

# Hazard Mitigation Plan – 2011

5-Year Plan Update

Miami County, Ohio



Kenneth Artz, Miami County EMA Director

Paul Huelskamp, Miami County Hazard Mitigation Committee Chairperson

# Hazard Mitigation Plan – 2011

## 5-Year Plan Update

Prepared for:

Miami County Emergency Management Agency  
210 Marybill Drive  
Troy, OH 45373

Prepared by:

Miami County Emergency Management Agency  
Miami County Hazard Mitigation Committee  
Mote & Associates, Inc.



**Mote & Associates**  
Engineering, Land Surveying

214 West Fourth Street, Greenville, Ohio 45331  
Phone: (937) 548-7511 Fax: (937) 548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

## TABLE OF CONTENTS

---

	<b>Page</b>
<b>List of Acronyms</b>	i
<b>Mitigation Plan Summary</b>	ii - iii
<b>Section 1: Introduction</b>	1
1.1 Community Profile	2 - 25
1.2 Documentation of the Planning Process	26 - 32
1.3 Planning Committee	33 - 34
1.4 Plan Adoption by the Board of County Commissioners	35 - 37
1.5 Plan Adoption by Multi-Jurisdictional	38
<b>Section 2: Hazard Identification, Risk Assessment &amp; Vulnerability Analysis</b>	39
2.1 Overview & Hazard Identification Summary	40 - 42
2.2 Identifying Hazards	43 - 52
2.3 Tornado/Windstorm	53 - 60
2.4 Severe Winter Storm/Blizzards/Ice/Sleet	61 - 65
2.5 Flooding	66 - 87
2.6 Earthquake	88 - 93
2.7 Severe Thunderstorm and Lightning/Hail	94 - 101
2.8 Temperature Extreme & Heat Wave	102 - 105
2.9 Epidemic/Disease Impact	106 - 108
2.10 Drought	109 - 114
2.11 Infestation/Invasive Species	115 - 118
2.12 Wildfire	119 - 123
2.13 Terrorism	124 - 126
2.14 Utility/Communication Failures	127 - 129
2.15 Hazardous Materials Incident	130 - 132
2.16 Transportation Accident	133 - 136

	<b>Page</b>
2.17 Dam/Levee Failure	137 - 141
2.18 Addressing Repetitive Loss Structures	142
2.19 Updating Asset Inventory	143 - 199
2.20 Multi-Jurisdictional Risk Assessment	200 - 201
2.21 Analyzing Development Trends	202 - 203
<b>Section 3: Mitigation Strategy</b>	<b>204</b>
3.1 Overview	205 - 207
3.2 Accomplishing Mitigation Strategies	208 - 220
3.3 2006 Plan Goals	221 - 223
3.4 2011 Plan Goals	224 - 228
3.5 Identifying Mitigation Activities	229 - 232
3.6 Re-Evaluating The County's Problems	233 - 234
3.7 Action Items (Priority Projects)	235 - 241
3.8 Updated Action Plan	242 - 252
<b>Section 4: Plan Maintenance Process</b>	<b>253</b>
4.1 Overview	254
4.2 Monitoring, Evaluating & Updating the Plan	255 - 257
4.3 Incorporating into Existing Planning Mechanism	258 - 264
<b>Appendix:</b>	
2011 Miami County Risk Assessment	A – 1
2008, 2009, 2010 Yearly Agendas, Minutes & Notices	A – 2
2006 Plan with 2007-2008 Updates	A – 3
2004 Risk Assessment Plan	A – 4

### **List of Commonly Used Acronyms**

CDBG	Community Development Block Grant
CRS	Community Rating System
DMA2K	Disaster Mitigation Act of 2000
DSP	Dam Safety Program
EMS	Emergency Medical Services
FD	Fire Department
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance Program
GIS	Geographic Information Systems
HIRA	Hazard Identification & Risk Assessment
HMGP	Hazard Mitigation Grant Program
LHMP	Local Hazard Mitigation Plan
LU/LC	Land Use Land Cover
MCD	Miami Conservancy District
MCBC	Miami County Board of Commissioners
MCHMPC	Miami County Hazard Mitigation Planning Committee
NCDC	National Climatic Data Center
NDMC	National Drought Mitigation Center
NFDRS	National Fire Danger Rating System
NFIP	National Flood Insurance Program
NID	National Inventory of Dams
NOAA	National Oceanic Atmospheric Administration
NRCS	National Conservation Resource Service
OAC	Ohio Administrative Code
OBC	Ohio Building Code
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
ODNR-FPM	Ohio Department of Natural Resources Flood Plain Management
Ohio EMA	Ohio Emergency Management Agency
OPWC	Ohio Public Works Commission
ORC	Ohio Revised Code
OSU	Ohio State University
PDM	Pre-Disaster Mitigation Grant Program
PDM-C	Pre-Disaster Mitigation Competitive Grant Program
SFHA	Special Flood Hazard Area
SHARPP	State Hazard Analysis Resource & Planning Portal
SHMD	State Hazard Mitigation Office
USGS	United States Geological Survey
WPCLF	Water Pollution Control Loan Fund
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

