file at the FCEM&HS Office for the following dams:

- Hoover Dam- operated by the City of Columbus
- O'Shaughnessy Dam- operated by the City of Columbus

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- Griggs Dam- operated by the City of Columbus
- Delaware Dam- operated by the Army Corps of Engineers
- Alum Creek Dam- operated by the Army Corps of Engineers

Franklin County and the City of Columbus address regional planning concerns by participating in planning activities with the Mid-Ohio Regional Planning Commission (MORPC). The City of Columbus has 52 comprehensive area plans addressing land use issues within the City. (Shown below) Many other Franklin County jurisdictions have similar plans in place.

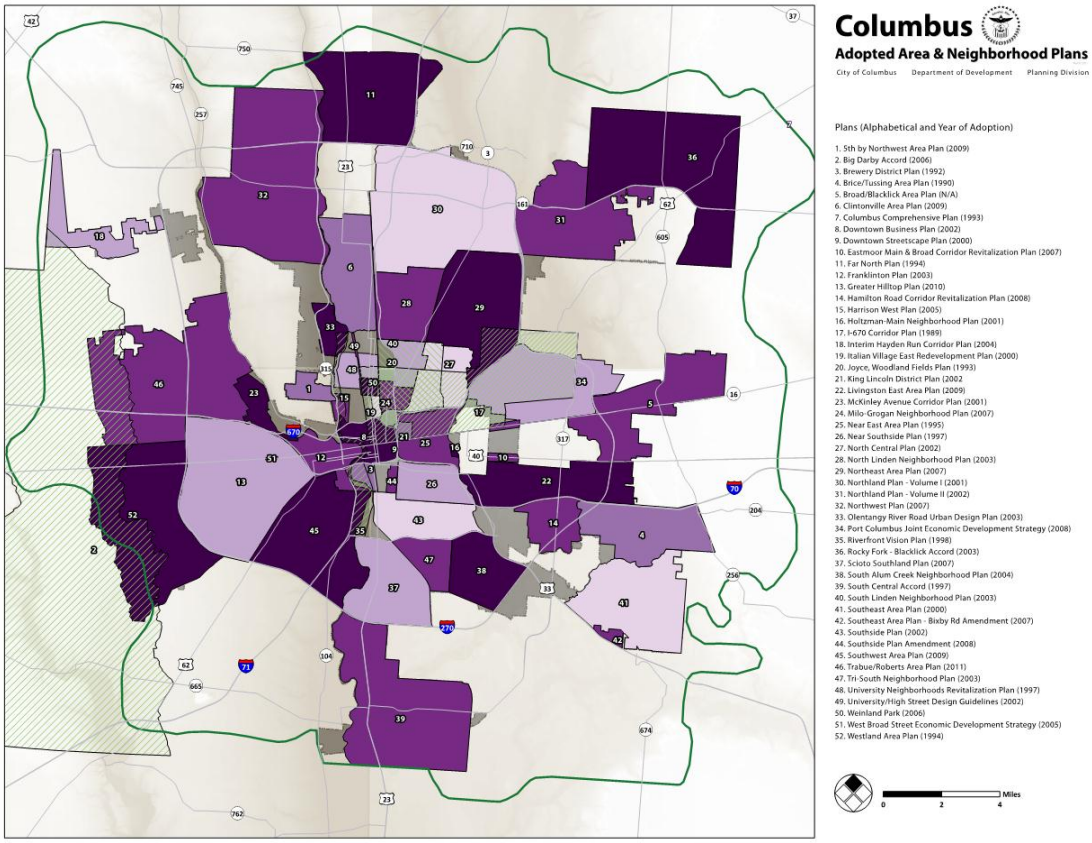

Figure 2: Comprehensive Plans Map

1. 5th by Northwest Area Plan (2009)
2. Big Darby Accord (2006)
3. Brewery District Plan (1992)
4. Brice/Tussing Area Plan (1990)
5. Broad/Blacklick Area Plan (N/A)
6. Clintonville Area Plan (2009)
7. Columbus Comprehensive Plan (1993)
8. Downtown Business Plan (2002)
9. Downtown Streetscape Plan (2000)
10. Eastmoor Main & Broad Corridor Revitalization Plan (2007)
11. Far North Plan (1994)
12. Franklinton Plan (2003)
13. Greater Hilltop Plan (2010)
14. Hamilton Road Corridor Revitalization Plan (2008)
15. Harrison West Plan (2005)
16. Holtzman-Main Neighborhood Plan (2001)
17. I-670 Corridor Plan (1989)
18. Interim Hayden Run Corridor Plan (2004)
19. Italian Village East Redevelopment Plan (2000)
20. Joyce, Woodland Fields Plan (1993)
21. King Lincoln District Plan (2002
22. Livingston East Area Plan (2009)
23. McKinley Avenue Corridor Plan (2001)
24. Milo-Grogan Neighborhood Plan (2007)
25. Near East Area Plan (1995)
26. Near Southside Plan (1997)
27. North Central Plan (2002)
28. North Linden Neighborhood Plan (2003)
29. Northeast Area Plan (2007)
30. Northland Plan - Volume I (2001)
31. Northland Plan - Volume II (2002)
32. Northwest Plan (2007)
33. Olentangy River Road Urban Design Plan (2003)
34. Port Columbus Joint Economic Development Strategy (2008)
35. Riverfront Vision Plan (1998)
36. Rocky Fork - Blacklick Accord (2003)

37. Scioto Southland Plan (2007)
38. South Alum Creek Neighborhood Plan (2004)
39. South Central Accord (1997)
40. South Linden Neighborhood Plan (2003)
41. Southeast Area Plan (2000)
42. Southeast Area Plan - Bixby Rd Amendment (2007)
43. Southside Plans
44. Southside Plan Amendment (2008)
45. Southwest Area Plan (2009)
46. Trabue/Roberts Area Plan (2011)
47. Tri-South Neighborhood Plan (2003)
48. University Neighborhoods Revitalization Plan (1997)
49. University/High Street Design Guidelines (2002)
50. Weinland Park (2006)
51. West Broad Street Economic Development Strategy (2005)
52. Westland Area Plan (1994)Plan (2002)

The Franklin County Natural Hazards Mitigation Plan identifies the potential impacts of natural hazards in Franklin County and makes recommendations that can be included in existing and future programs. Upon adoption of the Mitigation Plan, FCEM&HS will continue to work with local municipalities to incorporate natural hazard mitigation goals and actions into their local planning objectives.

3.5.4 FCEM&HS Mission and Vision

Mission- Franklin County Emergency Management & Homeland Security coordinates and prepares for county-wide all-hazards disaster planning, community education, warning, training, grant funding, response, and recovery efforts in order to prepare and protect the citizens of Franklin County before, during, and after natural and man-made disasters.

Vision- To establish Franklin County Emergency Management & Homeland Security as the center of excellence and influence for Emergency Management and Homeland Security programs and requirements within Franklin County.

3.5.5 Emergency Response Functions

FCEM&HS serves as the emergency management agency for all 42 jurisdictions in Franklin County and focuses on the following core competencies: warning systems, emergency operations center, resources, recovery, planning, training, exercises, citizen preparedness, and grants.

3.5.6 Weather Forecasting

The Wilmington, Ohio office of the National Weather Service provides weather watches and warnings for Franklin County in conjunction with the Storm Prediction Center in Norman, Oklahoma. When considering severe summer storms, the most common advisories relate to severe thunderstorm watches and warnings, and high wind warnings and advisories. Tornado and flood related advisories are also common. When the National Weather Service issues a tornado warning the Franklin County outdoor warning sirens are immediately sounded countywide. Others means of notification of severe weather within Franklin County include broadcast radio, local television stations, and NOAA weather radios. The National Weather Service defines a WARNING as an event that alone poses a significant threat to public safety and/or property, probability of occurrence and location is high, and the onset time is relatively short. A WATCH meets the classification of a warning, but either the onset time, probability of occurrence, or location is uncertain.

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4.0 *Hazard Identification*

4.1 Hazard Identification Update

Only natural hazards are identified and examined in this plan update as required by the Disaster Mitigation Act of 2000. See the Franklin County 2010 Risk Assessment, **Attachment #2**, for all of the hazards specific information and history of each hazard within the county.

Table 7 compares the six hazards identified for the initial plan and the seven natural hazards identified and analyzed in this update.

Table 7: Identified Hazards

Hazards Identified for 2007 Plan	Hazards Identified for the 2011 Plan
Flooding	Flooding
Winter Storms	Severe Winter Weather
Tornadoes	Tornadoes
Thunderstorms	Severe Summer Weather
Drought	Drought
----	Invasive Species
Earthquake	Earthquake

The whole hazard assessment portion of this plan works in conjunction with the 2010 Risk Assessment. See **Attachment #2** for an in-depth look at each hazard.

4.2 Identifying Hazards

To reduce the potential for damage due to hazards, it is necessary to identify hazards that may affect the County. This process was completed during the update of the Franklin County 2010 Risk Assessment. The methodology used to identify and rank the hazards faced in Franklin County can be found in the 2010 Risk Assessment, **Attachment #2**. Hazard identification investigates, identifies and documents potential hazards, and examines their causes and impact chains, which can vary in length. The severity of impact is further influenced by vulnerability factors (water catchment areas, steep slopes) and whether there are elements present which are vulnerable to the hazard, e.g., structures in low lying areas.

Knowledge of the types of hazards that may impact an area is essential for analyzing and assessing risks. Hazards require different levels of risk assessment depending on the extent of the impact they can have on the community. A hazard that is unlikely to happen (and if it does, causes very little damage) will not require the same level of assessment as one that happens frequently and causes severe damage.

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Steps in Hazard Identification

1. Identification and classification of hazards.
2. Determination of appropriate risk analysis level, based on potential impact and data available.
3. Identification and characterization of hazard-prone locations.
4. Estimation of the probability of occurrence.
5. Estimation of possible magnitude.

Hazard identification describes and assesses the frequency of occurrence, at a specific place, at a specific time, and with a specific intensity and duration, for a vulnerable population, property, economy and environment.

Countywide hazards, which include Severe Winter Weather, Tornadoes, Severe Summer Weather, Drought, Invasive Species, and Earthquakes, include all participating jurisdictions of this plan.

Flooding

Flooding happens during heavy rains, when rivers overflow, when snow melts too fast or when dams or levees break or overtop. The National Flood Insurance Program defines flooding as a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area, or of two or more properties. Three fourths of all presidential disaster declarations nationally are associated with flooding. During the 20th century, floods were the No. 1 natural disaster in the United States in terms of lives lost and property damage. Floods have caused the deaths of more than 10,000 people since 1900. Floods can roll boulders the size of cars, tear out trees and destroy buildings and bridges.

Severe Winter Weather

A winter storm is an event in which the dominant varieties of precipitation are forms that only occur at cold temperatures. Every year, winter weather indirectly and deceptively kills hundreds of people in the U.S., primarily from automobile accidents, overexertion and exposure. Winter storms are often accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, drifting snow, extreme-cold temperatures and dangerous wind chill. Heavy accumulations of ice can bring down trees and power lines, disabling electric power and communications for days or weeks. Heavy snow can immobilize a region and paralyze a city. Storms near the coast can cause coastal flooding and beach erosion. The economic impact of winter weather each year is huge, with costs for snow removal, damage and loss of business in the millions.

Tornadoes

According to the *Glossary of Meteorology* (AMS 2000), a tornado is "a violently rotating column of air, pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud." A funnel cloud rotates but has no

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ground contact or debris and creates no damage. A funnel cloud is not associated with strong winds at the surface. Tornadoes often begin as funnel clouds with no associated strong surface winds; however, not all of these funnel clouds evolve into a tornado. Most tornadoes produce strong winds at the surface while the visible funnel is still above ground, so it is difficult to discern the difference between a funnel cloud and a tornado from a distance.

Severe Summer Weather

Severe summer weather is classified as thunderstorms, hail, lightning and damaging wind. Each of these hazards has its own severity measure and often all four occur in one storm system, causing much more damage than each would have alone.

Thunderstorms can occur at any time of the year and just about anywhere in the world. A thunderstorm forms when moist, unstable air is lifted vertically into the atmosphere. Lightning occurs in all thunderstorms. It is estimated that lightning hits the Earth 100 times each second.

The rotating winds of tornadoes usually come to mind when thinking of the worst storm damage. However, high winds can cause damage whether they are rotating not . In fact, straight-line winds are responsible for most thunderstorm wind damage and can exceed 100 mph.

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere, where they freeze into ice. Hail forms only in thunderstorms, in cumulonimbus clouds that contain vast amounts of energy in the form of updrafts and downdrafts.

Drought

Drought is defined as a prolonged period of abnormally dry weather, where the lack of sufficient precipitation causes a serious hydrologic imbalance with economic and/or social consequences. Franklin County is primarily impacted by drought relating to shortages in the water supply as well as a decrease in overall water quality. Drought also greatly impacts the 24.19% of Franklin County land utilized as cropland or pasture.

Invasive Species

Invasive species are defined as any species that is not native to an ecosystem and whose introduction causes or is likely to cause harm to the economy, environment, or human health. An increasing threat of exotic diseases, such as the dangerous West Nile virus, exists because of increased transportation and encroachment of humans into previously remote ecosystems. Two events that have caused substantial economic and environmental damage in Ohio are the introduction of zebra mussels into waterways and the incursion of the emerald ash borer, responsible for killing ash trees.

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Earthquakes

Earthquakes are caused by the movement of the earth's crustal plates along faults. Franklin County is not located on a fault line, nor have any epicenters been located in Franklin County. Earthquakes occurring in other areas have been felt in Franklin County; however, no damage has been reported.

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5.0 *Flooding Risk Assessment*

5.1 Flooding Update

Because flooding is a site specific hazard, data about the location and types of structures and infrastructure in the County were reviewed to identify changes in vulnerability. HAZUS was utilized to generate specific data in relation to flooding risks. FEMA's Map Modernization process was completed for Franklin County in 2008. This map update was completed using the best available data for Franklin County and many areas saw changes in floodplain boundaries. Since the Risk Map has not taken place yet for Franklin County, the County must utilize the best available data for floodplain management purposes.

Information about flood loss was augmented in order to comply with the modifications of 44 CFR Part 201.6 that became effective in October 2007. Regulations now require that local hazards mitigation plans place special emphasis on the mitigation of Repetitive Loss Structures, which are structures insured by the NFIP that have had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.

5.2 Hazard Profile – Flooding

5.2.1 Composite of Franklin County

Franklin County has an unusually high number of stream corridors, more than 330 plus river miles. This fact combined with historical events, general weather patterns and urbanization help identify flooding as the greatest natural hazard threat to Franklin County. Planning documents completed by the City of Columbus, and various conservation and watershed groups, are referenced in this chapter. The Franklin County Greenways Plan is referenced significantly in this section because many of its objectives are consistent with the Franklin County Natural Hazards Mitigation Plan: integrated watershed management, stormwater management and flood control, restricted development in inappropriate terrain and increased participation in the Community Rating System (CRS).

In urbanized areas, changes in stream hydrology caused by stormwater and development related to filling in within the floodplain results in higher quantities of water and changes in peak flows. Since Franklin County is highly urbanized, this plan has been written by focusing on risks, hazards and vulnerabilities located in four quadrants of Franklin County: northwest, northeast, southeast and southwest. The plan will focus on flood, development, and water quality issues relative to each of these areas to provide a more detailed analysis of the problems identified, and provide a basis for the communities located in each region to plan future mitigation strategies.

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5.2.2 National Flood Insurance Program

The National Flood Insurance Program (NFIP) was established by the National Flood Insurance Act of 1968, and was strengthened by the Flood Disaster Protection Act of 1973. Both the City of Columbus and Franklin County participate in the National Flood Insurance Program and over 3,000 properties in the county are covered by this program. Participation in the NFIP ensures affordable flood insurance is available to community residents in flood-prone areas. In return, communities adopt floodplain regulations that meet minimum criteria established by FEMA. For example, Columbus requires that buildings, including basement levels, be elevated at least 1.5 feet above the base flood elevation in the floodway fringe. The Franklin County Special Resolution NFIP Regulation requires a minimum elevation of one-foot above the base flood elevation. Although requirements vary somewhat between the City of Columbus and Franklin County, buildings designed for human habitation and the storage of hazardous materials are prohibited in the floodway. There are currently three jurisdictions in the county that do not participate in the National Flood Insurance Program: Brice, Harrisburg and New Albany. Since flooding is listed as the number one hazard of concern in Franklin County, the FCEM&HS plans to work with these communities to bring them into compliance.

The Mitigation Core Group along with jurisdictional representatives acknowledges that flooding is the number one concern within Franklin County. Having all the local jurisdictions participate in the National Flood Insurance Program is critical to reducing the potential damaging effects of flooding within the County. The short and long term action items as well as the jurisdictional action items support the identification, and prioritization of flooding and compliance with the NFIP.

A Flood Insurance Rate Map (FIRM) is the official map produced by FEMA which delineates where NFIP regulations apply. FIRM's are also used by insurance agents and mortgage lenders to determine if flood insurance is required and what insurance rates should apply.

5.2.3 Community Rating System (CRS)

As mentioned in prior sections, CRS is a FEMA program that endorses sound floodplain management. The goals of CRS are to reduce flood losses and to promote the awareness of flood insurance. A community can benefit from actions it takes above and beyond the Federal minimum requirements of the National Flood Insurance Program. In a CRS participating community, the cost of flood insurance for residents is reduced by 5% to 45% based on the number of activities it undertakes and the points it receives for those activities. Currently, only the Village of Obetz in Franklin County participates in the Community Rating System.

5.2.4 Waterway Locations

All of Franklin County lies within the drainage basin of the Scioto River, which drains directly into the Ohio River. The Olentangy River, Alum Creek, Big Walnut Creek,

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Blacklick Creek, and the Big Darby Creek all flow through Franklin County and eventually empty into the Scioto River. Each of these main streams have multiple smaller tributary streams. Every community in Franklin County is impacted to some degree by streams and tributaries.

The various tributary streams and creeks generally flow north to south, from the west central part of the state towards the Scioto River. Scioto River and Olentangy River are the largest tributaries in the County.

Of the 42 municipalities within Franklin County, the City of Columbus, on the near west side, has suffered the most severe damage from flooding when the levee broke in 1913.

Table 8 shows which tributaries have the potential to lead to flooding in particular jurisdictions; there is a potential for flooding due to rivers and streams in almost all jurisdiction in the county. Please refer to the Franklin County Map Book located in **Attachment #1** for a detailed delineation of Franklin County's flood prone areas (those areas that flood but may not be in a floodplain) as well the FEMA designated floodplains.

Table 8: Rivers and Streams in Franklin County

Municipality	Rivers and Streams						
	Scioto River	Olentangy River	Alum Creek	Big Darby Creek	Big Walnut Creek	Little Walnut Creek	Blacklick Creek
Bexley			✓				
Canal Winchester						✓	
Columbus	✓	✓	✓		✓		✓
Dublin	✓						
Gahanna					✓		
Grandview Hts.							
Grove City	✓						
Groveport					✓		
Hilliard	✓						
New Albany							✓
Reynoldsburg							✓
Upper Arlington	✓						
Westerville			✓		✓		
Whitehall					✓		
Worthington		✓					
Brice							
Harrisburg				✓			
Lockbourne					✓		
Marble Cliff	✓						

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Municipality	Rivers and Streams						
	Scioto River	Olentangy River	Alum Creek	Big Darby Creek	Big Walnut Creek	Little Walnut Creek	Blacklick Creek
Minerva Park							
Obetz					✓		
Riverlea		✓					
Urbancrest							
Valleyview	✓						
Worthington		✓					

5.2.5 Extent of Flooding

Flooding can lead to property loss as well as to loss of life. Flooding damages structures, including homes and businesses, vehicles, and infrastructure, including roadways. People who are surrounded by flood waters can require evacuation placing their lives as well as the lives of rescuers in danger. Flooding can disrupt the operation of businesses and schools and recovery from flood damages can be time consuming and costly.

Flooding in the County can be exacerbated when heavy rains occur in late winter and accelerate the melting of snow. Flooding can also be exacerbated locally by the presence of impermeable surfaces due to buildings and pavement or lack of appropriately sized flood water detention basins.

Flooding in Franklin County can be exacerbated if the flow of water is obstructed in some way such as by an undersized culvert or debris collecting in the stream. This is a constant concern within the County upstream of overpass and railroad bridges. It has the potential to trap debris and create a dam, which was the case along the Blacklick Creek. Issues that can exacerbate flooding turn insignificant rain events into substantial flooding events directly upstream of the affected area, while significant rain events can cause large devastation to an even larger area.

5.2.6 Floodplain Data

Based on data provided by the Franklin County Auditor's Office there are 14,199 parcels, with a total appraised value of $4,132,173,100 located in areas currently identified as the 100-year floodplain. Typical land use within the floodplain includes agricultural, golf courses, vacant land and single family homes. Public entities, charitable organizations and/or churches make up approximately 75% of the parcels located in the designated floodplain. Four cemeteries also fall in the floodplain category, as well as four mobile home parks. Eleven parcels classified as quarries, of which most are located in the predominantly undeveloped south end of Franklin County.

As part of the 2011 Franklin County Natural Hazards Mitigation Plan Update it was decided that utilizing HAZUS would benefit Franklin County and the other jurisdictions

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involved to determine loss estimates for this site specific hazard. These loss estimates are utilized primarily to plan and stimulate efforts to reduce risks from natural hazards and to prepare for emergency response and recovery. Since flooding is a site-specific hazard HAZUS was utilized for this particular hazard in order to generate more specific loss estimations for the planning effort.

Although HAZUS was an important component of the flooding analysis for Franklin County it is important to note that Franklin County completed a Risk Assessment in 2010 and this information was utilized throughout this process as the basis of all the analyzes conducted on the hazards in Franklin County and is detailed in **Attachment #2**.

5.2.7 Analysis

An analysis of the parcel data provided by the Franklin County Auditor's Office indicates there is a significant amount of undeveloped land located within designated floodway and floodplain zones. Development and population trends indicate that currently undeveloped lands will be developed in the future for single and multi-family housing.

5.2.8 Stormwater

Water resource protection at the local level is becoming more complicated due to polluted runoff from impervious surfaces. An impervious surface is defined as an impenetrable material that prevents infiltration of water into the soil such as rooftops, roads and parking lots. As development alters the natural landscape, the percentage of land covered by impervious surfaces increases, initiating a chain of events that begins with alterations in the hydrologic cycle, works its way through physical and ecological impacts on riparian areas, adds on water pollution, and culminates in degraded water resources.

Impervious surface modeling can be useful in mitigating a reduction in water quality and enhance site planning. An example of mitigating stormwater runoff in new development is reducing road widths in residential areas, and parking spaces in commercial zones. Other mitigating concepts include an "impact fee" stormwater utility assessment which is based upon the impervious coverage of the property.

The Darby Creek Watershed Stormwater Management Strategies and Standards for New Development, dated January 2001 and prepared for the Darby Creek Watershed Task Force, recognizes that managing stormwater for new development is critical for the protection and conservation of the Darby watershed. This planning document encourages communities within the Darby Creek watershed to work with local departments to incorporate mitigation strategies into future development to reduce runoff from impervious surfaces. Suggestions include:

- Reduce minimum road requirements.
- Allow for the use of "queuing streets", narrow roadways which contain a single travel lane.

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- Reduce street length by examining alternative street layouts.
- Incorporate graded, landscaped islands to receive stormwater runoff from adjacent paved roads.
- Utilize dry swales and grass channels to convey and treat stormwater runoff.

This planning document also makes recommendations for stream buffers, open space development and post construction stormwater runoff control.

The Columbus Comprehensive Plan makes recommendations concerning stormwater management within the City of Columbus; however stormwater management crosses jurisdictional boundaries. As such, The Columbus Comprehensive Plan recommends the Mid-Ohio Regional Planning Commission encourage and promote continued cooperation on issues related to stormwater planning and management. Also, local governments throughout central Ohio should promote the establishment of regional stormwater districts, or other cooperative arrangements.

Finally, the Franklin County Greenways Plan encourages regional standards for river and watershed related land development regulations. Over three dozen political jurisdictions use a wide array of subdivision, stormwater management, and erosion and sediment control regulations. Developing regional standards for as many of these regulations as possible would ensure minimum standards for riparian areas and consistency for the development industry.

5.2.9 Previous Occurrences

The worst flood in Franklin County history occurred in March 1913. A levee break flooded the near west side (Franklinton area) resulting in the flooding of more than 4,000 homes and the loss of 95 lives. The second major flooding event occurred in 1959 when high water from heavy rains on frozen ground caused another levee break. Flooding occurred again on the near west and east sides of Columbus.

A review of historic weather events recorded by the National Weather Service from January 1993 through December 2010 indicates that flash flooding occurs most frequently and is experienced at various locations countywide. Flash Flood events in Franklin County generally occur as a result of heavy rainfall in a short period of time, or snow melts. Data regarding Presidential disaster declarations in Ohio from 1964 through 2011 shows that Franklin County has been included in six flooding declarations costing more than $100 million.

Appendix V lists all previous hazard occurrences recorded by the NCDC for Franklin County; including flooding, which spans the years 1993 through 2011. Many snow storms include some flash floods; for this analysis, these are presented as both flood and flash flood occurrences.

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5.2.10 Probability of Future Flooding

Using HAZUS, approximately 10.2 percent of the buildings within Franklin County have been determined to be within a flood-prone area with at least a 1-percent chance of flooding in any given year. In this plan, the term special flood hazard area is used rather than floodplain to clarify that the area under consideration is identified on the Flood Insurance Rate Maps as having at least a 1-percent chance of flooding in any given year. Historically, the area with a 1-percent chance of flooding in any given year has been called the "100-year floodplain."

Another way of considering the probability of damaging flooding occurring somewhere in the County is to review past occurrences. The NCDC website identifies a total of 53 significant flood events in Franklin County between 1993 and 2011 for an average of 2.94 significant flood events per year. This suggests that the probability of a flood occurring somewhere in Franklin County is over 100 percent in any given year.

5.3 Vulnerability Assessment – Flooding

5.3.1 Overview of Vulnerability

Flood vulnerability is described in terms of what community assets, structures, and infrastructure lay in locations where flooding is anticipated. Table 9 provides a vulnerability overview of damage due to flooding data provided by NCDC.

Table 9: Summary of Past Losses Due to Flooding

	Estimated Property Damages
Total Losses Due to Flooding (1993–2011)	$3,860,000
Average Annual Losses for 18 years	$214,444

According to NCDC, estimated significant property damage in Franklin County attributable to flooding during the years 1993 through 2011 is $3,860,000. Thus the average annual loss for these 18 years is $3,860,000 / 18 = $214,444.

The vulnerability to flooding for each jurisdiction is dependent upon the amount of land, the number of critical facilities, and the number of homes within the floodplain. The first two can be assessed from **Attachment #1, E.O.P. Mapping Annex**. From this map book the total number of critical facilities can be calculated and a visual assessment can be made to the amount of land that has the potential to flood. Currently, the number of houses cannot be calculated based off each jurisdiction. For planning purposes, an estimate can be made using the **Attachment #1** and the HAZUS information.

5.3.2 Identifying Structures

The Ohio Department of Natural Resources (ODNR) developed a statewide GIS map of the identified floodplains based on maps created in 1995. This flood hazard area map

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was combined with aerial photography to identify the structures located within the flood hazard area. Every structure in or near the floodplain is identified by a checkmark and is assigned a structure identification number.

According to the original ODNR Structure Inventory, which was created in 2002, Franklin County has 11,820 flood-prone structures, more than any other Ohio county. With a median value of occupied housing units at $116,200, the total estimated value of flood-prone structures is $1,373,484,000. These numbers are somewhat overstated due to the building of the Franklinton Flood Wall. The maps reflect the 100-year floodplain prior to the map modernization process and the wall construction. Please note that this is one data point and the use of HAZUS as part of the flooding analysis generated different numbers of at-risk structures than the ODNR Structure Inventory. It is still important to know that this tool is out there and can be updated to reflect the more accurate information contained in HAZUS.

5.3.3 Plan Update Notes

The initial version of this mitigation plan revealed that 11,820 structures in the County were located in Special Flood Hazard Areas. Current data compiled using HAZUS shows that 6,270 structures are located in the floodplain and have at least a 1-percent chance of flooding in any given year. The dramatic difference in the number of structures can be attributed to several factors.

1. The elimination of the hazard to structures protected by the Franklinton Flood Wall.
2. New and more accurate flood insurance rate maps.
3. New and more accurate structure inventory,
4. Utilization of HAZUS which gives a community a very distinct snap shot of structures within site-specific hazard areas such as floodplains.

5.3.4 Exposure of Existing Buildings to Damages Due to Flooding

HAZUS estimates that there are 386,078 buildings in the region which have an aggregate total replacement value of 91,875 million (2006 dollars, 2011 values are not available in HAZUS). For a 100-year flood, HAZUS estimates that about 3,930 buildings will be at least moderately damaged. This is 1.01% of the total number of buildings in the scenario. There are an estimated 1,266 buildings that will be completely destroyed by having over 50% damage to the structure. Table 10, shows an estimated percent of damage to each structure exposed and an estimated total damage for each occupancy type within Franklin County that can be expected from a 100-year flood event. Table 10 also shows the percentage of the total damage costs broken down for each occupancy type.

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Table 10: Building Exposure by Occupancy Type for a 100-year Flood

Occupancy	Expected Buildings Damaged			Exposure ($1000)	Percent of Total Cost
	Minor 1-20% Damage	Moderate 21-50% Damage	Substantial >50% Damage		
Residential	143	2401	1,262	6,793,454	65.8%
Commercial	72	25	3	2,530,397	24.5%
Industrial	5	11	1	481,720	4.7%
Agricultural	0	0	0	29,987	0.3%
Religion	7	0	0	219,006	2.1%
Government	2	0	0	66,047	0.6%
Education	1	0	0	198,018	1.9%
Total:	230	2,437	1,266	10,318,629	100.0%

5.3.5 Repetitive Loss Properties

The *State of Ohio Enhanced Mitigation Plan* states, "OEMA considers a number of types of projects to be eligible for mitigation; with flood mitigation projects having the highest priority" and "The highest priority goal for the prevention of the flood hazard is the removal of flood prone structures on the NFIP repetitive loss list." Flooding is the number one hazard in Franklin County therefore; this is also a high priority goal for the county.

A repetitive loss structure is one covered under the National Flood Insurance Program that has suffered flood damage on two or more occasions over a 10-year period ending when a second claim is made, in which the cost to repair the flood damage, on average, equals or exceeds 25% of the market-value of the structure at the time of each flood.

Repetitive loss data for Franklin County was obtained from FEMA Region V, and summarized in the following chart. The data was compared to current data at the Franklin County Auditor's Office. Each property was researched as to specific jurisdiction location, current market value and whether or not it is located in the flood plain. There were some inconsistencies between county data and FEMA data.

- Several properties were listed in the wrong local jurisdiction. (Mailing address does not always reflect the actual jurisdiction)
- One property listed does not currently exist and has been removed to be replaced by a development. Appropriate paperwork has been filed to have the property removed from the NFIP list.

The FEMA data only covers structures that have had two or more NFIP claims over a ten-year period. This does not capture all flood prone areas of the county. Properties in the Gould Park section of the city of Columbus have flooded repeatedly and are not included in the FEMA data. Also the properties in the Whims Ditch area on the south side of Columbus, behind the new floodwall also flood repeatedly. The floodwall does

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not protect these properties from flooding along the ditch. These are two troublesome areas of the county that need special attention to prevent future damage. In both cases, multiple structures are flooded on a regular basis.

National Flood Insurance Program repetitive flood loss data is maintained by FEMA and reflects properties within Franklin County that have made more than two flood insurance claim within a ten year period. In compliance with privacy laws the structures in the following chart are listed by jurisdiction only, not specific address.

A repetitive loss structure is defined as an NFIP-insured structure that has had at least two paid NFIP claims of more than $1,000 each in any 10-year period since 1978. Thirty-five structures in Franklin County are defined as repetitive loss structures. The numbers of repetitive loss structures are summarized by jurisdiction in Table 11.

Table 11: Repetitive Loss Structures

Municipality	Number of Repetitive Loss Structures	Property Value Loss
Prairie Township	3	$425,000
Washington Township	2	$800,000
Sharon Township	5	$575,000
Franklin Township	4	$550,000
Pleasant Township	3	$350,000
Madison Township	1	$100,000
Bexley	3	$925,000
Columbus	3	$425,000
Grove City	2	$222,000
Upper Arlington	3	$825,000
Westerville	1	$275,000
Whitehall	1	$100,000
Worthington	4	$1,500,000
Total	35	$6,052,000

5.3.6 Exposure of Future Buildings to Damages Due to Flooding

Current zoning and development regulations allow future development to occur within the Special Flood Hazard Area; this suggests that there is potential for additional loss due to flooding in the future. Special Flood Hazard Area development regulations relate to the base flood elevation, which is the estimated level of flooding that has a 1-percent chance of being equaled or exceeded in any given year. Because Special Flood Hazard Area or floodplain development regulations specify that residential structures must be elevated to or above the base flood elevation and commercial structures must either be elevated or flood-proofed to or above this level, the degree to which future structures are exposed to flood damages should be minimal.

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However, calculations of base flood elevations are based on models that rely upon data about previous flood events; should future floods be greater than those experienced in the past, the base flood elevation may not provide sufficient protection. Therefore a mitigation strategy of this plan includes that communities adopt more stringent Special Flood Hazard Area or floodplain development regulations causing future structures to be built with freeboard, i.e. above the current base flood elevation.

5.3.7 Estimating Potential Loss

Methodology

The method utilized for estimating potential losses due to flooding is based upon historical data provided by NCDC and HAZUS. Damages due to one flooding event in the County have varied from no cost for damages to $1.0 million.

According to NCDC, estimated property damage in Franklin County attributable to flooding or flash floods over the period 1993 through 2011 is $3,860,000. Past losses provided from NCDC are used to estimate the potential for annual losses due to flooding.

Estimated Potential Dollar Losses

Since the total loss over these 18 years is $3,860,000, the average annual loss is $3,860,000 / 18 = $214,444.

HAZUS estimated the potential dollar loss for a 100-year flood would be $10.3 billion. Therefore, on any given year there is a one percent chance there could be an estimated damage of $10.3 billion, which givens an average annual loss of $10.3 billion / 100 years = $103 million.

Because the NCDC records are over a relatively small time period for a hazard that has greater risks over a longer period of time, the HAZUS estimation should be incorporated to get a realistic estimated potential dollar loss for flooding. Therefore, the annual average loss from HAZUS is $103 million. By combining both annual losses, the total average annual loss due to flooding is $103.2 million.

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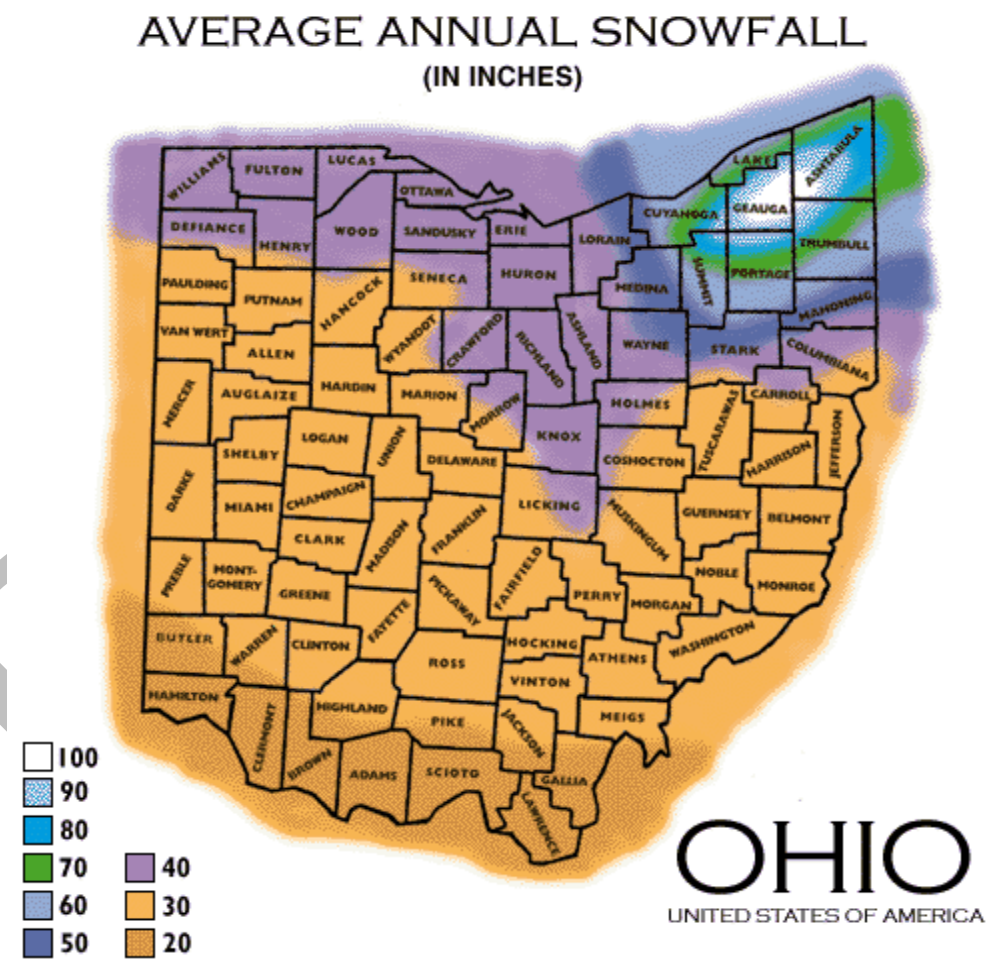
6.0 Severe Winter Weather Risk Assessment

6.1 Severe Winter Weather Update

In the previous version of this plan, Severe Winter Weather was described under the category of Winter Storms. In this 2011 update, features of winter storms that may cause damage are treated separately; heavy snow or ice is discussed as one hazard because damage from either of these hazards is due to their weight on power lines and roofs. Damage caused by high winds, another potentially damaging feature of winter weather, is described in the section about Severe Summer Weather. While temperatures during winter weather can be very low, Franklin County has no history of structural damages due to extremely cold temperatures, and cold temperature has never been considered a hazard for Franklin County.



6.2 Hazard Profile – Severe Winter Weather

6.2.1 Location

Severe winter storms occur throughout the State of Ohio. All of Franklin County is exposed to this hazard.

6.2.2 Extent of Damage

Severe winter storms pose a risk to life and property in Franklin County by creating conditions that disrupt utilities, telecommunications and transportation systems. Rain, freezing rain, ice, snow, extremely cold temperatures and wind are all associated with severe winter storms. Ice storms can impact trees, power lines and utilities systems. As recently as December 2010, freezing rain resulted in the accumulation of ¼ to ½ inch of ice on power lines and tree limbs. Significant snowfall and periods of extreme cold are difficult to predict, and have impacted Franklin County on multiple occasions throughout history.

NOAA reports the average annual snowfall in the vicinity of Franklin County as 36 inches. A single snowstorm in 2008 deposited over 20 inches in Franklin County, which broke the old record of 15.3 inches in 1910. Franklin County received a Presidential Disaster Declaration from this record snowfall.

6.2.3 Previous Occurrences

The blizzard of January 1978 was the last declared severe blizzard by the NWS in Franklin County. Below zero temperatures and winds up to 120 MPH caused Governor James A. Rhodes to call this the greatest disaster in Ohio's history. January 1978 holds the monthly snowfall record in Franklin County when more than 34.4 inches of snow fell across the region. Wind gusts up to 69 MPH contributed to blowing and drifting and virtually every county in Ohio was affected that year. In 1910 Franklin County had its greatest seasonal snowfall of 67.8 inches, including snowfall from a single storm totaling 15.3 inches.

The winter of 1950-1951 brought snowstorms that broke all records in Ohio for depth and duration. The whole state was covered with nearly two feet of snow and hazardous snow drifts formed all over the state.

During the period covering January 1993 to December 2002, there were more than four instances of snow and ice storms resulting in traffic accidents, power outages and trees collapsing. In 1996, Franklin County was under winter storm related warnings five times in the month of January alone. Damage in 1996 included a roof collapse from heavy snow, and flooding resulting from melting snow. Property damage estimates for these events totaled more than $16 million. There were three instances of extreme cold that resulted in multiple car accidents, burst water pipes, and two deaths from exposure.[24]

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What is being called the blizzard of 2008 was not officially called a blizzard due to wind speeds not reaching 35 mph. However, during this event a record setting 20 inches fell in central Ohio. Port Columbus International Airport had to cancel the majority of the flights on March 8th. This storm system caused most of Ohio counties to go into at least level two snow emergency and five deaths were linked to this storm (Ohio History Central). The State of Ohio has a long history of winter storms. Heavy snow or ice from severe winter storms generally occurs more than once each year in the county.

Appendix V lists previous occurrences of damaging snow storms in Franklin County; data is from NCDC, which covers the years 1993 through 2011. Many snow storms include some ice; for this analysis, these are presented as both snow and ice occurrences.

6.2.4 Probability of Future Severe Winter Weather

Historic data indicates that heavy snow or ice typically occurs every year in Franklin County. NCDC supports this showing that there were 47 damaging snow and ice storms over 18 years between 1993 and 2011. Thus, the average number of damaging heavy snow or ice storms in Franklin County is 2.6 storms per year. This suggests that the probability of a damaging heavy snow or ice storm occurring in Franklin County in any given year is over 100 percent.

Based on historical information the chances of a winter storm with the potential to disrupt the county are high, however the changeable weather patterns in Central Ohio make predictions speculative at best.

6.3 Vulnerability Assessment – Severe Winter Weather

6.3.1 Overview of Vulnerability

Vulnerability to the effects of winter storms is related to how prepared and accustomed an area is for this type of severe weather. Franklin County normally receives about 28 inches of snow a season and varies from season to season so residents are accustomed to this type of weather.

The impact of winter storms varies by different weather conditions such as blinding wind storms and dangerous wind chills. Strong winds can knock down trees, utility poles and power lines. Extreme cold can cause frostbite or hypothermia and become life threatening for infants and the elderly. Freezing temperatures can cause pipes to freeze and ice jams may form in freezing and thawing rivers, resulting in flash flooding.

Winter storms can also bring heavy accumulations of ice which can down trees, electrical wires, telephone poles and lines, and communication towers. Utilities and communications can be impacted for several days. Heavy snowfall can immobilize a community and create economic impacts related to the cost of snow removal and loss of business. Most deaths related to severe winter weather result from traffic accidents on

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icy roads, heart attacks while shoveling snow and hypothermia from prolonged exposure to the cold.

Vulnerability to the effects of winter storms on buildings is considered to be somewhat dependent on the age of a building because as building codes become more stringent, buildings are capable of supporting heavier loads and as building age, various factors may deteriorate their structural integrity. Vulnerability also depends upon the type of construction and the degree to which a structure has been maintained. Commercial buildings, warehouses, and municipal structures with large span roofs are also susceptible to a collapse under the weight of heavy snow or ice buildup.

6.3.2 Potential Impact of Severe Winter Weather

In Franklin County, accumulations of snow and/or ice during winter months are expected and normal. The most common detrimental effects of snow and/or ice are not collapsed structures but traffic accidents and interruptions in power supply and communications services.

As demonstrated by the ice storm in 2011 which accumulated over a half inch of ice and produced strong winds, hundreds of thousands lost power with hundreds without power for over a week. In a worst case scenario, a large ice storm that devastates the entire state hitting Franklin County the hardest with large ice buildups will cause downed trees and power lines. In this scenario, the majority of communities many be without power and completely shut down due to hazardous conditions. Power recovery will be delayed due to utility crews being spread a crossed the state. This would leave sensitive populations are extreme risk and delay overall recovery. If a large snow event were to happen in this scenario either before or after the ice storm and the precipitation accumulation were to build up, then a large number of structures will be a risk of roof collapse. Because roof failure is dependent upon many factors it is impossible to predict how many structures would be affected by an individual event. However, one factor, age, which can affect roof failure is discussed in the next section.

6.3.3 Identifying Structures

Exposure of Existing Buildings to Severe Winter Weather

Structures identified as potentially vulnerable to damage from heavy snow or ice are structures older than 50 years that may have deteriorated over time. Data is only available for housing units. Therefore, only housing unit structures will be evaluated.

It is not necessarily the case that older structures are at greater risk of damage due to heavy snow or ice. There are 12.1 percent of structures standing in Franklin County that were built before 1939 and about a third of the structures in the County are more than 50 years old, and these have withstood many heavy snow and ice storms. Nevertheless, for this review, because the National Trust for Historic Preservation identifies structures greater than 50 years old as being eligible for designation as historic, the assumption is

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made that structures built before 1960 are at some risk of at least minor damage due to heavy snow and/or ice. There are 169,283 structures in the County that were built before 1960, thus the percent of structures considered to be particularly vulnerable to damage due to heavy snow or ice is 32.5 percent. Figure 3 shows the number of structures built in Franklin County and illustrates the fact that a large number of structures in the County are more than 50 years old.

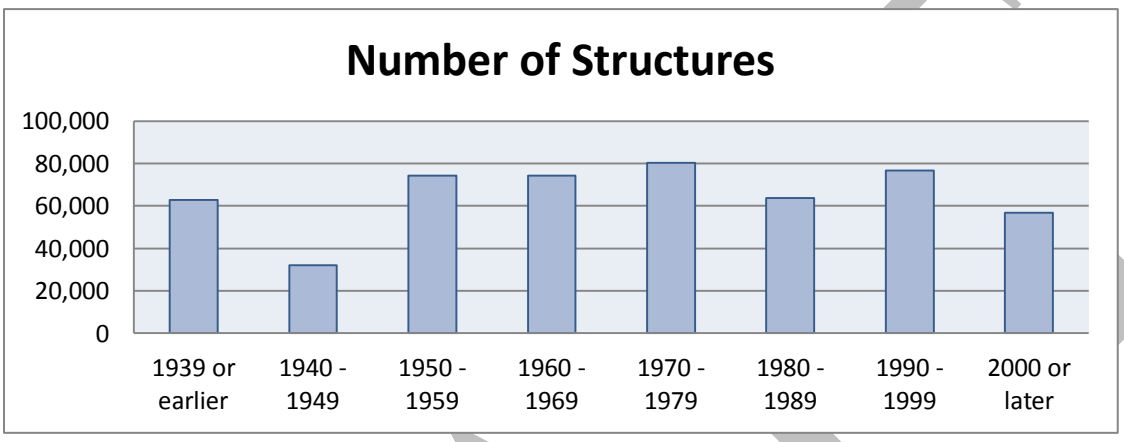

Figure 3: Numbers of Structures Built

To predict the structural cost associated to a worst case scenario snow storm, it will be assumed that all structures older than 50 years will be damaged significantly. This analysis is based on the perception that building codes have become more stringent and that new buildings can withstand the 30 pounds per square foot snow loads expected for Ohio. To estimate the commercial values, the same percentage of structures will be assumed to be built over 50 years ago, which is 32.5%. With the total value of residential and commercial structures being $56 billion and $16 billion, the estimated maximum damage that is expected for a worst case scenario winter storm is $18.2 billion and $5.2 billion, respectively. This estimate does not represent the total cost associated with the winter storm, which will also include damaged utilities and emergency services.

Exposure of Future Buildings to Severe Winter Weather

All structures and infrastructure in Franklin County will be exposed to heavy snow and ice. However, Franklin County adopted in 2009 the International Building Code (IBC) and International Residential Code (IRC) standard. It is assumed buildings built after this date can further withstand heavy snow and ice loads.

6.3.4 Estimating Potential Loss

Methodology

According to NCDC, estimated property damage in Franklin County attributable to major heavy snow and/or ice storms over the period 1993 through 2011 is $16,656,000. Past

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losses provided in NCDC are used to estimate the potential for annual losses due to heavy snow and/or ice.

Estimated Potential Dollar Losses

Since the total loss over these 18 years is $16,656,000, the average annual loss is $16,656,000 / 18 = $925,333.

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7.0 Tornadoes Risk Assessment

7.1 Tornadoes Update

In the previous version of this plan, the Tornado portion had included the description of Microbursts. In this 2011 update, discussion on Microburst has been moved to Severe Summer Weather to improve clarity between hazards. In this update, extent of tornadoes is described using the Enhanced Fujita Scale, which has been used since 2007.

7.2 Hazard Profile – Tornadoes

7.2.1 Location

Tornadoes and potentially damaging high winds occur throughout Ohio. A tornado may be experienced at any location in Franklin County. This chapter will focus on the history of tornadoes, and activities in place to mitigate the effects of their damage in Franklin County.

General weather patterns and geography make Franklin County susceptible to the threat of tornadoes. A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. Tornadoes are spawned by a thunderstorm and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage produced by a tornado is a result of high wind velocity and wind-blown debris.

Tornadoes are capable of striking anywhere in the United States. A tornado is defined as a violently rotating column of air extending from the base of a thunderstorm to the ground. A tornado outbreak typically involves an intense upper-level disturbance that provides the strong vertical wind shear that gives an updraft its twisting motion. Approximately 1,000 tornadoes are spawned by severe thunderstorms each year. Figure 4 shows the probability of a tornadoes per 1,000 square miles across the entire country indicating where the approximate 1,000 tornadoes will touch down each year.

Before thunderstorms develop, a change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the thunderstorm's updraft tilts the rotating air from horizontal to vertical.

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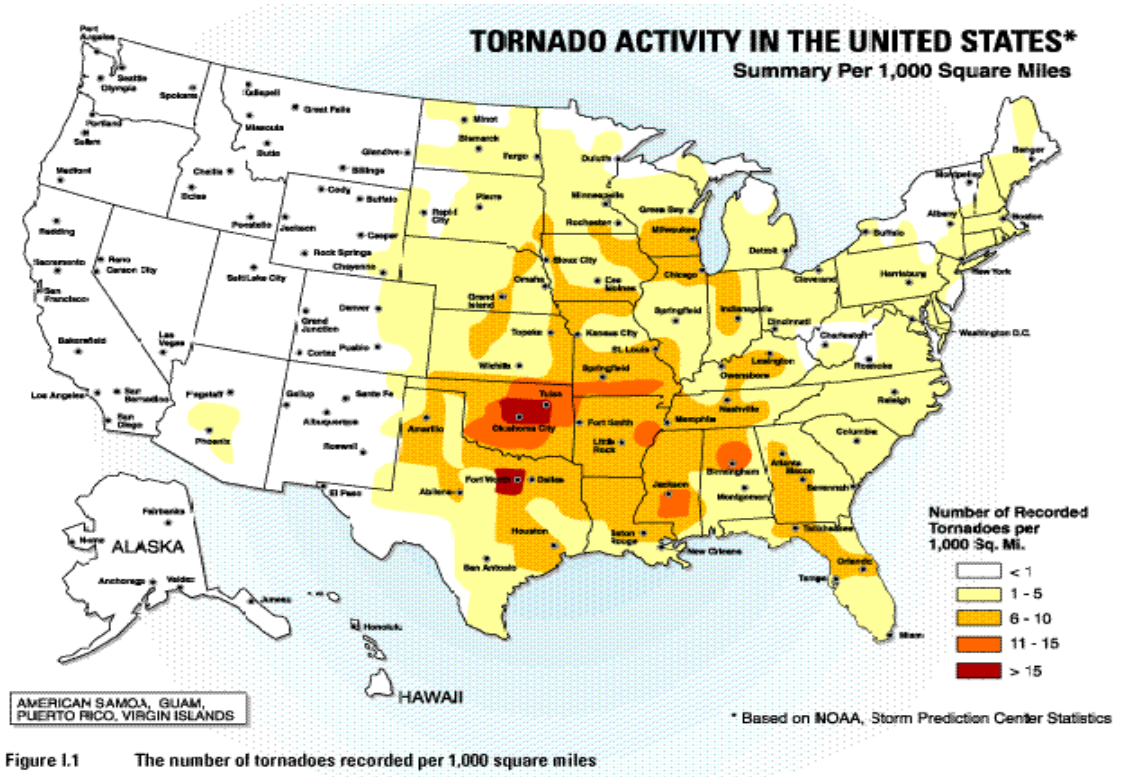

Figure 4: Tornado Activity in the United States

7.2.2 Extent of Damage

Since 2007 an Enhanced Fujita Scale (EF Scale) has been used in the United States to describe the magnitude of tornadoes. Prior to 2007, the Fujita Scale was commonly used to describe magnitude. This enhanced scale is based on new information about the relationship between wind speed given in miles per hour (mph) and corresponding damages. The EF Scale categorizes tornadoes from EF0 to EF5 with EF0 being the most commonly occurring type of tornado with the lowest wind speed and least damage. The most damaging and deadliest tornado recorded in Franklin County was an F3 tornado on the old Fujita. Table 12 shows the relationship between the Fujita and the Enhanced Fujita Scales.

More than 900 tornadoes have struck down in Ohio, with 191 deaths and 4,441 injuries between 1950 and 2010. Of all the counties in Ohio, Franklin County has had the most tornadoes with 29. From these tornadoes, no deaths had been recorded. For all tornadoes in Ohio about 90% occur while the majority of the population is awake and about 60% happen between 2p.m. and 6p.m. The larges tornado in Franklin County was an F-3 in 1971, which would be an EF-4 with the new scale.

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Table 12: Enhanced Fujita Scale

Fujita Scale		Enhanced Fujita Scale	
F Number	3-Second Gust (mph)	EF Number	3-Second Gust (mph)
0	45–78	0	65–85
1	79–117	1	86–110
2	118–161	2	111–135
3	162–209	3	136–165
4	210–261	4	166–200
5	262–317	5	Over 200

Table 13 provides a description of the types of damages that can be expected with each category of tornado.

Table 13: Expected Tornado Damages

F or EF Scale	Examples of Possible Damage
0	**Light Damage:** Some damage to chimneys; broken tree branches; shallow-rooted trees pushed over; damage to sign boards.
1	**Moderate Damage:** Surface peeled off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
2	**Considerable Damage:** Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
3	**Severe Damage:** Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
4	**Devastating Damage:** Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
5	**Incredible Damage:** Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked.

7.2.3 Previous Occurrences

In Ohio the peak tornado season runs from April through mid-July, with June reporting the most occurrences. However, tornadoes and severe thunderstorms can and have occurred in any month. On Palm Sunday, April 11, 1965 a tornado outbreak devastated much of the Midwest. A total of 57 people died in Ohio from 47 tornadoes that occurred that day. Union and Morrow counties to the near west and north of Franklin County were two of several counties affected.

Devastating tornadoes struck Ohio during the afternoon and early evening of April 3, 1974 resulting in the death of 41 people, injuries of 2,000 and damage to more than 7,000 homes. The series of tornadoes that touched down in the western part of Ohio that day rank as one of the most devastating hazard events in recent Ohio history. Compared with

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other states, Ohio ranks 21 for frequency of tornadoes, 11 for number of deaths, 4 for injuries and 7 for cost of damages. Franklin County has had the highest recorded number of tornado sightings in Ohio, 22 since 1950, with only 2 recorded deaths since 1916 and none since 1950. However, Franklin County has not experienced maximum tornado damage.

Historic weather events collected by the National Weather Service from January 1993 through December 2008 indicate the most recent tornado touchdown in Franklin County occurred within Mudsock near Hilliard on May 11, 2008. Few homes received minor damage and property loss estimates totaled more than $5,000. The tornado event registered F-0 on the Fujita. Appendix V lists previous occurrences of tornadoes in Franklin County; data is from NCDC, which covers the years 1993 through 2011. Many snow storms include some ice; for this analysis, these are presented as both snow and ice occurrences.

7.2.4 Probability of Future Tornadoes

There were 29 damaging tornadoes reported by the National Weather Service National Climatic Data Center for Franklin County for the entire 1950-2010 period. Thus the calculated probability of a damaging tornado in the County in any given year is 29/60 = 0.48 or 48 percent.

7.3 Vulnerability Assessment – Tornadoes

7.3.1 Overview of Vulnerability

Anything in the path of a tornado is at risk. For tornadoes, aged and dilapidated structures or structures not built to applicable building codes are more susceptible to damage. Mobile homes and campgrounds are especially susceptible to damage due to tornado. Strong winds can rip roofs off of any dilapidated structures and overturn mobile homes. Rural areas are more exposed to tornadoes, but the destructive capability increases in urban areas, as was demonstrated in Xenia, Ohio.

While the county records of deaths after 1950 is zero (2 deaths in 1916) and a low number of injuries from tornadoes, the potential for severe destruction and death remains. Population increases and further expansion of the outdoor siren warning system will also necessitate a continued emphasis on public education.

7.3.2 Potential Impact of Tornadoes

Vulnerability to the effects of a tornado is somewhat dependent upon the age of a structure because as building codes become more stringent, buildings are more capable of enduring greater wind forces.

In a worst case scenario, Franklin County could be hit with an EF-5 tornado that would travel from one side of the county to the other. No matter what the path, if an EF-5 went

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through the County tens of thousands of buildings would be destroyed. Even with the current building codes, most buildings cannot withstand the forces of an EF-5. Apart from the devastation within the path of the tornado, large regions of the county can be expected to be without power.

7.3.3 Identifying Structures

Exposure of Existing Buildings to Tornadoes

The methodology for identifying structures potentially at risk of damage due to tornadoes is the same as the methodology used for identify structures potentially at risk of damage due to heavy snow or ice.

All structures and infrastructure has the potential to be exposed to the effects of a tornado. Depending upon the severity of a tornado, any existing structures could be damaged or destroyed. However, in Franklin County, there are 169,283 structures that were built before 1960. Thus the percentage of existing buildings considered at particular risk of damage due to tornado or high wind is 32.5 percent.

To predict the structural cost associated with a worst case scenario for a tornado; an analysis will be run with an EF-5 tornado traveling on a straight path through the most densely populated and developed areas within the county. This analysis uses a tornado with a destructive path of three quarters of a mile wide while traveling approximately 25 miles across Franklin County from the Southwest side to the Northeast side of the county. To perform this analysis a GIS query was conducted. In Table 14, an assessment shows the amount of damage that is expected per type of structure. It also shows the value of damage that is expected for this worst case scenario. The degrees of damage in the table are from Destroyed to Affected and the monetary damage associated with the damage corresponds to the degree of damage. For example a destroyed home was calculated at a value of 100% because it was totally destroyed, where as a home merely affected only reflects 25% of the value as damages.

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Table 14: Damage Assessment for an EF-5 Tornado through Franklin County

Damage Assessment by Land Use Type per Parcel					
	Destroyed	Major	Minor	Affected	Total
Commercial	495	483	576	864	2,418
Industrial	187	185	147	250	769
Residential	3,495	4,287	4,569	4,473	16,824
Total	4,177	4,955	5,292	5,587	20,011
Damage Assessment by Total Appraised Value per Parcel					
	Destroyed (Value x 1)	Major (Value x .75)	Minor (Value x .5)	Affected (Value x .25)	Total
Commercial	$368,100,100	$321,199,725	$226,730,200	$129,510,025	$1,045,540,050
Industrial	$85,832,900	$103,809,225	$65,898,700	$26,537,825	$282,078,650
Residential	$396,564,500	$354,490,125	$237,964,200	$112,669,400	$1,101,688,225

Exposure of Future Buildings to Tornadoes

Any future structures have the same potential for exposure to tornado or high winds as this hazard does not occur in specific locations. Future buildings will be slightly more resistant to the effects of tornado or high winds as they will meet the most current building code requirements for bracing and roof design.

7.3.4 Estimating Potential Loss

Methodology

The Franklin County Risk Assessment data is used support the NCDC data to estimate potential losses from this nonspecific hazard. According to the NCDC, estimated property damage in Franklin County attributable to major tornadoes from 1950 through 2011 is $56,830,000. These data are used to estimate potential annual dollar losses due to tornado.

Estimated Potential Dollar Losses

Since the total loss over these 61 years is $56,830,000, the average annual loss is $56,830,000 / 61= $931,639.

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8.0 Severe Summer Weather Risk Assessment

8.1 Severe Summer Weather Update

In the previous version of this plan, Severe Summer Weather was described under the category of Severe Thunderstorms & Lightning. This section has been enhanced to include high winds, hail, and microbursts.

The 2010 Franklin County Risk Assessment and the NCDC website were used to capture the data used in this document.

8.2 Hazard Profile – Severe Summer Weather

8.2.1 Location

Severe thunderstorms, lightning and hail can pose a threat to life and property in any part of Franklin County by creating conditions that disrupt essential services. High winds have destructive impacts to trees, power lines and other utilities, which ultimately impacts residents. In July 2003, a series of severe thunderstorms with extraordinarily high winds downed numerous trees throughout Franklin County, resulting in power outages affecting more than 100,000 customers over a period of three to five days. Downed trees also blocked roadways throughout the County which had to be cleared quickly to ensure emergency response vehicles had access. The damage and potential impacts from severe thunderstorms and high winds should not be underestimated.

A weather event which appears commonly in Franklin County is the microburst. Microbursts generally occur within an isolated area, but can cause damage similar to that of a tornado.

8.2.2 Extent of Damage

Severe summer storms occur throughout the State of Ohio. All of Franklin County is exposed to the hazards associated with severe summer storms. These storms can contain hail, wind, tornadoes, microbursts, and thunder and lighting.

High winds from summer weather that move in a straight line can cause extensive damage, much like a tornado. High winds are defined as sustained wind speeds of 40 mph or greater lasting for 1 hour or more, or winds of 58 mph or greater for any duration.

Microbursts (also known as downbursts) are powerful downdrafts associated with thunderstorms, rain showers and particularly hail. Microburst winds can equal that of small tornadoes and the damage looks as if a tornado went through the area. Wind speeds above 120 mph in microbursts are not uncommon.

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8.2.3 Previous Occurrences

During the period from January 1950 to March 2010, there were more than 388 weather events involving severe thunderstorms, hail and lightning resulting in property damage estimates totaling over 319 million dollars in Franklin County. The majority of damage resulting from these events is downed trees and power lines. Other damages include roofs being blown off, semi-tractor trailers being knocked over and lightning strikes. Based on the 2010 Risk Assessment, four deaths have occurred from individuals being struck by lightning over a 60 year period. More than 56 people were injured and four people were killed between January 1950 to March 2010 as a result of thunderstorms and high winds.

Although damage from severe thunderstorms and lightning has occurred throughout Franklin County, the majority of damage reports have come from the northern half of the county. The northwest and northeast quadrants of Franklin County are the most populous, rapidly growing areas. The conclusion could be drawn that as the population increases and more development occurs, more damage to property may occur and more lives may be at risk from thunderstorms and lightning.

FEMA Region V provides information regarding the types and frequency of disasters in Ohio. Table 14 provided by FEMA V supports the Franklin County Natural Hazards Mitigation Plan's emphasis on flooding and severe storms in Franklin County.

Table 15: Flooding and Severe Storms in Franklin County

Year	Disaster Type	Disaster #
1989	Severe Storms & Flooding	831
1990	Severe Storms, Tornadoes & Flooding	870
1992	Severe Storms, Tornadoes & Flooding	951
1995	Severe Storms & Flooding	1065
1996	Severe Storms & Flooding	1097
1996	Flooding & Severe Storms	1122
1997	Severe Storms & Flooding	1164
1998	Severe Storms	1227
2002	Tornadoes & Severe Storms	1444
2003	Severe Storms, Tornadoes & Flooding	1484
2004	Landslides & Severe Storms	1507
2008	Severe Wind Storms	1805

8.2.4 Probability of Future Severe Summer Weather

There were 258 thunderstorm and high wind events reported in Franklin County for a period from 1950-2010. Thus the calculated probability of a damaging tornado in the county in any given year is 258/59 = 4.37 or 437 percent. Thus, the average number of damaging thunderstorms and high wind events for the county is 4.37 storms per year. So

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the probability of the occurrence of a damaging thunderstorm or high wind event in Franklin County in any given year is 100 percent.

8.3 Vulnerability Assessment – Severe Summer Weather

8.3.1 Overview of Vulnerability

Not all thunderstorms carry risks to property and lives. They bring needed rain to farmlands and reservoirs. No place in the United States is completely immune to the threats of severe thunderstorms. Thunderstorms can produce several severe weather conditions that are harmful to life and property including flash flooding, lightning, hail, high winds and tornadoes.

History tells us that Franklin County has always experienced thunderstorms and always will. Storm severity cannot be predicted, but improved weather radar and public warnings may lessen the impacts of these storms, allowing residents to be better prepared.

8.3.2 Potential Impact of Severe Summer Weather

The National Weather Service (NWS) estimates that over 100,000 thunderstorms occur each year on the U.S. mainland. Approximately 10 percent are classified as "severe." Thunderstorms can produce deadly and damaging tornadoes, hailstorms, intense microburst winds, lightning and flash floods. Since 1975, severe thunderstorms were involved in more than 327 Federal disaster declarations. Every thunderstorm produces lightning, which kills more people each year than tornadoes.

Severe summer storms can lead to property damage as well as to loss of life. Severe summer storms damages structures, including homes and businesses, vehicles, and infrastructure, including utility lines. Neighborhoods can be left without power for several days. This can be life threatening to people that rely on life sustaining equipment powered by electricity in their homes. Severe Summer Storms can disrupt the operation of businesses and schools and recovery from storm damages can be costly.

In Franklin County, high winds occur annually. The most common detrimental effects are interruptions in power supply and communications services due to downed wires and blocked roadways due to downed trees.

As seen in a large portion of Ohio, including Franklin County, Tropical Depression Ike passed through Ohio with devastating force leaving hundreds of thousands without power with thousands of trees blown down. In a worst case scenario, a severe summer storm could pass over Franklin County causing large power outages leaving hundreds of thousands without power. Large quantities of trees and large limbs will fall down potentially destroying everything that they fall on to, which will include structures, power lines, and vehicles. Downed trees will also have the potential to obstruct emergency routes delaying emergency response times. The wind forces from a worst case scenario

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event like this will have the potential to knock over dilapidated buildings and cause exterior damage to a vast number of buildings within the County.

8.3.3 Identifying Structures

Exposure of Existing Buildings to Severe Summer Weather

The methodology for identifying structures potentially at risk of damage due to severe summer storms is the same as the methodology used for identify structures potentially at risk of damage due to heavy snow or ice.

All structures and infrastructure within Franklin County could be exposed to the effects of severe summer storms. Depending upon the severity of the storm, any existing structures might be damaged to some extent. However, in Franklin County, there are 169,283 structures that were built before 1960. Thus the percentage of existing buildings considered at particular risk of damage due to severe summer storms is 32.5%.

To predict the structural cost associated to a worst case scenario for a severe summer storm (which could include wind, hail and lighting); it is assumed that all structures older than 50 years will be significantly damaged. This analysis is based on the perception that building codes have become more stringent and that new building will withstand all wind forces expected in Ohio. To estimate the commercial values, the same percentage of structures will be assumed to be built over 50 years ago, which is 32.5%. With the total value of residential and commercial structures being $56 billion and $16 billion, the estimated maximum damage that is expected for worst case scenario wind and hail damage is $18.2 billion and $5.2 billion, respectively.

Exposure of Future Buildings to Severe Summer Weather

Any future structures could be exposed to severe summer storms as this hazard does not occur in specific locations. However, future buildings may be less likely to be damaged by the effects of severe summer storms as they will meet the most current building code requirements for bracing, roof design, and electrical grounding.

8.3.4 Estimating Potential Loss

Methodology

According to the NCDC, estimated property damage in Franklin County attributable to the four hazards associated with summer storms are thunderstorms, lightning, high winds, and hail account for $188,818,000 in damage. Damage attributable to thunderstorms from 1950 through 2011 is $7,482,000. Damage attributable to lightning from 1993 through 2011 is $25,000. Damage attributable to high winds from 1993 through 2011 is

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$130,700,000. Damage attributable to hail from 1950 through 2011 is $181,311,000. This data is used to estimate potential annual dollar losses due to severe summer storms.

Estimated Potential Dollar Losses

Due to severe summer storms combining four hazards that have been historically documented over different periods of time, the potential dollar losses from severe summer storms will be broken down into each specific hazard. The total loss for thunderstorms over 61 years is $7,482,000, the average annual loss is $7,482,000 / 61 = $122,655. The total loss for lightning over 61 years is $25,000, the average annual loss is $25,000 / 18 = $1,388. The total loss for high winds over 18 years is $130,700,000, the average annual loss is $130,700,000/ 18 = $7,261,111. The majority of high winds costs are associated with one event that totaled 98% of the total costs. The total loss for hail over 61 years is $181,311,000, the average annual loss is $181,311,000 / 61 = $2,972,311. The majority of the costs associated with hail damages are contributed to two large hail events that caused excessive damage.

The total average estimated annual cost to all severe summer weather is $10,357,465. This high cost is due to the two large hail events and is an accurate depiction of the potential damage to severe summer weather on any given year.

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9.0 *Drought Risk Assessment*

9.1 Drought Update

The drought section for this plan was created for the 2011 plan update. Even though the hazard had been identified in the previous plan, there was no section created for the hazard. This section will follow the same format as other sections for increased clarity.

9.2 Hazard Profile – Drought

9.2.1 Location

Franklin County is primarily impacted by drought relating to shortages in the water supply as well as a decrease in overall water quality. Drought also greatly impacts the 24.19% of Franklin County land utilized as cropland or pasture.

9.2.2 Extent of Damage

The Ohio Emergency Management Agency determines drought conditions by the Crop Moisture Index, the Standard Precipitation Index, and the Palmer Drought Severity Index (PDSI) to monitor drought conditions.

The PDSI is used to describe abnormally wet to abnormally dry conditions. Zero represents normal rainfall and temperature conditions; drought and wet weather condition indices are described in Table 15. Franklin County has been known to experienced periods of extreme drought, as well as extremely wet.

Table 16: Palmer Drought Severity Index

Index	Description of Conditions
4.0 or more	Extremely wet
3.0 to 3.99	Very wet
2.0 to 2.99	Moderately wet
1.0 to 1.99	Slightly wet
0.5 to 0.99	Incipient wet spell
0.49 to -0.49	Near normal
-0.5 to -0.99	Incipient dry spell
-1.0 to -1.99	Mild drought
-2.0 to -2.99	Moderate drought
-3.0 to -3.99	Severe drought
-4.0 or less	Extreme drought

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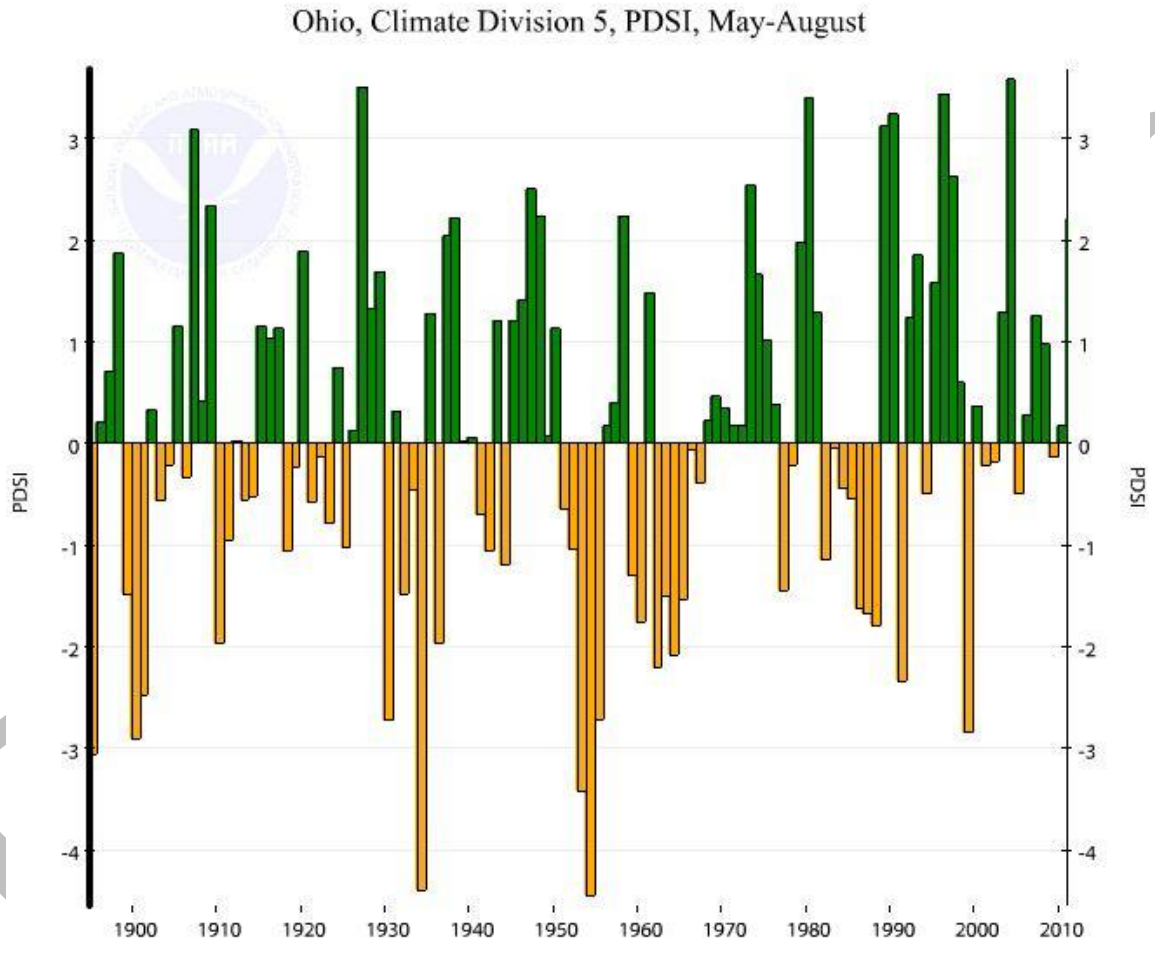
9.2.3 Previous Occurrences

Data provided by NCDC show that drought conditions in Ohio Climate Division 5 have resulted in Palmer Drought Severity Index level as low as -4.45 for a four month period in 1954. Figure 5, shows the PDSI for a four month period May-August between 1895-2011. Ohio has a generally temperate climate and infrequently has a severe drought experience over an extended period of time. Over the summer months when drought conditions are most severe and would have the greatest effect on crops, region 5 in Ohio where Franklin County is located, has only experienced 4 severe drought conditions and 2 of which were categorized as extreme drought.



3	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
.24	0.07	1.13	-0.64	-1.04	-3.42	-4.45	-2.72	0.17	0.40	2.24	-1.30

Figure 5: Summer PDSI in Climate Division 5 for the past 115 years

No droughts have occurred in Franklin County since 1999 per the NCDC, shown in **Appendix V**. On July 30, 1999, the Director ODNR Lakes and Reservoirs issued a directive to allow limited quantities of water to be taken out of state owned lakes and

reservoirs by truck or trailer tanks for emergency livestock water supply to drought-stricken farmers, for emergency public water supply, and for emergency firefighting. Precipitation deficits for the months of May through August averaged between 8 and 10 inches, shown in Figure 6. This is about one-quarter of total annual normal precipitation in most areas. Streams were empty, wells dried up, and the Scioto River hit record depth of 0.0ft.

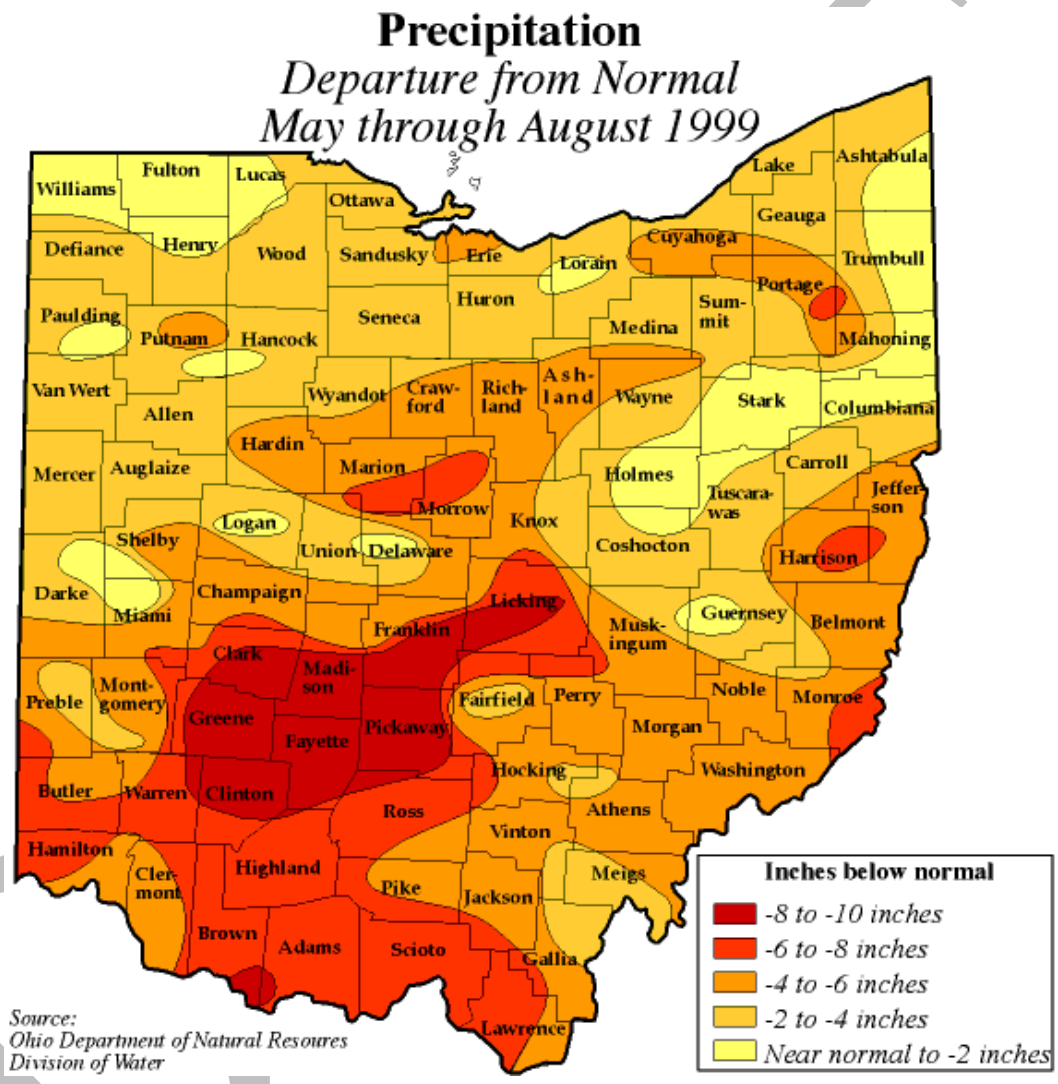


Figure 6: Precipitation Deficit in 1999

9.2.4 Probability of Future Damaging Drought

Having experienced 27 periods of at least mild drought conditions over the course of 115 years from 1896 to 2011, probability of a mild drought in any given year is estimated to be 27/115 = 0.23 or 23 percent. By looking at the 4 events of severe drought conditions

over the course of 115 years, probability of a severe drought occurring in any given year is estimated to be 4/115 = 0.03 or 3 percent.

However, not all drought periods lasted for a full year. Figure 7 is from the National Drought Mitigation Center at the University of Nebraska Lincoln shows the locations of severe drought conditions between 1895 and 1995. It also shows that severe drought occurs in the Franklin County area in central Ohio between 5 and 9.99 percent of the time. For the purpose of this plan, 5 to 9.99 percent chance will be used to evaluate this hazard.

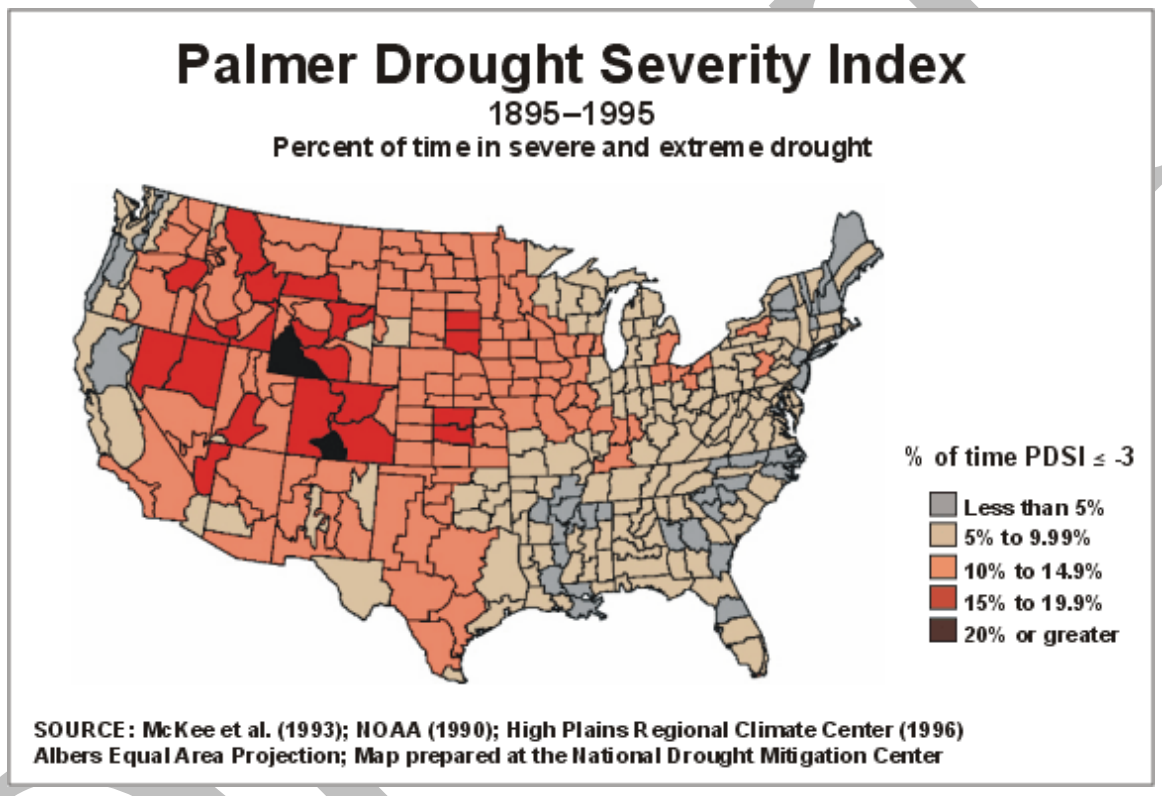


Figure 7: Percent of Time in Severe or Extreme Drought

9.3 Vulnerability Assessment – Drought

9.3.1 Overview of Vulnerability

A drought in Franklin County can have significant detrimental effect on the domestic water supply, especially for well-water, agriculture, and water-dependent recreational activities. Economic effects in Franklin County would include crop loss. No structural damage due to drought is anticipated in Franklin County.

9.3.2 Potential Impact of Drought

Negative impacts of drought would be experienced by agricultural interests, and some communities would need to reduce water usage in times of severe drought. Communities reliant on reservoirs built to endure times of drought may endure the impacts of drought better. The major crops in Franklin County are soybeans, corn, and wheat with totals of 24,455, 17,868, and 2,334 acres, respectively, harvested in 2007.

No damage to structures or infrastructure is anticipated due to drought.

9.3.3 Identifying Structures

No structures would experience damage due to drought.

Since no structures would experience damage due to drought, this updated plan, like the previous plan, does not identify existing or future buildings at risk of loss due to drought.

9.3.4 Exposure of Existing Buildings to Damages Due to Drought

No existing buildings are exposed to damage due to drought.

9.3.5 Exposure of Future Buildings to Damages Due to Drought

No future buildings will be exposed to damage due to drought.

9.3.6 Estimating Potential Loss

Methodology

Estimated potential dollar loss due to drought is estimated to be zero because no historical data is available for losses due to drought.

Estimated Potential Dollar Losses

The estimate potential dollar loss annually in Franklin County due to structural damage due to drought is $0.00.

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10.0 *Invasive Species Risk Assessment*

10.1 Invasive Species Update

Invasive species has been identified as a hazard by the 2010 Franklin County Rick Assessment and has been included for the first time into this plan. This section is completely new and will follow the same format as other sections for increased clarity.

Since invasive species can travel beyond the borders of any one state or county, any vulnerability of Ohio to invasive species can affect the species brought into Franklin County. Therefore, Ohio risks will be discussed in this section.

10.2 Hazard Profile – Invasive Species

10.2.1 Location

This hazard has the potential for affecting areas throughout Franklin County.

10.2.2 Extent of Damage

Picture of Infected Ash Tree-USDA NRCS

Of the invasive species in Franklin County, two that currently pose some of the greatest economic and environmental threats are the zebra mussel and the emerald ash borer. Each has already caused a substantial amount of economic and environmental damage in the state and is expected to continue. Because invasive species are easily transferred, it is hard to predict and mitigate any future exposures to new species. Any species has the potential to multiply and spread across the state causing havoc on the ecosystem and causing multi-million dollars of damage. There are multiple types of invasive species within Ohio, such as; autumn-olive, honeysuckle, buckhorns, common reed, garlic mustard, etc. However, for the purposes of this report only zebra mussels and the emerald ash borer will be analyzed.

10.2.3 Probability of Future Damaging Invasive Species

Since Ohio is a major player in the nation's transportation system, it is vulnerable to transportation related exposures to invasive species.

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10.3 Vulnerability Assessment – Invasive Species

10.3.1 Overview of Vulnerability

Submerged structures and infrastructure in bodies of water are at risk of being affected by zebra mussels. Due to a rapid multiplication, a town off Lake Michigan lost water for three days when a colony of zebra mussels clogged their water-intake pipe. Zebra mussels are easily transported on vessel hulls and multiply fairly rapidly.

Any ash tree within the state of Ohio has the potential to be affected by the emerald ash borer. It is not a question of if the emerald ash borer will affect an ash tree but rather when. The population is increasing and it is only a matter of time till it affects all the ash trees in the state. The emerald ash borer is a beetle that chews the inner bark and phloem of the ash trees. The feeding of the beetle creates holes that cut off the flow of nutrients and water to the rest of the tree.

10.3.2 Potential Impact of Invasive Species

The replacement of all the ash trees within Ohio parks, along streets and on private property is expected to cost between $700 million and $2.9 billion.

Although zebra mussels have impacted Ohio's waters, Franklin County has seen minimal impacts of this species. Those that are affected such as boaters and facilities that utilize water from the affected water bodies have been able to adapt to the introduction of this species.

10.3.3 Identifying Structures

Exposure of Existing Buildings to Invasive Species Damages

Structures identified as potentially at risk of damage due to invasive species are ones found in bodies of water, like water intake pipes. Therefore, if zebra mussels are known to be in the same water ways as an intake, regular maintenance can prevent damage to the facility using the intake. There is no current data shown for effects of invasive species on buildings.

Even though invasive species are an ever changing list, at the current time, no invasive species are shown to cause damage to any type of existing structures.

Exposure of Future Buildings to Invasive Species Damages

Future buildings should have the same vulnerability to invasive species as existing buildings. Currently, there are no buildings that are affected by any invasive species. Therefore, no damage is expected by invasive species.

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10.3.4 Estimating Potential Loss

Methodology

The 2010 Risk Assessment estimates that the cost to Ohioans can be as much as $4.2 billion and as little as $1.0 billion for the replacement of the ash trees to other resistant trees. The price will ultimately be dependent on the timeframe and the amounts that municipalities will be able to afford for the replacement of these trees. To obtain an estimated amount for Franklin County, these amounts will be divided up over 10 years and the 88 counties.

Estimated Potential Dollar Losses

Estimated potential dollar losses due to the emerald ash borer for Franklin County can be between $1.1 million to $4.7 million per year. Because Franklin County holds the state capital and a large number of parks, even the large amount may be a low estimate for potential dollars lost.

Because the invasive species hazard is relatively new, there is little to no historical data to use for estimating the cost accrued by this hazard. Zebra mussels have impacted Ohio's waters, but Franklin County has seen minimal dollars lost due to the introduction to this species.

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11.0 *Earthquake Risk Assessment*

11.1 Earthquake Update

For the 2011 Plan Update, information on earthquakes remain the same, other than new data on potential losses were utilized.

11.2 Hazard Profile – Earthquake

11.2.1 Location

An earthquake could affect any part of Franklin County. Franklin County is not located on a fault line, nor have any epicenters been located in Franklin County. The closest significant fault that might contribute to an earthquake in Franklin County is the New Madrid Fault, located in Missouri.

11.2.2 Extent of Damage

Although Ohio is not thought of as an earthquake-prone state, at least 160 earthquakes with epicenters in Ohio have been felt since 1776. Most have been felt only locally and have caused no damage or injuries. The largest historic earthquake in the state occurred in 1937. This event had an estimated magnitude of 5.4 and caused considerable damage in the town of Anna and in several other western Ohio communities. Ohio is on the periphery of the New Madrid Seismic Zone, an area in Missouri and adjacent states that was the site of the largest earthquake sequence to occur in historical times in the continental United States. In 1980, an earthquake with a magnitude of 5.3 on the Richter Scale and centered in Sharpsburg, Kentucky, was strongly felt throughout Ohio and caused minor damage in communities along the Ohio River in southwestern Ohio. In 1998, a 5.2 magnitude earthquake occurred in western Pennsylvania and caused some damage in the epicentral area. Three regions of the state have been identified as susceptible to seismic activity; however neither Franklin County nor its contiguous counties are included in these regions.

There are two different ways of describing the magnitude of an earthquake. One way measures peak ground acceleration. Peak ground acceleration is the maximum horizontal ground acceleration measured in centimeters per second per second (cm/sec^2). Peak ground acceleration can range from zero for an earthquake that is noticed by very few people to 350, which would a catastrophic event. A peak ground acceleration of 10 cm/sec^2 means that the shaking is equivalent to about 1 percent of the acceleration due to gravity. Generally, ground acceleration must exceed 15 cm/sec^2 for significant damage to occur. According to the U.S. Geological Survey (USGS) Earthquake Hazard Program and as shown in Figure 8, peak ground acceleration in Franklin County during an earthquake would measure around 6 cm/sec^2, as it is located near where the colors in the Figure 8 change from light blue to gray.

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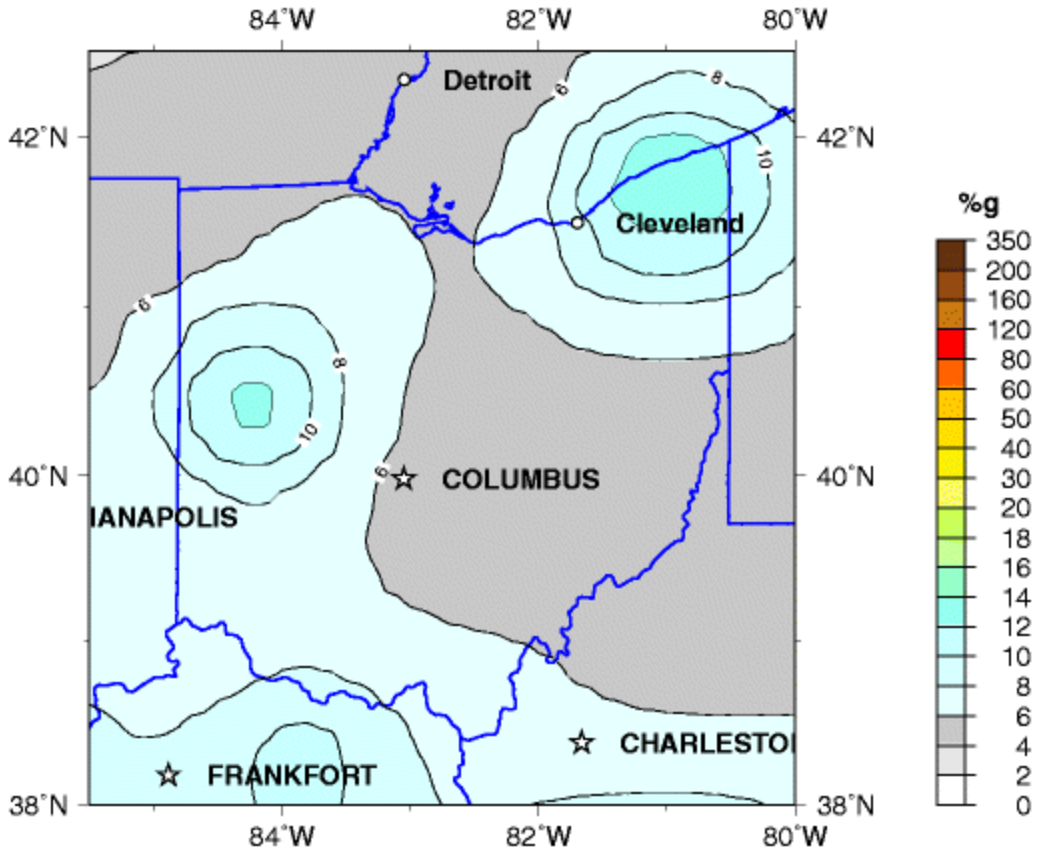

Figure 8: USGS Seismic Hazard Map – Ohio

Another way of measuring the intensity of an earthquake is the Modified Mercalli Intensity Scale. Measures on this scale range from 1, an earthquake that is not generally noticeable, to 12, an earthquake that causes complete destruction. Recent earthquakes in Ohio have been measured from 4 to 5 on the Modified Mercalli Intensity Scale. On the Modified Mercalli Intensity Scale:

- A measure of 4 is a moderate earthquake that is felt indoors by many people and rattles dishes, windows, and doors.
- A measure of 5 is a rather strong earthquake that is felt outdoors by most people and causes some dishes and windows to break.
- A measure of 6 is a strong earthquake that frightens people, causes windows, dishes, and glassware to break, and overturns or moves some heavy furniture but that causes slight structural damage.

11.2.3 Previous Occurrences

The USGS data show no earthquakes capable to causing moderate damage in Franklin County since 1974.

USGS data identify that there has been zero earthquakes with the epicenter within Franklin County. USGS data shows only 43 earthquakes impacting Ohio between 1776 and 2007 with a magnitude of at least 3.5.

11.2.4 Probability of Future Damaging Earthquakes

Given that USGS identifies Franklin County as having a 2% chance over 50 years to have an earthquake with a ground acceleration of 6 cm/sec^2. It can be concluded that to get ground acceleration large enough to cause significant damage, 15 cm/sec^2, the chance would be less than 2% over 50 years.

The estimated probability of a damaging earthquake affecting Franklin County in any given year is estimated at less than 1 percent per year. This is based on the analysis by USGS estimating a 2% chance over 50 year, which is a 0.04% chance of occurrence in one year.

As part of the 2011 Franklin County Natural Hazards Mitigation Plan Update it was decided that utilizing HAZUS would benefit Franklin County and the other jurisdictions involved to determine loss estimates for this regional hazard. These loss estimates are utilized primarily to plan and stimulate efforts to reduce risks from natural hazards and to prepare for emergency response and recovery. Since an earthquake is a wide spread hazard HAZUS was utilized for this particular hazard in order to generate more accurate loss estimations for the planning effort.

11.3 Vulnerability Assessment – Earthquake

11.3.1 Overview of Vulnerability

All structures and infrastructure in Franklin County are equally at risk of experiencing an earthquake. However, in a mild earthquake of the magnitude typically experienced in Ohio, no structural damage is anticipated. In other cases, damages are expected to be limited and examples of anticipated damages are broken dishes and windows and toppled file cabinets.

11.3.2 Potential Impact of Earthquake

Based on the history of earthquakes in Ohio, no structural damages are anticipated in Franklin County. However, for earthquakes, the available history covers a period of just over 200 years, which is relatively short period of time for an examination of earthquakes. Large earthquakes may only affect a location every several centuries or millennia.

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A very large earthquake affecting Franklin County might cause structural damage in dilapidated structures or structures that do not meet current building codes. Roads and bridges might be damaged and trees and power lines might fall.

Thus the impact of an earthquake might range from negligible to minor damage. Based on over 200 years of experience in Franklin County, there will most likely be no damage or very slight damage. If in the worst case scenario a magnitude 5.4 earthquake, the strongest earthquake in Ohio's history, were to have an epicenter in the center of Franklin County, then moderate damage would be expected.

HAZUS estimates that there are 386,000 buildings in the region which have an aggregate total replacement value of 91,875 million. For a 5.4 magnitude earthquake, HAZUS estimates that about 54,130 buildings will be at least moderately damaged. This is 14.0% of the total number of buildings in the scenario. There are an estimated 10,219 buildings that will be completely destroyed by having over 50% damage to the structure. Table 17, shows an estimated total damage for each occupancy type within Franklin County that can be expected.

Table 17: Building Exposure by Occupancy Type for a 5.4 Magnitude Earthquake

Occupancy	Expected Buildings Damaged				
	None	Slight	Moderate	Extensive	Complete
Single Family	186,783	65,916	29,119	6,759	1,481
Other Residential	37,839	14,521	7,350	1,714	341
Commercial	13,772	4,798	3,623	1,181	202
Industrial	3,502	1,141	926	308	45
Agricultural	664	200	169	58	8
Religion	1,147	443	329	114	24
Government	400	149	130	39	10
Education	500	172	143	46	11
Total:	244,607	87,340	41,790	10,219	2,122

The total building related economic losses are $7,367,070,000. For capital stock loses only, loses are $6,150,490,000; 61.0% of which was residential and 29.0% is non-residential. No damage is expected for critical facilities. However, functionality of these buildings will be limited. Of the 3,855 hospital beds available before the earthquake, only 1,518 hospital beds (39.0%) will be available after the event. Of the 40 police stations and 30 fire stations there will only be 14 (35.0%) and 19 (63.3%) stations, respectively, with greater than 50% functionality.

Please note that this is one data point and the use of HAZUS as part of the earthquake analysis generated slightly different numbers structures within the region. It is still important to know that this tool is out there and can be updated to reflect the more accurate information contained in HAZUS.

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11.3.3 Identifying Structures

Exposure of Existing Buildings to Earthquake Damages

In this update, the age of a structure is used to estimate the potential damage an earthquake may have in Franklin County.

All existing buildings have the potential to experience an earthquake. Given no history of damage in Franklin County due to earthquakes, damages are estimated to be limited to the more dilapidated structures and structures with unreinforced masonry. The number of residential structures in Franklin County that are at least 50 years old is 169,283. Of these structures, dilapidated structures would be expected to endure the most damage over all.

Exposure of Future Buildings to Earthquake Damages

All future structures will also have the potential to experience an earthquake. However, given that new structures must meet current building codes and given the expected magnitude of earthquakes in the County, no property damages are anticipated.

11.3.4 Estimating Potential Loss

Methodology

USGS data was used to identify that there is no evidence that an earthquake has caused any damage in Franklin County since 1776. Therefore, do dollars have been lost to earthquakes.

Estimated Potential Dollar Losses

Estimated annual potential dollar losses, due to the type of very small earthquake, anticipated for Franklin County are $0.00.

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12.0 *Summary of Risk Assessment Findings*

The purpose of completing a rigorous assessment of risk is to inform decision-making about the mitigation actions that are most appropriate to implement in relation the hazards affecting Franklin County. Table 17 shows that Franklin County can expect the greatest losses from flooding. Annualized anticipated losses due to flooding are more than all other losses combined. The next biggest estimated annual dollar loss is severe summer weather. The estimated annual cost of severe summer weather is due to two significant hail events. Annualized anticipated losses due to tornado are comparable to the anticipated losses due to severe winter weather, but have a lesser annual probability of occurring. Even though the potential for a 100-year flood to occur is only 1%, the risk of billions of dollars in damage for that event makes it a very devastating hazard. Thus, the majority of actions proposed in this mitigation plan address potential damage due to flooding. Additional information can be analyzed by referring to the 2010 Risk Assessment report, **Attachment #2**.

Table 18: Risk Assessment Findings

Hazard	Vulnerable Locations	Annual Probability of Occurrence in Franklin County	Estimated Annual Dollar Loss
Flood	Special Flood Hazard Areas	100%	$103,214,444
Severe Winter Weather	Entire County	100%	$925,333
Tornadoes	Entire County	48%	$931,639
Severe Summer Weather	Entire County	100%	$10,357,465
Drought	Entire County	5 to 9.99%	$0.00
Invasive Species	Entire County	100%	>$1,000,000
Earthquake	Entire County	<1%	$0.00

The conclusion of the risk assessment findings is that the greatest damage attributable to a single hazard occurring in Franklin County is flooding. Thus, the hazard that will receive immediate attention and the greatest number of county resources will be flooding.

In the risk assessments conducted a worst case scenario was performed for each hazard. A vulnerability analysis of these scenarios is shown in Table 18. Unlike the annual estimated losses, the total anticipated losses due to a worst case scenario cannot be compared due to the significance variations of each one of these hazards. For example, even though the damage value is on the same magnitude for flooding and earthquakes, the probability of a major flood event occurring is significantly higher than a catastrophic earthquake in Franklin County. It is also important to note that this table represents the total number of at-risk structures. Based off of multiple circumstances that are

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unpredictable in nature, the damage values may overestimate the actual damage if a worst case scenario were to happen.

Table 19: Vulnerability Analysis

Hazards	Number of Structures At-Risk				Damage in Dollars ($1000)			
	Residential	Non-Residential	Critical	Total	Residential	Non-Residential	Critical	Total
Flooding	3,806	125	4	3,935	$6,793,454	$3,459,128	$66,047	$10,318,629
Severe Winter Weather	169,283	55,017	0	224,300	$18,200,000	$5,200,000	$0	$23,400,000
Tornadoes	16,824	3,187	31	20,011	$1,101,688	$1,327,619	$462,000	$2,891,307
Severe Summer Weather	169,283	55,017	0	224,300	$18,200,000	$5,200,000	$0	$23,400,000
Invasive Species	0	0	0	0	$0	$0	$0	$0
Drought	0	0	0	0	$0	$0	$0	$0
Earthquake	127,201	14,270	0	141,471	$3,754,020	$2,396,470	$0	$6,150,490

Because critical facilities are tax exempt, they are not given a value by the county auditor. This makes it extremely difficult when assessing the value to each facility. For each hazard, aside from flooding and tornadoes, all critical facilities are assumed to withstand normal forces and events based on the hazards affecting Franklin County. This is assumed because these facilities are typically designed to meet building code and they are typically maintained by the personnel occupying the building. Therefore, no damages are assumed for these types of facilities. In the case of flooding, HAZUS has assigned a value of damage to only the structures that will be affected. This value indicates that the critical facilities will only be slightly impaired and not completely damaged. To evaluate the amount of damage to critical facilities in the worst case scenario for a tornado, each facility in the path of most destruction was evaluated on an individual basis. This is the same path that the other structures were evaluated on. The value for this item is merely an estimate and can greatly differ by the path of the tornado.

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13.0 *Mitigation Goals*

13.1 Mitigation Goals Update

Goals express aspirations about long-term conditions rather than specific measures.

13.2 Goals

The Franklin County Natural Hazards Mitigation Plan Core Group developed problem statements, goals and objectives in an incremental, step-by-step process. This section summarizes the process used to develop the Action Plan for the four natural hazards identified in the mitigation plan including flooding, severe thunderstorms and lightning, tornadoes and severe winter weather.

The mission of the Franklin County Natural Hazards Mitigation Plan is to provide a comprehensive view of natural hazards in Franklin County and make recommendations designed to protect citizens, essential facilities, infrastructure and private property from natural hazards. This can be achieved by incorporating these ideas into existing and future land use planning documents, identifying at-risk infrastructure and increasing public education about natural hazards.

The Core Group examined existing and repetitive problems occurring in Franklin County and the mitigation plan goals were identified based on their findings. The goals focus on a specific area serving as an umbrella over several problem statements related to that goal.

The plan goals determined by the Core Group provide the foundation for the Action Item recommendations. From each mitigation goal, ideas for implementation have been included to reduce or prevent losses from natural hazards in Franklin County, they are as follows:

I. **Manage Development:** Integrate goals and action items from the Franklin County Natural Hazards Mitigation Plan into existing and future land-use planning documents, and existing regulatory programs.

II. **Maintain Public & Private Infrastructure:** Develop inventories of at-risk infrastructure and prioritize preventative measures in areas vulnerable to natural hazards.

III. **Manage Debris Along Streams & Waterways:** Involve watershed and natural resource management, and all other interested parties, in natural hazards mitigation planning to rehabilitate and maintain streams and waterways.

IV. **Minimize Damage to Public & Private Property:** Strengthen partnerships between government agencies and private sector businesses to develop public awareness of and involvement in natural hazards mitigation strategies.

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V. **Minimize Loss of Life from Severe Weather Hazards:** Develop and implement public education programs to increase public awareness and understanding of the risks associated with natural hazards.

VI. **Reduce the Number of Repetitively Damaged Existing Structures:** Protect buildings in repetitive loss areas through acquisition, elevation or other mitigating activity.

13.3 Mitigation Strategies & Additional Ideas for Implementation

There are a number of ways to mitigate the effects of future disasters on communities. This section focuses on the types of actions communities have specifically identified to mitigate risks and potential losses.

The following mitigation actions are discussed in four primary areas: preventative measures, property protection, resource protection and structural projects.

13.3.1 Preventative Measures

Preventative measures are those measures put in place to protect new and future development from potential hazards. Building codes, standards for manufactured homes, planning, zoning, subdivision regulations, green space preservation and stormwater management are examples of preventative measures.

13.3.2 Building Codes

Building Codes are a useful tool in addressing most of the hazards a community may face, including earthquakes, tornadoes, high winds and snow storms. Provisions can include anything from retrofitting roofs to accommodate heavy snows, to requiring new buildings to have tornado "safe rooms".

13.3.3 Manufactured Home Standards

Aside from location, manufactured or "mobile" homes are generally not regulated at the local level. They must meet construction standards set by the US Department of Housing and Urban Development (HUD). All mobile homes constructed after June 15, 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards.

Mitigating activities to protect mobile homes from wind damage includes anchoring the mobile home to a permanent foundation.

13.3.4 Planning and Zoning

The intent of planning activities is to direct development away from areas considered to be high hazard. Various local planning documents are referenced in the flooding chapter of this plan.

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Zoning ordinances or resolutions provided criteria for how land should be used within a zoning district.

13.3.5 Property Protection

Property protection measures are used to modify buildings or property subject to damage to lessen its impact. Flood proofing a structure is a form of property protection. A flood proofed structure is designed to allow the structure to flood with minimal damage, so the structure is usable relatively quick after the event.

13.3.6 Physical Barriers

A number of alternatives exist to protect property from the effects of flooding. Barriers can be created to keep a flood hazard away. The Franklinton Floodwall is an example of a flood barrier. Completed in 2004, this structure is designed to re-direct the flow of water away from improved properties in low-lying areas. Relocation, building elevation and demolition are other alternatives available to removing at-risk structures from hazard areas.

13.3.7 Retrofitting

Retrofitting involves modifying a property or site to minimize or prevent damage. Flood retrofitting measures can include both dry and wet flood proofing. In dry flood proofing, walls are coated with waterproofing compounds and any openings are closed. Wet flood proofing operates under the assumption that flooding will occur and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage.

13.3.8 Resource Protection

Resource protection involves preserving natural areas such as fields, floodplains and wetlands in a natural state. This chapter covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while improving the overall environment. Many of these issues have been touched upon in the hazard specific chapters.

13.3.9 Wetland Protection

Wetlands are generally found in floodplains and depression areas of a watershed. Wetlands serve as a depository for floodwaters, which reduces the flow of water downstream. They also serve as a natural filter, which helps to improve water quality, and provide habitat for fish, wildlife and plants.

Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency

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under Section 404 of the Clean Water Act. Before a "404" permit is issued, the plans are reviewed by several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps' jurisdiction or that are addressed by a nationwide permit may be regulated by local authorities.

If a permit is issued by the Corps or the county, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. When a wetland is mitigated at another site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an established one. Second, a new wetland in a different location will not necessarily have the same flood damage reduction benefits as the original one did.

13.3.10 Erosion and Sedimentation Control

Farmlands and construction sites typically contain large areas of exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow destabilize and wash away the soil.

Sediment suspended in the water tends to settle out where flowing water slows down. It can clog storm sewers, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more is left in the channels. The result is either clogged streams or increased dredging costs.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and sediment basins. Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

13.3.11 River Restoration

The objective of river restoration is to return streams, stream banks and adjacent land to a more natural condition. A key component of these efforts is to use appropriate native

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plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants and rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

Restoring the right vegetation to a stream helps reduce the amount of sediment entering the water, can reduce flood damage by slowing the velocity of water and can reduce long term maintenance costs.

13.3.12 Structural Projects

Structural projects are usually funded by public agencies and constructed to protect people and infrastructure from damage due to natural hazards. Floodwater management is the primary focus of structural projects. A good example of this is either a floodwall or levee.

13.3.13 Drainage and Storm Sewer Improvements

Man-made ditches and storm sewers help drain areas where the surface drainage system is inadequate, or where underground drainage ways may be safer or more practical. Storm sewer improvements include installing new sewers, enlarging small pipes and preventing back flows. Drainage and storm sewer improvements usually are designed to carry the runoff from smaller, more frequent storms. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving stream or river has sufficient capacity to handle the additional volume and flow of water. To reduce the cumulative downstream flood impacts of numerous small drainage projects, additional detention or run-off reduction practices should be provided in conjunction with the drainage system improvements.

A combination of restored wetland detention, vegetation and infiltration trenches that reduce runoff can be implemented in conjunction with stormwater system improvements.

13.3.14 Drainage System Maintenance

Detention ponds, stream channels, swales, ditches and culverts all serve as drainage systems. Drainage system maintenance is an ongoing program to clean out blockages caused by an accumulation of sediment or overgrowth of weedy, non-native vegetation or debris, and remediation of stream bank erosion sites.

"Debris" refers to a wide range of blockage materials that may include tree limbs and branches that accumulate naturally, or large items of trash or lawn waste accidentally or intentionally dumped into channels, drainage swales or detention basins. Maintenance activities do not alter the shape of the channel or pond, but they do affect how well the drainage system can do its job. Sometimes there is a fine line that separates debris that should be removed from natural materials that helps form habitat. Therefore, written procedures that are consistent with state laws and environmental concerns are usually needed.

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14.0 *Mitigation Action Items*

For each goal, the Core Group Committee used the results of the risk assessment to identify action items that might move the County toward achieving its long-term goals. Goals and action items were modified slightly based on the results of the updated Risk Assessment.

14.1 Mitigation Action Items Update

At the June, 2011 meeting, the Core Group Committee and participating jurisdictions reviewed mitigation objectives. Some objectives were identified as having been achieved in Franklin County since the initial version of this plan was prepared. Completed objectives for the County remain and are briefly described in discussions below to show mitigation accomplishments since the initial plan was developed.

14.2 Mitigation Action Items Prioritization Process

14.2.1 Prioritization Methodology

The Mitigation Core Group began the prioritization process by examining the action items from the original version of the plan and taking a risk based approach. The risk based approach agreed upon by the committee was to utilize the hazard ranking from the Risk Assessment for Franklin County and group the action items based on the hazard they address. For example, Short-term action item #1 addresses flooding and flooding is the #1 hazard in Franklin County, so that project is ranked as a #1 priority project. In the Risk Assessment for Franklin County the hazards were carefully ranked according to a pre-determined methodology with the assistance of subject matter experts, so the Core Group adopted that methodology to ensure consistency across all plans. This process generated results that the Mitigation Core Group and Franklin County Emergency Management & Homeland Security felt represented the true intent of the prioritization process.

14.2.2 Action Items

This plan was designed to serve as a county-wide strategic plan which jurisdictions can use to guide local mitigation efforts. Included in this plan are short-term action items, long-term action items and jurisdiction based action items.

The core group worked to define the short-term and long-term action items. The short-term action items were considered the higher priority items in that they addressed a specific problem, they could be completed in less than five years and funding could be reasonably expected. The long-term action items are those items considered to be continuous or take more than five years. Funding requirements range from very little (planning issues) to very expensive (replacing aging infrastructure).

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14.2.3 Natural Hazards Mitigation Plan Action Items

This mitigation plan identifies short and long-term action items developed through core group activities, research and data collection. These activities may require federal and state grant funding, or be implemented at the local level through partnerships and cooperation. Each Action Item is separated into four components that include the following:

- **Ideas for Implementation:** Actions that can be taken to meet the goals of the action item
- **Coordinating Organization:** Organizations willing to organize resources, identify funding sources (if necessary) and monitor activity implementation
- **Timeline:** An estimate of the amount of time needed to implement the action
- **Plan Goals Addressed:** This identifies the specific goal the action item addresses
- **Benefit Cost Review:** Provides a comprehensive review of monetary and non-monetary costs and benefits associated with each action. A Benefit Cost Review for all the short-term and long-term action items was conducted.

In addition to the action items developed by the core group, local jurisdictions were asked to update and create action items related specifically to their jurisdictions. They were given copies of the goals and action items developed by the core group in order to guide their efforts. Based on the goals identified, there are seven short-term and five long-term action items developed by the Core Group Committee. Additional local jurisdiction Action Items are listed in the section, Jurisdictional Mitigation Actions.

Since the Core Group Action Items were developed in the previous plan, some have been addressed and are as follows:

- **Short-term Action Item #1:** This new action item involves the purchasing of property along Whims Ditch to reduce repeat property damage due to flooding.
- **Short-term Action Item #2:** This new action item encourages more storm water retention to reduce the amount of flooding and bank erosion.
- **Short-term Action Item #3:** The purchase of new sirens in halfway complete to cover the remaining parts of the County.
- **Short-term Action Item #6:** This new action item is to develop a system to better help emergency responders evacuate the population with transportation needs.
- **Long-term Action Item #1:** MORPC was added as an advocate to the plan.
- **Long-term Action Item #2:** MORPC was added as a coordinating organization.
- **Long-term Action Item #5:** FEMA kits were added to awareness efforts.
- **Long-term Action Item #6:** The number of repetitive loss properties was updated.

Since the previous Plan a few of the Core Group Action Items have been completed. The description of completed action items can be found in **Appendix VI**. Here is a list of the completed action items:

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- **Completed Action Item #1:** Flooding in the City of Whitehall has been alleviated by the removal of debris from nearby ditches and streams.
- **Completed Action Item #2:** The Blacklick logjam has been removed.
- **Completed Action Item #3:** The Reverse 911 System has been purchased in cooperation with the Ohio State University and distributed.
- **Completed Action Item #4:** NOAA weather radios have been distributed to any organization that wanted one.

14.3 Short-Term Action Items

Short-term action items are activities that may be implemented, sometimes with existing resources, within one to five years.

SHORT-TERM ACTION ITEM #1

PROBLEM:

Properties along Whims Ditch in the Franklin Township area have a history of repeat flooding events that cause damage to homes and property.

ACTION ITEM:

Acquire as many homes as possible within the Whims Ditch floodplain, which have historically been subject to repeated flooding.

IDEAS FOR IMPLEMENTATION:

- Purchase the subject land/homes based upon appraised values.
- Evaluate the existing structures for asbestos and other hazards, destroying the structures, and returning the land to its pre-development state.
- Maintain the vacant land and ensure appropriate deed restrictions are in place upon the properties to prevent future development.
- Implement a Phase II project to acquire additional homes in the floodplain.

STATUS:

- Ongoing. This project is 25% complete.
- Phase I of this project is underway at the time of this plan update. 15 homes are set for acquisition and demolition.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- Franklin County Engineer's Office
- Franklin Township

TIMELINE:

Ongoing: 15 houses are set for acquisition and demolition in 2011-2012.

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PLAN GOALS ADDRESSED:

- Minimize Damage to Public and Private Property

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Number of people affected by hazard	Over 50	Less than 50	Less Impact
Area affected	10 acres	Less than 10 acres	Area still affected but less impact
Number of parcels	36	Less than 36	Less Impact
Loss of Life	none	none	NA
Injury	none	none	NA
Benefits			
Reduction in repetitive loss claims.			
Reduce City's expense in cleaning up after flood events.			
Costs			
Necessary time to implement entire project			
Voluntary Process			
Expensive to implement			

SHORT-TERM ACTION ITEM #2

PROBLEM:

There are increased impervious surfaces in multiple watersheds around the County. Siltation from bank erosion is a major cause of impairment in streams near new development. The source of the increased volume of stormwater is an increase in development and non-pervious surfaces. There have been extensive changes in the landscape from agricultural to residential areas and businesses throughout Franklin County. Stormwater retention ponds from housing developments were not designed to reduce volume, and there is a lack of floodplain to dissipate the energy of the flow. Most subdivisions do not have stormwater infrastructure to address volume or water quality.

ACTION ITEMS:

- Create wetlands and rain gardens where the stormwater retention ponds are not designed to reduce volume. Implement land management practices to reduce the volume of stormwater runoff from developed communities.
- Reconnect 150 linear feet of Dysart Run to the floodplain and stabilize 3 sections of bank with severe erosion to reduce erosion and siltation
- Increase stormwater retention/detention features along waterways like, Holcomb Ditch, to reduce and/or slow the flow of stormwater.

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IDEAS FOR IMPLEMENTATION:

- Stabilize sections of bank with severe erosion to reduce erosion and siltation.
- Form a group of stakeholders to determine the extent and cause of repeat flooding problems.
- Evaluate potential solutions for technical feasibility, costs/benefit and environmental impact.
- Research and secure funding for potential solutions.

STATUS:

- No action has been taken on this project. No funding has been allocated for these priorities.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- Franklin County Engineer's Office
- City of Hilliard
- Norwich Township
- Ohio Department of Natural Resources (ODNR)

TIMELINE: Ongoing. February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Manage Debris Along Streams and Waterways
- Minimize Damage to Public and Private Property

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Increased impervious surfaces	Numerous	Less impervious surface	Less Impact
Number of people affected by hazard	Numerous	Numerous	Less Impact
Area affected	Franklin County	Less Impact in Franklin County	Less Impact
Number of parcels	Numerous	Less Impact	Less Impact
Loss of Life	NA	NA	NA
Injury	NA	NA	NA
Benefits			
Coordination with other affected areas to pool dollars			
Less impervious area equals less stormwater and localized flooding			
Less maintenance on systems that are taxed by stormwater and localized flooding.			
Costs			
Time to implement to change regulations			
Coordination between municipalities			

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SHORT-TERM ACTION ITEM #3

PROBLEM:

Development has occurred at a rapid pace in Franklin County and lands that had previously been used for agricultural purposes are quickly being developed as housing developments. This intense development has increased the population of Franklin County and left gaps in the coverage area of the outdoor warning siren system. FCEM&HS sees a need for fully covering the county with outdoor warning sirens.

ACTION ITEM:

Develop comprehensive strategies to increase siren coverage as well as promote weather radios as a reliable means of indoor warning.

IDEAS FOR IMPLEMENTATION:

- Prioritize areas of the county in need of sirens based on current and expected population growth and the costs/benefits.
- Work with local jurisdictions to identify gaps and secure funding to remedy them.
- Seek out public funding to expand the outdoor siren warning system to areas of the county with inadequate coverage.
- Encourage or require developers to install outdoor sirens in new housing developments. Create public/private partnerships with developers.
- Research and secure funding for potential solutions.
- Seek out private or public funding to purchase NOAA weather radios for use in public and private schools, trailer courts, churches, nursing homes, etc.

STATUS:

- Ongoing. 30% complete. 22 Sirens purchases throughout the county.

COORDINATING ORGANIZATION:

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- All 42 local jurisdictions

TIMELINE:

- This project will be in effect for the life of this plan. February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Minimize Loss of Life from Severe Weather Hazards

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Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Increased need for siren coverage	Need additional sirens to cover the gaps in Franklin County	Full coverage of Franklin County	Less Impact
Number of people affected by hazard	In the thousands	Less than 100	Less Impact
Area affected	Most of Franklin County	Significantly less of Franklin County	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	Less potential loss of life
Benefits			
More residents are aware of the hazard of tornados			
Potentially less deaths due to sirens			
Costs			
Securing funding			
Long-term maintenance costs			
Municipality buy-in to process			

SHORT-TERM ACTION ITEM #4

PROBLEM:

Back-up generators are essential during power outages to maintain critical public functions. These functions include emergency communications, traffic signals, pump and water booster stations.

ACTION ITEM:

Seek funding for back-up generators for critical public buildings and infrastructure.

IDEAS FOR IMPLEMENTATION:

- Each community should prioritize critical public functions and back-up generator needs.
- Funding sources should be researched and secured.

STATUS:

- Ongoing. Individual jurisdictions have prioritized their critical facilities and added back-up generators as they are able and budgets allow.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security
- All 42 jurisdictions

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TIMELINE:

- February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Minimize Loss of Life from Severe Weather Hazards

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Increased need for back-up generators	Several areas within Franklin County have the continued need for back-up generators	Less need for back-up generators	Less Impact
Number of people affected by hazard	Over 100	Less than 100	Less Impact
Area affected	Some of Franklin County and listed municipalities	Significantly less of need for back-up generation	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	Less potential loss of life
Benefits			
Less critical facilities without power during needed times for operation			
Critical Facilities able to respond to needs of community			
Costs			
Not a fundable FEMA project as a standalone project			
Funding is a concern			

SHORT-TERM ACTION ITEM #5

PROBLEM:

Many municipalities do not have adequate lightning detection/warning systems for city parks and other outdoor recreation areas.

ACTION ITEM:

Seek funding for lightning detection/warning systems for city parks nad other outdoor recreation areas.

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IDEAS FOR IMPLEMENTATION:

- Each community should assess lightning detection/warning needs.
- Discuss impact and funding with those jurisdictions currently operating lightning detections systems.
- Funding resources should be researched and secured.

STATUS:

- Ongoing. Individual jurisdictions have purchased lightning detection systems as they are able and budgets allow.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security
- All 42 local jurisdictions

TIMELINE:

- February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Minimize Loss of Life from Severe Weather Hazards

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Increased need for lightening detection systems	Several areas within Franklin County do not have lightening detection systems	Greater Coverage within Franklin County's Parks System	Less Impact
Number of people affected by hazard	Various	Less	Less Impact
Area affected	Some of Franklin County and listed municipalities mostly public parks	Significantly less need for other forms of warning	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	Less potential loss of life
Benefits			
Reduction in the number of injuries from lightning strikes			
Costs			
Not a fundable FEMA project as a standalone project			
Funding is a concern			

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SHORT-TERM ACTION ITEM #6

PROBLEM:

Franklin County has a significant population of citizens with functional needs. These needs range from being reliant on life sustaining equipment to speaking a foreign language to not having access to a vehicle.

ACTION ITEM:

Development of a plan and strategy to ensure residents with functional needs are properly cared for in an emergency.

IDEAS FOR IMPLEMENTATION:

- Develop a registry to identify residents who may need additional assistance in an emergency.
- Develop further relationships with direct care providers throughout the county.

STATUS:

- Ongoing. Functional Needs Sheltering Plan in Draft form as of the writing of this plan. 75% Complete.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security (FCEM&HS)

TIMELINE: February 2007- February 2013.

PLAN GOALS ADDRESSED:

- Minimize loss of life from severe weather hazards

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Functional Needs Populations	Throughout the county- some are mapped through GIS	Better data on the location of these populations	Less Impact
Number of people affected by hazard	Various	Less	Less Impact
Area affected	Pockets of Franklin County	Less effect areas still at risk	Less Impact
Number of parcels	Numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Better coordination to target population with functional needs			
Costs			
Time consuming effort to identify these populations			
Time commitments of personnel to coordinate these efforts is extensive			

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SHORT-TERM ACTION ITEM #7

PROBLEM:

Invasive plant species are quickly taking over the landscape in Central Ohio creating hazardous natural resources situations. In the U.S. alone, invasive plants cause more than $120 billion a year in damages to agriculture, industry, recreation, forestry, human health and the environment. Though there are more than 50 species on the ODNR Invasive Species list, the main species of concern in Central Ohio are:

- Bush and vine honeysuckles (Lonicera japonica, L. maackii, L. morrowii, L. tartarica)
- Wintercreeper and Winged Euonymous (Euonymous alatus, E. fortunei)
- Japanese Knotweed (Polygonum cuspidatum)
- Pragmites/Common Reed Grass (Phragmites australis)
- Bradford Pear (Pyrus calleryana)
- English Ivy, Myrtle and Asiatic Bittersweet (Hedera helix, Vinca minor, Celastrus orbiculatus)
- Japanese Barberry and Privet (Berberis thunbergii, Ligustrum sp.)
- Tree of Heaven (Ailanthus altissima)
- Garlic Mustard (Alliaria petiolata)

ACTION ITEM:

To remove and/or chemically treat 5% of the invasive plant species each year within Franklin County, targeting areas of major concern, particularly those surrounding reservoirs. Though this will not eliminate them, it would be a start to control them if the areas that have been removed in previous years are maintained free of invasive species by once a year spraying.

IDEAS FOR IMPLEMENTATION:

- Encourage those agencies that are actively removing invasive species to continue doing so.
- Encourage those Government agencies that own land to develop and start implementing an invasive species control plan.
- Encourage private land owners to remove invasive species on their properties and direct them to already existing educational materials regarding invasive plants.
- Educate land owners about grants available to help remove invasive species.
- Encourage continued partnerships and the formation of new partnerships for the removal of invasive species on public lands.

STATUS: New

COORDINATING ORGANIZATION(S):

- Ohio Invasive Plants Council
- City of Columbus Watershed Management
- Local Government and County Park Departments, ODOT, ODNR, Watershed Groups, Environmental Groups

TIMELINE:

- February 2012- February 2017.

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Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Invasive species growing faster than able to eradicate	Several areas within Franklin County	Less Invasive species	Less Impact
Number of people affected by hazard	Numerous	Less	Less Impact
Area affected	Pockets of Franklin County	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Removal of invasive species help with the natural environment			
Costs			
Time consuming effort remove invasive species and must keep up on it			
Expensive to upkeep			

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14.4 Long-Term Action Items

Long-term action items may require new or additional resources and may take over five years to implement.

LONG-TERM ACTION ITEM #1

Integrate the goals and action items from the Franklin County Mitigation Plan into existing and future land use planning documents, and existing regulatory programs.

IDEAS FOR IMPLEMENTATION:

- Use the plan to influence development standards throughout Franklin County, such as flood damage reduction requirements, so that standards are in place prior to annexation.
- Incorporate goals and objectives from the plan into future regional planning documents completed by local jurisdictions, MORPC and other agencies doing planning.
- Encourage MORPC and Franklin County Economic Development and Planning Department to be advocates of the mitigation plan, and to incorporate goals and objectives from the plan into future planning documents.
- Partner with the banking and insurance industries to sensitize them to flood issues and educate them about the mitigation plan.
- Partner with Developers and the Development Community about density and floodplain issues, and educate them about the mitigation plan.
- Townships have authority in Ohio Revised Code to pass levies to purchase land for green space. Investigate possibilities of using this tool in high hazard/risk areas.
- Incorporate stormwater management strategies and standards developed by the Darby Creek Watershed Task Force into future development in Franklin County.
- Integrating planning best practices into community planning projects to ensure development is discouraged in at-risk areas and areas without existing infrastructure.
- Encourage jurisdictions to identify Priority Conservation Areas to preserve high hazard/risk areas using MORPC's "Balanced Growth Plans" and "Watershed Protection Plans".

STATUS:

- 10% Complete. Partnerships are being formed and mitigation actions are being considered in planning documents.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- Franklin County Economic Development and Planning Department
- Mid-Ohio Regional Planning Commission (MORPC)

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TIMELINE:

- February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Manage Development

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Many planning activities and documents do not recognize mitigation as a strategy	Sporadic coverage of mitigation efforts within other planning documents	Greater Coverage within Franklin County	Less Impact
Number of people affected by hazard	Entire County	Better coordination	Less Impact
Area affected	Entire County	Less affected area	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Better coordination for overall better planning for Franklin County			
Costs			
Time consuming effort			
Participation critical from all entities involved- time commitment could be restrictive			

LONG-TERM ACTION ITEM #2

Develop inventories of at-risk infrastructure and prioritize preventative measures in areas vulnerable to natural hazards.

IDEAS FOR IMPLEMENTATION:

- Work with local jurisdictions to identify at-risk, aging water and sewer systems, and estimate the replacement cost and prioritize replacement needs.
- Encourage municipalities to analyze the impact new development will have on existing infrastructure.
- Develop incentives for local governments, citizens and businesses to pursue hazard mitigation projects.
- Encourage municipalities to incorporate hazard mitigation strategies into capital improvement budget planning.
- Identify bridges and roadways vulnerable to natural hazards.

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STATUS:

- Ongoing. 25% complete. FCEM&HS maintains GIS maps of the County's infrastructure including its relation to hazard areas. Each jurisdiction maintains information on the condition of their infrastructure and whether it is at-risk due to age or location.

COORDINATING ORGANIZATION(S):

- Local Jurisdiction water and sewer departments
- Franklin County Engineer's Office
- Franklin County Emergency Management & Homeland Security

TIMELINE:

- February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Maintain Public & Private Infrastructure

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Many planning activities do not recognize mitigation as a strategy	Sporadic coverage of mitigation within other planning efforts	Greater Coverage within Franklin County	Less Impact
Number of people affected by hazard	Various	Less	Less Impact
Area affected	Pockets of Franklin County	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Better coordination to target needed population for transportation needs			
Costs			
Time consuming effort to delineate sensitive population			

LONG-TERM ACTION ITEM #3

Involve watershed and natural resource management, and other interested parties, in natural hazard mitigation planning to rehabilitate and maintain streams and waterways.

IDEAS FOR IMPLEMENTATION:

- Establish a group or committee made up of all individuals or entities producing localized area plans. Examples include the City of Columbus, MORPC and

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FCEM&HS. Identify clear roles for participants, meeting regularly to evaluate mitigation strategies.

- Establish and maintain a local planning library made up of all development, growth and area planning guidelines.
- Establish a group or committee made up of all parties interested in streams and waterways, including conservation groups, to focus on stream maintenance in Franklin County. Examples include Big Darby and Olentangy River watershed groups. Identify clear roles for participants, meeting regularly to evaluate mitigation strategies.
- Conduct a review of the Franklin County Natural Hazards Mitigation Plan every 5 years by evaluating mitigation successes, failures and areas that were not addressed.

STATUS:

- Ongoing. 25% complete. Watershed groups and the City of Columbus Watershed Management were all invited to participate in the planning process.

COORDINATING ORGANIZATION:

- Franklin County Emergency Management & Homeland Security (FCEM&HS)

TIMELINE:

- February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Manage Debris Along Streams and Waterways.

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Populations and property needing streams and waterways	Several areas within Franklin County which need to be delineated	Greater Coverage within Franklin County	Less Impact
Number of people affected by hazard	Various	Less	Less Impact
Area affected	Pockets of Franklin County	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Better coordination to target needed population for transportation needs			
Costs			
Time consuming effort to delineate sensitive population			

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LONG-TERM ACTION ITEM #4

Strengthen partnerships between government agencies and private sector businesses to develop public awareness of and involvement in natural hazard mitigation strategies.

IDEAS FOR IMPLEMENTATION:

- Develop a public education effort specific to winter hazards and ice, with information about tree limb branches located over electric, phone and cable lines and the importance of keeping lines clear.
- Work with residents to understand the issues related to restoring power in an emergency.
- Distribute information about natural hazards and mitigating activities to property owners in areas identified to be at risk through hazard mapping.
- Partner with investor owned utilities (IOU) to educate their customers about mitigation activities, including the removal of tree limbs around critical infrastructure, and where to plant new foliage. Information to be delivered via utility bills or direct service contact with customers.
- Encourage homeowners and IOU's to establish procedures for tree limb removal prior to winter weather.

STATUS:

- Ongoing. 25% Complete. FCEM&HS and other governmental organizations have

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- American Electric Power
- Private and public utility companies

TIMELINE: February 2007- February 2017.

PLAN GOALS ADDRESSED:

- Minimize Damage to Public and Private Property

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Communication lacking among private sector and public as it relates to hazards	Entire County	Greater Coverage within Franklin County	Less Impact
Number of people affected by hazard	Entire County	Less	Less Impact
Area affected	Pockets of Franklin County	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA

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Benefits
Better coordination between public and private.
Potential cost savings with coordinated efforts.
Costs
Time consuming effort
Private sector committing time and resources to these efforts

LONG-TERM ACTION ITEM #5

Develop and implement public education programs to increase public awareness and understanding of the risks associated with natural hazards.

IDEAS FOR IMPLEMENTATION:

- Hold the annual Weather Spotter Program training in conjunction with the National Weather Service- Wilmington.
- Obtain Storm Ready certification for Franklin County.
- Identify methods for notifying people who are hard of hearing about severe weather warnings.
- Develop a planning template for use by private or public sector entities that specifically address emergency snow levels and preparedness actions.
- Disseminating media kits already prepared by FEMA to increase the public's awareness of flood hazards.
- Disseminate the Risk Assessment for Franklin County to the public to ensure they are able to make risk based decisions when planning for emergencies.

STATUS:

- Ongoing. 25% Complete. All groundwork for the Storm Ready program is in place and certification will be sought as soon as feasible.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- Volunteer and Social Service organizations

TIMELINE:

- February 2007- February 2020.

PLAN GOALS ADDRESSED:

- Minimize Loss of Life from Severe Weather Hazards

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Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Communication lacking among agencies and others that would benefit from hazard awareness	Entire County	Greater Coverage within Franklin County	Less Impact
Number of people affected by hazard	Entire County	Less	Less Impact
Area affected	Entire County	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Better coordination between agencies and other entities that would benefit from better hazard awareness.			
Potential cost savings with coordinated efforts.			
Costs			
Time consuming effort.			

LONG-TERM ACTION ITEM #6

Conduct mitigation activities in repetitive loss areas through acquisition, elevation or other mitigating activity.

CURRENT REPETITIVE LOSS PROPERTIES:

- City of Bexley 3
- City of Columbus 3
- Franklin Township 4
- City of Grove City 2
- Madison Township 1
- Pleasant Township 3
- Prairie Township 3
- Sharon Township 5
- City of Upper Arlington 3
- Washington Township 2
- City of Westerville 1
- City of Whitehall 1
- City of Worthington 4

IDEAS FOR IMPLEMENTATION:

- Research and assess cause of overall flooding to repetitive loss structures.
- Seek funding to permanently reduce damage to these structures.
- Assess the status of repetitive loss properties to ensure they warrant remaining on the list.

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STATUS:

- Ongoing. 10% complete. Homes are being acquired in the Whims Ditch are and more will be acquired as funding allows.

COORDINATING ORGANIZATION(S):

- Franklin County Emergency Management & Homeland Security
- City of Bexley
- City of Columbus
- Franklin Township
- City of Grove City
- Madison Township
- Pleasant Township
- Prairie Township
- Sharon Township
- City of Upper Arlington
- Washington Township
- City of Westerville
- City of Whitehall
- City of Worthington

TIMELINE:

- February 2007- February 2020.

PLAN GOALS ADDRESSED:

- Reduce the Number of Repetitively Damaged Existing Structures

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
At risk structures and repetitive loss structures	Several delineated areas within Franklin County	Less structures at risk or considered repetitive loss	Less Impact
Number of people affected by hazard	Various	Less	Less Impact
Area affected	Delineated as repetitive loss	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	Potentially	Less loss of life
Benefits			
Better coordination to target needed population for transportation needs			
Costs			
Time consuming effort			
Volunteer coordination repetitive loss structure owners			
FEMA process arduous			
Expensive process			

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LONG-TERM ACTION ITEM # 7

Involve watershed and natural resource management, governmental land-owning agencies and other interested parties, in natural hazard mitigation planning to control and eliminate invasive plant species.

IDEAS FOR IMPLEMENTATION:

- Educate citizens and business owners about invasive plants and the threats they pose to the communities and natural ecosystems in Central Ohio, as well as the State.
- Encourage all property owners to eliminate invasive plants on their land.
- Encourage all Government land-owning agencies to develop an invasive species control plan and to take steps to implement their plan. (i.e. City and County Parks Departments, ODOT, ODNR, etc.)
- Require new development and rezoning to include native species in plantings.

STATUS:

- New

COORDINATING ORGANIZATIONS:

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- Ohio Invasive Plants Council
- Local Government and County Park Departments, ODOT, ODNR, Watershed Groups, Environmental Groups.

TIMELINE: February 2012- February 2020.

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Coordination is key in eradicating invasive plant species	All of Franklin County	Less Invasive species	Less Impact
Number of people affected by hazard	All of Franklin County	Less	Less Impact
Area affected	All of Franklin County	Less affect areas still at risk	Less Impact
Number of parcels	numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Removal of invasive species help with the natural environment			
Long-term education helps land owners understand their part in eradicating invasive species			
Costs			
Time consuming effort remove invasive species and must keep up on it			
Expensive to upkeep			

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LONG-TERM ACTION ITEM # 8

Identify resources and take appropriate actions in order to mitigate the effects of the hazards identified in the Risk Assessment for Franklin County as they impact each Franklin County jurisdiction.

IDEAS FOR IMPLEMENTATION:

- Consider which resources can be utilized to mitigation natural hazards.
- Seek out resources to mitigate natural hazard damages throughout the county.
- Seek funding to update floodplain modeling for Big Walnut and Blacklick Creeks.

STATUS:

- New

COORDINATING ORGANIZATIONS:

- Franklin County Emergency Management & Homeland Security (FCEM&HS)
- All 42 Jurisdiction

TIMELINE:

- February 2012- February 2020.

Benefit Cost Review

Vulnerability	Before the Action Item is Implemented	After the Action Item is Implemented	Difference
Communication lacking among agencies and others that would benefit from hazard awareness	Entire County	Greater Coverage within Franklin County	Less Impact
Number of people affected by hazard	Entire County	Less	Less Impact
Area affected	Entire County	Less affect areas still at risk	Less Impact
Number of parcels	Numerous	Less than currently	Less Impact
Loss of Life	NA	NA	NA
Benefits			
Better coordination between agencies and other entities that would benefit from better hazard mitigating.			
Potential cost savings with coordinated efforts.			
Costs			
Coordination between municipalities			
Necessary time to implement entire project			

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15.0 *Jurisdictional Mitigation Actions*

15.1 Jurisdictional Mitigation Update

Actions that were proposed in the previous mitigation plan were reviewed by the Franklin County Mitigation Officer and members of the Core Group to determine their status. These actions are recorded in this updated plan as having been completed, deleted, deferred, or ongoing.

These actions were part of the review of range of actions suggested for inclusion in this updated plan. Many of the actions proposed by the previous version of the mitigation plan are again proposed for implementation.

15.2 Review of Jurisdictional Proposed Mitigation Actions

Table 17 lists the mitigation actions that were proposed by each jurisdiction in Franklin County and the status of actions as completed, deleted, deferred, or ongoing. Similar to the process that was led by the Mitigation Core Group; the action items were also ranked based on past historical events and the cumulative costs of each potential disaster. The jurisdictions involved prioritized alternatives through an iterative process of document review during 2011 planning process until consensus was reached. The jurisdiction involved reached consensus on the prioritization of the Action Items based directly on the prioritized ranking of the hazards themselves. This process generated results that the Mitigation Core Group and the FCEM&HS felt confident in and represented the true intent of the prioritization process.

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Table 20: Proposed Mitigation Actions with Updated Status

Jurisdiction	Projects by Jurisdiction Priority	Status	Funding Source	Goals Addressed		Hazard Addressed
				Franklin County Hazard Mitigation Plan	Ohio Hazard Mitigation Plan	
City of Bexley Projects coordinated by Mayor's office	1. Seek funding for repetitive loss structures to permanently reduce damage to these structures. (3 known properties est. at 925,000 /2 years) *	Unchanged: No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures		Flooding
	2. Research and determine cause of overall flooding in Bexley. (100,000/ 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property		Flooding
	3. Seek funding to address core problems of flooding with permanent solutions (TBD by #2)	Unchanged: No action has been taken. No funding for project.				Flooding
	4. Seek funding for back-up generators for critical public buildings. (10 Buildings @ 500,000 / 6 months)	Ongoing: Police station and City Hall have backup generators. One City building still needs generator. Some school buildings need generators. 30% complete.	Local Dollars			All natural hazards
	5. Seek funding for lightning detection/warning for city parks. (100,000 / 1 year)	Unchanged: No action has been taken. No funding for project.				Severe thunderstorms and lightning
	6. Seek finding for backup generators for intersections which will be utilized as evacuation routes. (TBD by #4)	Unchanged: No action has been taken. No funding for project.				All natural hazards

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	7. Work with Franklin County Emergency Management and Homeland Security to develop public educational outreach regarding all natural hazards and Franklin Counties susceptibility to those hazards and make available on Bexley's website. (No costs, on going)	Ongoing. This project will continue throughout the life of this plan. 50% complete.	No Cost		Continue outreach to mitigate for severe weather events	All natural hazards
Blendon Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (15,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (No cost, on going)	Ongoing. This project will continue throughout the life of this plan. 50% complete.	No Cost	Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
Village of Brice Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (10 facilities @ 1000 / 2 months)	Ongoing. FCEM&HS provided radios to many facilities throughout the county. 75% complete.	EMPG- Special Project Funding	Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	Severe thunderstorms and lightning

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	2. Purchase Tornado Sirens through the Franklin County Emergency Management & homeland Security additional Tornado Sirens around our community. (3 @ 60,000 / 4 months)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	Tornadoes
Brown Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (15,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (No cost)	Ongoing. This project will continue throughout the life of this plan. 50% complete.	No Cost	Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
	3. In cooperation with Franklin County Emergency Management/Homeland Security, purchase tornado sirens to cover gaps in coverage in Brown Township.	New				Tornadoes
	4. Study and mitigate stormwater flooding along Davis, Walker, Morris, and Patterson roads.	New				Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Canal Winchester Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (35 facilities @ 3000 / 6 months)	Ongoing. FCEM&HS provided radios to many facilities throughout the county. 75% complete.	EMPG- Special Project Funding	Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	All natural hazards
	2. Develop plan to have lightning arrestors installed on all lift stations. (70,000 / 1 year)	Ongoing. 10% complete. Additional funding needed.	Local Dollars	Minimize damage to public and private property.		Severe thunderstorms and lightning
	3. Seek funding for purchase and installation of additional tornado sirens.	New				Tornadoes
	4. Seek permission & funding to acquire equipment to optimize interagency communications	New				
Clinton Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (15,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (No cost, on going)	Ongoing. This project will continue throughout the life of this plan. 50% complete.	No cost	Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
City of Columbus Projects coordinated by Mayor's office	1. Seek funding for repetitive loss structures to permanently reduce damage to these structures. (3 known properties est. at $425,000 /2 years) *	New	This is the old project they don't have this many properties anymore.	Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	2. Acquisition project in Sharon Woods (4,000,000 / 3 years)	Unchanged: No action has been taken. No funding for project.				Flooding
	3. Study cause of repeated flooding in Gould Park area and explore possible solutions to the flooding. (100,000 / 1year)	Unchanged: No action has been taken. No funding for project.				Flooding
	4. Develop & implement an Emergency Action Plan to provide for flood protection of the North Bank Park / Arena District Area. ($750,000)	New				Flooding
	5. Buyout of flood prone properties in the Gould Park and Annadale / Martindale Areas. ($3.0 Mil.)	New				Flooding
	6. Retrofit of city owned detention basins for water quality and peak flows. ($1.0 Mil)	New				Flooding
	7. Repair of Harmon Avenue Floodwall gate sill. ($500,000)	New				Flooding
	8. Repair S.R. 315 floodwall. ($300,000)	New				Flooding
	9. Stormwater five year capital projects ($15 Mil./yr)	New				Flooding
	10. Repair of log gate across CSX Railroad. ($500,000)	New				Flooding
City of Dublin Projects Coordinated by Dublin Police, Operations Bureau Commander 2/20/2007	1. Seek funding for the purchase of additional tornado sirens to increase coverage of the Dublin Emergency Warning System. ($50,000.00) (Narrow Band Conversion $16,200.00)	Complete: Five additional sites added in 2011; all sites are being upgraded with new narrowband communications systems; all sites receiving new solar power system and upgraded electrical components.	Local Dollars	Maintain public and private infrastructure		Tornadoes

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	2. Seek funding for back-up generators for evacuation route intersections.	Complete: All of the traffic signalized intersections in Dublin have back up power supplies.	Local Dollars			All natural hazards
	3. Seek funding for back-up generators for critical public buildings and/or infrastructure .	Ongoing: The Dublin Justice Center and the Dublin Service Center have on site back up generators for the facilities. 25% Complete.		Minimize damage to public and private infrastructure	Reduce flood risk	All natural hazards
	4. Seek funding to increase public notification capabilities (i.e. 1610 A.M. and Dublin Emergency Calling System). $15,000.00 Annual Cost (Subscription)	Ongoing: The City of Dublin upgraded its Dublin Emergency Calling System (Code Red) to include text messaging and social media interfaces. 75% Complete.				All natural hazards
	5. Seek funding to purchase equipment to support interagency communications. Estimate $2.5 million (Grant 1.529 million awarded)	Complete: The City of Dublin merged the existing Dublin 800MHz radio system with the City of Worthington and Delaware County to form a regional emergency radio system called the Central Ohio Interoperable Radio System (COIRS).	Local Dollars	Manage debris along streams and waterways		All natural hazards
	6. Seek funding for the purchase, replacement, and/or upgrading of: 1) Tornado sirens in the city, 2) Lightning detection/warning systems for city parks/pools, 3) the Dublin Emergency Calling System, and/or 4) NOAA weather radios (to provide to critical public and private facilities)	New		Minimize Loss of Life		Severe Summer Storms and Tornadoes

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	7. Seek funding for at-risk and/or aging stormwater systems.	New				Flooding
	8. Develop and implement public education programs to increase public awareness and understanding of the risks associated with natural hazards, by strengthening partnerships between the City of Dublin and private sector businesses.	New				All natural hazards
Franklin Township Projects coordinated by Township Trustee's office	1. Seek funding for three repetitive loss structures to permanently reduce damage to these structures. (3 structures @ 300,000 / 2 years)	Unchanged. No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding
	2. Develop a comprehensive plan to address habitual flooding in the Whims Ditch area. (100,000 / 1 year)	Ongoing. 15 homes are in the progress of being acquired in the Whims Ditch. 30% complete.	PDM	Maintain public and private infrastructure		Flooding
	3. Minor Flooding Throughout Township	Ongoing: Franklin Township Road Dept. has been identifying the problem areas and retrofitting the lines as needed. We have been replacing damaged Storm Water lines as well as rebuilding Catch Basins to maintain proper flow of Storm Water. 50% complete.	Local Dollars			Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	4. Increase coverage of tornado sirens in the township	Ongoing: Franklin Township will talk with the City of Columbus and see if there is anything that the 2 jurisdictions can do together to install another Siren in the area of the Columbus Police Academy off of N. Hague.	Local Dollars			Tornadoes
	5. Seek funding for acquisition of properties along Whims Ditch.	New				Flooding
City of Gahanna Projects coordinated by Mayor's office	1. Storm water five year capital projects *(3,000,000 / 3 years)*	Unchanged. No action has been taken. No funding for project.			Reduce flood risk	Flooding
	2. Flood routing swale for Academy Woods. *(750,000 / 2 years)*	Unchanged. No action has been taken. No funding for project.		Minimize damage to public and private property		Flooding
	3. Detention basin, flood routing swales and culverts for Industrial Zone phase 1. *(450,000 / 1 year)*	Unchanged. No action has been taken. No funding for project.				Flooding
	4. Industrial Zone phase 2, pond dredging retention basins. *(1,000,000 / 9 months)*	Unchanged. No action has been taken. No funding for project.		Manage debris along streams and waterways		Flooding
	5. Engineering of flood mitigation program. *(150,000 / 6 months)*	Unchanged. No action has been taken. No funding for project.				Flooding
	6. Industrial Zone 36" pipe for Kahiki *(450,000 / 9 months)*	Unchanged. No action has been taken. No funding for project.		Minimize damage to pubic and private property		Flooding
	7. Construction of flood reliever piping system. *(850,000 / 2 years)*	Unchanged. No action has been taken. No funding for project.				Flooding
	8. Royal Manor BW phase 1 & 2 construction. *(1,500,000 / 18 months)*	Unchanged. No action has been taken. No funding for project.				Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	9. Old Gahanna storm rehab, *(3,000,000 / 2 years)*	Unchanged. No action has been taken. No funding for project.				Flooding
	10. Storm component of East Johnstown Road *(1,500,000 / 18 months)*	Unchanged. No action has been taken. No funding for project.				Flooding
	11. Hunters Ridge/Claman Heights Storm Improvements (200,000/2 years)	New		Minimize damage to pubic and private property		Flooding
	12. Royal Manor/Brentwood Storm Improvements (5,500,000/3 years)	New		Minimize damage to pubic and private property		Flooding
	13. Souder Ditch Watershed – Erosion Repair Projects ($1,500,000/18 months)	New		Minimize damage to pubic and private property		Flooding
City of Grandview Heights Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (20 facilities @ 2000 / 6 months)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards paid through local sources		All natural hazards.
	2. Purchase Tornado Sirens through Franklin County Emergency Management & Homeland Security. (40,000 / 4 months)	Complete	Local Dollars			Tornadoes
	3. Install a gate valve at the outlet of a storm sewer to remove approximately 10 acres of property from the 100 year flood plain.	New				Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Grove City Projects coordinated by Mayor's office	1. Seek funding for repetitive loss structures to permanently reduce damage to these structures (2 known properties est. at 400,000 /4 years) *	Unchanged: No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding
	2. Seek funding for back-up generators for critical public buildings (5 facilities @ 500,000 / 6 months)	Ongoing: two facilities complete. 30% complete.	Local Dollars	Maintain public and private infrastructure		All natural hazards
	3. Seek funding for lightning detection/warning for city parks (45,000 / 6 months)	Unchanged: No action has been taken. No funding for project.				Severe thunderstorms and lightning
	4. Seek funding for backup power generators for evacuation route intersections. (120,000 / 3 months)	Ongoing: 30% complete.	Local Dollars			All natural hazards
	5. Seek funding for backup power for 5 existing pump stations. (500,000 / 6 months)	Unchanged: No action has been taken. No funding for project.				All natural hazards
	6. Seek funding for backup power for existing water booster stations/water tanks. (50,000 / 6 months)	Unchanged: No action has been taken. No funding for project.				All natural hazards
	7. Work with Franklin County Emergency Management and Homeland Security to develop public educational outreach regarding all natural hazards and Franklin County's susceptibility to those hazards then make available on city's website. (5,000 / on going)	Ongoing. This project will continue throughout the life of this plan. 50% complete.		Minimize loss of life from severe weather hazards.	Educate the populous regarding dangerous weather notifications.	All natural hazards

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	8. Potential changes in the operation of the Columbus sanitary sewer system could result in the flooding of 10 homes in the southeastern section of Grove City, Scioto Meadows/Hibbs Rd. (10 homes, 300,000)	New				Flooding
City of Groveport Projects coordinated by Mayor's office	1. Identify resources and strategies to remove the Blacklick log jam. (2,000,000 / 1 year)	Completed. Logjam was removed.	State Budget	Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Research and secure funding for tree trimming program.	New				All natural hazards
	3. Purchase and raise frequently flooded properties on Hanstein Ditch and add property to existing city owned parkland to the east.	New				Flooding
	4. Replace bridge on Hanstein Ditch to prevent current bridge from breaking free, flowing down stream and causing flooding upstream.	New				Flooding
	5. Research and secure funding to provide storm sewers on properties along Old Hamilton Road that have old colapsed tile that causes flooding.	New				Flooding
	6. Seek funding for back-up generator to the community recreation center that would be used as an emergency command center, emergency communication center and temporary housing facility for natural disasters.	New				All natural hazards

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Hamilton Township Project coordinated by Township Trustee's office	1. Seek funds for determining the cause and relief of flooding of Township Park located at Lockbourne Road at Big Walnut Creek *(100,000 / 1 year)*	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Fill in the property and add drainage which would help other residents and the township with road drainage along the old traction line from Daughtery Rd. to Todd Rd.	New				Flooding
Village of Harrisburg	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (1500 / 3 months)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	Tornadoes Severe thunderstorms and lightning
	2. Purchase Tornado Sirens through the Franklin County Emergency Management & Homeland Security. (60,000 / 4 months)	Unchanged: No action has been taken. No funding for project.				Tornadoes
City of Hilliard Projects coordinated by Mayor's office	1. Develop a comprehensive plan for addressing the habitual flooding problems along the existing ditches, streams, and runs in the City of Hilliard. (100,000 / 1 year)	Ongoing: 25% Complete.	Hilliard Storm Water Utility Funds	Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Operations and Maintenance of Storm Water Facilities. ($546,200 per year)	Ongoing: 25% Complete.				Flooding
	3. Stream restoration on Clover Groff Ditch	Complete	Local Dollars			Flooding
	4. Stream restoration on south part of Hamilton Ditch	Complete	Local Dollars			Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	5. Flood control evaluation on Holcomb Ditch	Ongoing: Design 25% complete.	Hilliard Storm Water Utility Funds			Flooding
	6. Install retention basin at Heather Ridge. (250,000, 1 year)	Ongoing: Design 90%	Hilliard Storm Water Utility Funds			Flooding
	7. Implementation a Storm Water Management Program	Ongoing: NPDES Permit Program. 25% Complete.				Flooding
	8. Implement the Hilliard Storm Water Master Plan	Complete: Adopted Fall 2011.	Local Dollars			Flooding
	9. Pedestrian bridge over stream at Hilliard Family Aquatic Center	Complete	Local Dollars			Flooding
	10. Hamilton Ditch north stream restoration and water quality improvements	Ongoing: Design . 25% Complete.				Flooding
Jackson Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (10,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (5,000 /.on going)	Ongoing. This project will continue throughout the life of this plan. 50% complete.		Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
Jefferson Township Projects coordinated by	1. Seek funding for public information including outreach projects and technical assistance to property owners. (10,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Township Trustee's office	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (5,000 /.on going)	Ongoing. This project will continue throughout the life of this plan. 50% complete.		Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
	3. Mitigate stream flooding in Fieldstone.	New: Supporting a grant application by Franklin Soil and Water Conservation District.				Flooding
	4. Incorporating CodeRed to provide all residents and businesses in the township with access to emergency notifications and severe weather alerts.	New				All natural hazards
	5. Seek funding for the purchase of additional tornado sirens to increase coverage. ($50,000.00)	New		Minimize loss of life from severe weather hazards		Tornadoes
Village of Lockbourne Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (2000 / 3 months)	Unchanged: No action has been taken.		Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	Tornadoes Severe thunderstorms and lightning
	2. Purchase Tornado Sirens through Franklin County Emergency Management & Homeland Security. (40,000 / 4 months)	Unchanged: No action has been taken.				All natural hazards.

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Madison Township Projects coordinated by Mayor's office	1. Identify resources and strategies to remove Blacklick Creek log jam. *(2,000,000 / 1 year)*	Completed	State Budget	Manage debris along streams and waterways	Reduce flood risk	Flooding
	2. Seek funding for one repetitive loss structure to permanently reduce damage.	New			Reduce flood risk	Flooding
	3. Conduct a study on Berger Road and at the intersection of Groveport and Rager to prevent flooding on these emergency response routes. (2 years)	New			Reduce flood risk	Flooding
	4. Install tornado sirens in the areas of Madison Township where Franklin County EMA has identified the need for sirens. (20,000 / year)	New				Tornadoes
Village of Marble Cliff Project coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (2000 / 3 months)	Ongoing		Minimize loss of life from severe weather hazards		All natural hazards
	2. Use a third party system to email residents in the event of an emergency. (zero funding, ongoing)	Ongoing. 30% complete.	No cost			All natural hazards
Mifflin Township Projects coordinated by Township	1. Seek funding for public information including outreach projects and technical assistance to property owners. (5,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Trustee's office	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (5,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
Village of Minerva Park Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (1000 / 3 months)	Ongoing. FCEM&HS provided radios to many facilities throughout the county. 75% complete.		Minimize Loss of Life	Provide increased access to hazardous weather announcements	Tornadoes
	2. Purchase Tornado Sirens through the Franklin County Emergency Management & Homeland Security. (20,000 / year)	Completed				Tornadoes
Village of New Albany Projects coordinated by Mayor's office	1. Seek funding for repetitive loss structures within the Village of New Albany to permanently reduce damage to these structures. (1 structure at 250,000 / 1 year)	Unchanged: Seeking funding for project.		Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding
	2. Seek funding for the implementation of the Rose Run Greenway Corridor Study to control flooding of the Rose Run Stream and improve its water quality. (200,000 / 1 year)	Phase 1: 100% complete, Phase 2 0% complete.	Federal 594 Grant City Match / Federal or State Grants	Manage debris along streams and waterways.		Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	3. Develop and implement public education to increase public awareness and understanding of flooding hazards associated with ditches, streams, and waterways and their need for maintenance. (15,000 / 1 year)	Ongoing. 50% complete.	City General Fund	Minimize damage to public and private property.		Flooding
	4. Seek funding to purchase 3 additional Outdoor Siren Warning Systems in New Albany. To provide adequate public emergency alerts (Tornado, Flooding, etc.) to all areas within New Albany it is necessary to install additional outdoor sirens in the south, west and north locations of the community. (3 units/ $66,000)	New		Minimize Loss of Life		Tornadoes
	5. Seek funding for a two-way radio system for utilization by the public service department. Communication with maintenance staff on the road and in the field is critical to City operations when responding to severe storm events such as snow/ice, rain and wind. (Implementation cost is $85,000)	New		Increase response time		All natural hazards.
	6. To eradicate the infestation of the EAB in New Albany the City proposes to develop a management plan for the removal and disposal of Ash trees on City property and within the right-of-way and replace them with a better tree variety that is disease and insect resistant. (Estimated cost $200,000)	New				Invasive Species

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	7. To alleviate the drainage problems the City proposes to install a public storm sewer system and direct the excess water flow to a nearby City own wetland park. Additionally, the rear yards would be re-graded to achieve positive drainage to newly installed storm structures. (Estimated cost $250,000)	New				Flooding
	8. There are six (6) privately owned properties with structures that encompass the Rose Run Stream corridor which are subject to damage when stream waters reach flooding stages. The City proposes to separate this project into two parts. Part A would include the purchase of the private properties and removal of their structures threatened by flooding. Part B is the construction work to increase the streams capacity, stabilize the banks and restore vegetation within the stream corridor. (Part A $4,250,000) (Part B $350,000)	New				Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	9. There are two (2) privately owned properties with structures that encompass the Head Waters of the Rose Run Stream corridor which are subject to damage when stream waters reach flooding stages. The City proposes to separate this project into two parts. Part A would include the purchase of two (2) private properties and removal of one (1) structure threatened by flooding. Part B is the construction work to increase the head water capacity, stabilize the banks and restore vegetation within the stream corridor. (Part A $200,000) (Part B $250,000)	New				Flooding
Norwich Township Projects coordinated by Township Trustee's office	1. Seek funding to develop interagency communications with local service departments, law and fire.(200,000 / 18 months)	Ongoing: Met to explore the feasibility of a regional communications center. 25% complete.		Maintain public and private infrastructure		All natural hazards.
	2. Establish a communications plan for the Township and the City of Hilliard (TBD see #1)	Unchanged.		Maintain public and private infrastructure		All natural hazards.
Village of Obetz Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (1500 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	Tornadoes Severe thunderstorms and lightning
	2. Purchase Tornado Sirens through the Franklin County Emergency Management & Homeland Security. (40,000 / 4 months)	Unchanged: No action has been taken. No funding for project.			Provide increased access to hazardous weather announcements	Tornadoes

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
Perry Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (5,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website.(2,500 / 1 year)	Ongoing. This project will continue throughout the life of this plan. 50% complete.		Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
Plain Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (1000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property	Reduce flood risk	Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website. (1500 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
	3. Mitigate flooding issues for two properties on Johnstown Rd.	New				Flooding
Pleasant Township	1. Seek funding for repetitive loss structures to permanently reduce damage to these structures* *(1 known property est. at 100,000 /4 years)* *	Unchanged: No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding
	2. Increase coverage of tornado sirens in the township	New		Minimize Loss of Life		Tornado

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	3. Reduce runoff flooding on Harrisburg-Georgesville Rd. and Gay Rd.	New				Flooding
Prairie Township Project coordinated by Township Trustee's office	1. Seek funding for repetitive loss structures to permanently reduce damage to these structures (2 known properties est. at 300,000 /4 years) *	Unchanged: No action has been taken. No funding for project.				Flooding
	2. Reduce flooding allong Tamara Avenue that impacts road access to twenty-two homes. (5 years)	New		Minimize damage to public and private property		Flooding
	3. Seek funding for equipment to establish a tree trimming progam to reduce the amound of fallen tree limbs along the public right-of-way.	New				All natural hazards.
City of Reynoldsburg Projects coordinated by Mayor's office	1. Seek funding for outdated NFIP maps for the Blacklick Creek area in coordination with areas that flood. (20,000 / 2 years)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property		Flooding
	2. Evaluate smaller streams that are draining from newly developed areas in adjoining municipalities affecting the city.(4,000,000 / 2 years)	Unchanged: No action has been taken. No funding for project.		Manage debris along streams and waterways.		Flooding
	3. Seek funding for back-up generators for critical public buildings. (50,000 / 1 year)	Unchanged: No action has been taken. No funding for project.				All natural hazards.
	4. Research and determine the cause of municipal building lightning strikes and why it has been hit by lightning so many times. Seek funding to permanently mitigate cause, if possible.(20,000 / 1 year)	Unchanged: No action has been taken.		Maintain public and private infrastructure.		Severe thunderstorms and lightning

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	5. Seek funding for lightning detection/warning for city parks. (40,000 / 1 year)	Unchanged: No action has been taken. No funding for project.				Severe thunderstorms and lightning
	6. Seek funding for back-up generators for evacuation route intersections. (120,000 / 6 months)	Unchanged: No action has been taken. No funding for project.				All natural hazards.
Village of Riverlea Projects coordinated by Mayor's office	1. Establish a disaster recovery plan for Village records. (10,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Maintain public and private infrastructure.		All natural hazards.
	2. Install a new sewer line to service residents now dependent on electric powered plumbing station. Connect it to the general sewage system managed by the City of Columbus. (550,000 / 1 year)	Unchanged: No action has been taken. No funding for project.				All natural hazards.
Truro Township Projects coordinated by Township Trustee's office	1. Seek funding for public information including outreach projects and technical assistance to property owners. (5000 / 1 year)	Unchanged. No action has been taken. No funding for project.		Minimize damage to public and private property		Flooding
	2. Work with Franklin County Emergency Management and Homeland Security to develop public outreach regarding all natural hazards, and the county's susceptibility to those hazards, and make available on website.(1500 / 1 year)	Ongoing. This project will continue throughout the life of this plan. 50% complete.		Minimize loss of life from severe weather hazards	Educate the state populous regarding dangerous weather notifications.	All natural hazards.
	3. Evaluate smaller streams that are draining from newly developed areas in adjoining municipalities that are affecting the township. (100,000 / 1 year)	Unchanged. No action has been taken. No funding for project.		Manage debris along streams and waterways.	Reduce flood risk	Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
City of Upper Arlington Projects coordinated by Mayor's office	1. Seek funding for repetitive loss structures within the jurisdiction to permanently reduce damages to these structures. (4 known properties est. at 450,000 /4 years) *	Unchanged: No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding
Village of Urbancrest Projects coordinated by Mayor's office	1. Purchase and construct a "SAFE HOUSE" for residents to go to in case of severe weather. (300,000 / 9 months)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards		All natural hazards.
	2. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (2000 / 4 months)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards		All natural hazards.
	3. Purchase Tornado Sirens through Franklin County Emergency Management & homeland Security additional Tornado Sirens around our community. (40,000 / 4 months)	Unchanged: No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards		Tornadoes
Village of Valleyview Projects coordinated by Mayor's office	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (2000 / 6 months)	Complete	Grant-via FCEM&HS	Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	All natural hazards.
	2. Purchase Tornado Sirens through Franklin County Emergency Management & homeland Security. (40,000 / 4 months)	Complete	Local Dollars	Minimize loss of life from severe weather hazards		Tornadoes

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	3. Achieve acquisition of the Village Hall. This is a Village owned facility and is subject to repeat flooding as it is not only located in the Floodway, but it is subjected to runoff from homes located at a higher elevation.	New				Flooding
	4. Assess and mitigate the impacts of the Hague Avenue bridge reconstruction project (City of Columbus capital improvement project) on the Dry Run Creek.	New				Flooding
Washington Township	1. Purchase NOAA weather alert radios for every hospital, parks & recreation center, public utility facility, large population venue, private/public school and government building accessed by the public. (2000 / 6 months)	Ongoing. FCEM&HS provided radios to many facilities throughout the county. 75% complete.		Minimize loss of life from severe weather hazards	Provide increased access to hazardous weather announcements	All natural hazards.
	2. Purchase Tornado Sirens through Franklin County Emergency Management & Homeland Security. (60,000 / 4 months)	Unchanged. No action has been taken. No funding for project.		Minimize loss of life from severe weather hazards		Tornadoes
	3. Seek funding for repetitive loss structures within the jurisdiction to permanently reduce damages to these structures. (2 known properties est. at $800,000 /2 years) *	Unchanged. No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures		Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
City of Westerville	1. There is currently a lack of public awareness about the release of water from the Alum Creek Dam, which results in flooding problems on the bikeways in the floodplain. Increase communication with the US Army Corps of Engineers regarding release of water from the Alum Creek Dam. Install signage, gates and gauges along the bikeways. ($12,000)	Complete	Local Dollars			Flooding
	2. Nuisance flooding occurs in areas that do not fall within the floodplain, primarily along Spring Road. Install signage and gauges at Spring Road and improve the infrastructure. ($3,180,000)	Complete- Improvements to Otterbein University property corrected the problem	Otterbein University funding			Flooding
	3. There is a net loss of the floodplain due to increased development. Discourage development that creates a net loss of the floodplain.	Ongoing. 75% complete.	No cost			Flooding
	4. There is a lack of public awareness of the magnitude of a potential flood event. Develop public service announcements (PSAs) about flooding potential.	Ongoing. 50% complete.	No cost			Flooding
	5. There is debris present in the streams in public areas, i.e. parks. Develop a preventative maintenance program.	Ongoing. 50% complete.	No cost			Flooding
	6. Critical facilities exist in the floodplain. Seek funding to relocate or floodproof structures within the floodplain. ($5,000)	Unchanged. No action has been taken. No funding for project.				Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	7. The bridges at Schrock and Main are not up-to-date and are undersized. Undertake an engineering study to determine adequate floodway size.	Ongoing- Main St. Bridge is complete. 50% complete.	Local Dollars			Flooding
	8. Critical facilities throughout Franklin County are unable to handle increased loads (especially St. Ann's). Evaluate the possibility of coordination at the county level to alleviate the lack of adequate emergency care and medical treatment during a large-scale disaster event.	Complete	No cost			All natural hazards.
	9. Westerville currently lacks a stormwater utility. Develop a stormwater utility.	Unchanged. No action has been taken. No funding for project.				Flooding
	10. There is a lack of a database which illustrates the location of "other" critical facilities like nursing homes and day care centers. Other places like Germain Amphitheater and several community churches also should be mapped. Create a map of "other" critical facilities.	Complete- Database created through GIS and Fire Prevention software	Local dollars			All natural hazards.
	11. Knowledge is lacking about the locations of shelters to be used during a storm event. Establish and identify a shelter network. Develop a PSA regarding the location of pre- and post-storm shelters. ($5,000)	Unchanged. No action has been taken. No funding for project.				All natural hazards.

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	12. The media creates problems as it relates to severe storm events. The media often provides a false sense of insecurity about storm events and does not always provide reliable warning. Educate the public through a public service announcement (PSA) as well as the media about relaying information.	Complete- The City uses Facebook and Twitter to relay information on Traffic Delays. Weather warnings will be left to the National Weather Service for dissemination.	No cost			All natural hazards.
	13. There is a lack of a reliable warning system with total coverage as it relates to lightning especially in public areas like parks and pools. Install lightning prediction and protection systems throughout public areas.	Ongoing- 2 parks complete. 30% complete.	Local dollars			Severe Summer Weather
	14. There are dead spots on the radios used by public safety personnel. Seek funding to increase coverage of radios used by public safety personnel by adding additional antennas for the City of Columbus system.	Complete- Re-alignment of communications towers and additional capabilities added to radios corrected the issue.	Local dollars			All natural hazards.
	15. There is a lack of backups for traffic lights at critical intersections after a storm event. Install backup sources for critical intersection lights. ($100,000)	Unchanged. No action has been taken. No funding for project.				All natural hazards.

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	16. Snowstorms result in an inability to travel and also in residents not adhering to snow emergency warnings. Develop a plan to address transportation issues and research the potential for intelligent traffic systems. Increase enforcement during snow emergencies. ($7,500)	Unchanged. No action has been taken. No funding for project.				Severe Winter Weather
	17. Communications and utilities are disrupted both during and after a tornado. Bury utility lines and evaluate the possibility of a wireless network. ($20,000,000)	Ongoing. 25% complete.	Local Dollars			Tornadoes
	18. The City of Westerville experiences communication systems (phone, computer network, cable, radio, etc.) disruption during severe storm events. Develop and utilize a wireless network across the city. Evaluate the use of an AM frequency for weather reports (also under Tornadoes section with burying electric lines).	Completed- Private and Public Wireless Networks complete in all City buildings	Local dollars			All natural hazards.
	19. No comprehensive/coordinated database of sensitive populations for reverse 911 purposes exists. Create a database of sensitive populations.	Completed- City implemented Dialogic system which includes sensitive populations	Local dollars			All natural hazards.

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	20. Severe storms have the potential to cause power outages across the city. Explore the following possibilities: backup generators, fuel cell network, alternative energy sources, burying utility lines, undertaking an assessment of mechanical load on aboveground utilities (i.e. poles).	Ongoing- All City buildings have backup generators. 75% complete.	Local dollars			Severe Summer Weather
	21. Bradford pear trees are an issue throughout the city each time that there is a storm event due to damage by wind, lightning, hail, etc. Implement a replacement program for Bradford pear trees for both public and private property and update the tree assessment. ($35,000/year)	Ongoing. 50% complete.	Local Dollars			Severe Summer Weather
	22. There is a need to implement watercourse easements citywide. Areas like the Huber area, Spring Grove, and areas north of the Franklin County line, currently do not have watercourse easements. Develop a citywide watercourse protection ordinance.	Ongoing- Huber and Spring Grove are complete. 50% complete.	No cost			Flooding
	23. There is a lack of education for things like vegetation removal and disposing of grass clippings in the streams, both of which affect proper stream function. Increase education to residents on proper stream function.	Completed	Local Dollars			Flooding

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	24. There are concerns that many residents are unaware of the growing problem of erosion. Increase awareness through PSAs.	Completed	Local Dollars			Flooding
	25. There are concerns over changes in runoff caused by the erosion associated with new development. Seek funding to evaluate the effects of new development on erosion.	Completed	Local Dollars			Flooding
	26. Maps identifying highly erodable areas currently do not exist. Create a map of sensitive erosion areas.	Completed	No cost			Flooding
	27. Some utility poles within the city are overburdened with utility lines. Undertake a vulnerability assessment on utility poles. ($175,000)	Unchanged. No action has been taken. No funding for project.				All natural hazards.
	28. The current siren system does not have total coverage due to the exclusion of areas within Delaware County under the Franklin County system. Increase the total number of sirens to increase total overage.	Completed- 100% coverage in City	Local Dollars			Tornadoes
	29. There is a need for public education for reputable vendors providing aid following a tornado event. PSA on awareness of reputable vendors to provide aid following a tornado event.	Complete- list was compiled in the City disaster plan	No Cost			Tornadoes

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
	30. There is a lack of safe spots in public areas, especially parks. Build shelters and establish a shelter network. Seek funding for multi-use facilities in public laces. ($600,000)	Unchanged. No action has been taken. No funding for project.				Tornadoes
	31. Temporary structures (i.e. trailers at construction sites) are not regulated. Implement regulations for temporary structures.	Completed- regulations are in place	No cost			Tornadoes
	32. There is a potential for reduction in revenues due to the after-effects of tornadoes. Work with the Chamber of Commerce for business continuity for smaller businesses.	Unchanged. No action has been taken. No funding for project.				Tornadoes
	33. Concerns exist about private use of groundwater for irrigation purposes (tapping of aquifers for sprinkling systems). Investigate groundwater usage.	Unchanged. No action has been taken. No funding for project.				Drought
	34. Public education is lacking on the Drought Disaster Plan produced by the Westerville Water Department. PSA on existing Drought Disaster Plan. Use existing tools to provide public education: magazine, calendar, water quality report, website. Seek funding to enhance billing system to educate the public on the plan.	Ongoing. 50% complete.	PSA – PIO and Water Utility Manager Billing System – Utility Billing Supervisor, Water Utility Manager and Electric Manager			Drought

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Jurisdiction	Projects by Jurisdiction	Status	Funding	Goals Addressed		Hazard
City of Whitehall Projects coordinated by Mayor's office	1. Seek funding to evaluate and potentially resolve areas of concern with continuous localized flooding. (1 known property est. at 150,000 /4 years) *	Unchanged: No action has been taken. No funding for project.		Reduce the number of repetitively damaged existing structures	Reduce flood risk	Flooding
	2. Seek funding and coordinate with Franklin County Emergency Management and Homeland Security on the problem area near Hamilton Road railroad underpass which continuously floods. (120,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Minimize damage to public and private property.	Reduce flood risk	Flooding
	3. Seek funding for critical facility within the City of Whitehall (police station and 911 facility) that is continuously susceptible to flooding. (250,000 / 1 year)	Completed. The City installed a back-flow device in a foundation drain and that seems to have solved the problem of flooding associated with this facility.		Maintain public and private infrastructure	Reduce flood risk	Flooding
	3. Conduct hazard mitigation activities related to Mason Run and Turkey Run. (500,000 / 2 year)	New		Maintain public and private infrastructure		Flooding
City of Worthington Projects Coordinated by City Manager's office	1. Retrofit structures in the Haymore Avenue Area. (1,500,000 / 1 year)	Unchanged: No action has been taken. No funding for project.		Maintain public and private infrastructure	Reduce flood risk	Flooding
	2. Seek funding for repetitive loss structures within the jurisdiction to permanently reduce damages to these structures*(4 known properties est. at 900,000 /4 years) *	Unchanged: No action has been taken. No funding for project.		Reduce the number of repetitively damages existing structures.	Reduce flood risk	Flooding

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16.0 *Plan Maintenance*

16.1 Plan Maintenance Update

The plan maintenance of this chapter details the processes in which the Franklin County Emergency Management & Homeland Security and the Core Group will operate to ensure that the Franklin County Natural Hazards Mitigation Plan remains a current and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan and producing a plan revision every five years. Public meetings and participation will be integrated into the plan maintenance process. The FCEM&HS will continue to work with regional planning representatives, local governments and developers to incorporate mitigation strategies into current and future planning mechanisms.

16.2 Monitoring Mitigation Actions

16.2.1 Plan Adoption

The plan will be adopted by all jurisdictions choosing to participate. A sample resolution is included in **Appendix I**. Once all the jurisdictions adopt the updated plan, their signed resolutions will be found in **Appendix I**. Every effort will be made to secure the participation of all jurisdictions in the county. Once the plan has been submitted to the State Hazard Mitigation Officer at the Ohio Emergency Management Agency and approved, the plan will be adopted by each jurisdiction. The Ohio EMA will submit the plan to the Federal Emergency Management Agency (FEMA) for review. Upon acceptance by FEMA, Franklin County will gain eligibility for Hazard Mitigation Grant Program funds.

16.2.2 Coordinating Body

The Franklin County Hazard Mitigation Core Group will be responsible for monitoring of the plan and undertaking the formal review process. FCEM&HS has formed a Hazard Mitigation Core Group that consists of members from local agencies, organizations and citizens. The Core Group included the following:

- Appointed Officials
- Fire Officials
- Emergency Management
- National Weather Service
- Geographic Information System (GIS)
- Mid-Ohio Regional Planning Committee (MORPC)
- Building and Zoning Officials
- Service Departments
- Utilities Officials
- Insurance Industry

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16.2.3 Monitoring Mitigation Projects

The Franklin County Mitigation Officer will monitor the progress made on the implementation of the identified action items. Jurisdictions will be responsible for updating FCEM&HS on mitigation actions taken.

By monitoring mitigation actions, when the plan is next updated, information about the status of proposed mitigation actions will be readily available. The updated plan will include a section explaining if previously proposed mitigation actions have been implemented, completed, or deferred. The updated plan will identify actions that are no longer appropriate for the community and should be deleted. The updated plan will identify obstacles to implementation that caused proposed actions to be deferred and will recommend strategies for overcoming those obstacles.

The Core Group will not only monitor the implementation of mitigation actions proposed in this plan, but will also monitor actions of participating jurisdictions and surrounding communities that may affect the ability of Franklin County to withstand the effects of natural hazards or to recover from a disaster in the future. The method for gathering information about actions beyond those proposed in this plan will be informal; as active members of the Franklin County community, Core Group members will bring their own knowledge of the area to monitoring meetings to provide information about actions of participating jurisdictions as well as of nearby communities.

16.2.4 Implementation through Existing Programs, Communities & Organizations

Planning is conducted at the municipal level for cities and villages in Franklin County. The Franklin County Economic Development and Planning Department provides planning services for the unincorporated areas in Franklin County. The Mid-Ohio Regional Planning Commission (MORPC) provides planning, programming, and brokerage services for housing, transportation, water, land use, zoning, environmental, and technology issues within Central Ohio. The All Natural Hazards Mitigation Plan includes recommendations that can be accomplished by including mitigation activities into current and future regional planning initiatives.

16.3 Evaluating the Plan

16.3.1 Annual Review Process

The Franklin County Natural Hazards Mitigation Plan will be evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. FCEM&HS, with consultation and collaboration from the Core Group, maintains overall responsibility for monitoring and evaluating the progress of the mitigation strategies in the Plan. All jurisdictions will be encouraged to attend a yearly plan update meeting. These meetings will track project progress and discuss any new projects that need to be added. This will provide an opportunity for jurisdictions to discuss any current or new problems and prioritize future funding. They can also share their successes.

The committee will review the goals and action items to determine their relevance to changing situations in the county, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The coordinating organizations responsible for action items will present the status of their action item, the implementation processes and the difficulties encountered, at which time strategies may need to be revised.

16.4 Updating the Plan

This plan must be updated within 5 years and again adopted by the County and participating jurisdictions in order to maintain compliance with the regulations stated in 44 CFR Part 201.6 and ensure eligibility for applying for and receiving certain Federal mitigation grant funds.

Monitoring and evaluation will identify necessary modifications to the plan including changes in mitigation strategies and actions that should be incorporated in the next update.

The Franklin County Mitigation Officer will initiate the process of updating the plan in sufficient time to meet State and Federal deadlines.

16.5 Continued Public Involvement

The public will continue to have the opportunity to provide feedback about the Plan. Copies of the plan will be available through Ohio EMA and the FCEM&HS websites.

The Franklin County Mitigation Officer will provide access to of the plan to key Franklin County offices. The adopted plan will be posted on the FCEM&HS and OEMA website so that the public has electronic access to the plan. The Web site will include contact information for anyone to provide comment so that residents, business owners, and others who read the plan will be able to provide a comment about the plan or about the mitigation strategies. The Mitigation Planning Officer will maintain these comments and will provide them to the Mitigation Core Group for consideration during the update process

The Franklin County Mitigation Officer will post notices of mitigation plan update meetings using the usual methods for posting meeting announcements in the County to invite the public to participate. In addition to posting announcements on the FCEM&HS website, social media will also be used to announce the opportunity to participate.

The Franklin County Mitigation Officer will document the number of people who participate in the annual meetings and the results of the meeting for inclusion in the plan during the process. In this way, the public will have an opportunity to become involved in the planning process and to influence mitigation planning decisions.