## **Mitigation Plan Summary**

The Miami County Hazard Mitigation Committee through partnering with many agencies throughout Miami County successfully continues to complete mitigation activities that benefit the residents of Miami County. These completed hazard mitigation projects will reduce future damages, death, and injuries should a disaster strike. The Plan also addresses future mitigation work needed to be done to further reduce future loss and to provide a framework where local governments, businesses, and County residents and visitors can ensure that positive mitigation planning activities are being carried out. It is the intent that future planned work will be carried out based on accurate information and the appropriate mitigation action items will be prudent investments for the taxpayers of Miami County.

Miami County with its three largest Cities of Piqua, Tipp City, and Troy are located along the north-south I-75 corridor and has experienced 3.5% population growth since 2000. As Miami County expands and changes, challenging vulnerabilities must be addressed. Miami County will face numerous hazards in the future, both natural and man-made, and these hazards can result in disasters that impact citizens, businesses, and all levels of government. By identifying hazards and taking appropriate steps to mitigate future vulnerabilities, growth and change can be done in a positive manner that will lessen the impact of future hazard events. Miami County has had zoning in place since 1972 and has had a Comprehensive Plan that has helped to establish excellent land use planning. Hazard mitigation can be defined as the sustained action taken to reduce or eliminate long-term risks to people and their property from hazards including natural or man-made disasters. Hazard mitigation planning is a positive process built on assessing the hazards and applying effective strategies to complete preventive measures. It involves multiple stakeholders from throughout the Community and the State along with blending public and private sector goals, objectives, and actions.

The goals of this plan are to significantly reduce life, loss and injuries and minimize damage to structures and property from disasters. It is also intended to reduce disruptions to society, better integrate hazard mitigation programs and policies, reduce the number of repetitive flood loss structures, and to promote education and outreach activities to create a culture of hazard mitigation for Miami County residents.

The Miami County Hazard Mitigation Plan currently is required to be updated every five years in order to remain eligible to receive public assistance for hazard mitigation fund grants. The 2011 plan updates are intended to address new conditions and laws and includes an update and status report of mitigation action items occurring within the 2006 FEMA Approved Plan.

Section 1 “Introduction” summarizes the Plan and describes the planning process and includes the documentation for adoption of the Plan by the Miami County Board of Commissioners and all of the participating municipalities.

Section 2 “Hazard Identification, Risk Assessment & Vulnerability” identifies the most prevalent hazards that have affected and may in the future affect Miami County. This section includes hazard history, determination of risk and vulnerability of buildings and infrastructure, and a discussion on County development trends and how that may affect future analysis.

Section 3 “Miami County Mitigation Strategy” addresses hazard mitigation goals, objectives, and action items to be effective in hazard mitigation.

Section 4 “Plan Maintenance Process” addresses how the Plan will be evaluated and updated.

Appendix: Includes supporting documentation and information that complements the Miami County Hazard Mitigation Plan.

## **Introduction**

- 1.1 Community Profile
- 1.2 Documentation of the Planning Process
- 1.3 Planning Committee
- 1.4 Plan Adoption by the Board of County Commissioners
- 1.5 Plan Adoption by Multi-Jurisdictional

## 1.1 Community Profile - Introduction

Miami County is located in the west-central portion of Ohio. Champaign, Clark, Darke, Montgomery, and Shelby Counties neighbor Miami County. The county contains three major urban areas including the City of Troy (the County seat) along with the City of Piqua and the City of Tipp City. The County also includes nine villages: Bradford (part of the community), Casstown, Covington, Fletcher, Laura, Ludlow Falls, Pleasant Hill, Potsdam, and West Milton, and 12 townships. The total County population according to the 2010 Census is 102,506. A small portion of the City of Huber Heights and the City of Union are also within the Southern most part of Miami County. The majority of Miami County lies in the Miami Rivers Survey. The county was established on the first of March 1807 and was named for the Miami Native American Tribe.

The county is located near three (3) of Ohio's largest cities: Cincinnati, Columbus, and Dayton. West Central Ohio and Miami County's physical landscape has largely been shaped by the north-south recession of prehistoric glaciers, the 1913 flood, and the construction of the I-75 corridor through the center of the County. Glacial activity deposited an abundance of fertile agricultural soils and large quantities of groundwater, sand, and gravel resources in the County. The devastating 1913 flood event left a legacy of flood control dams which today acts to limit development and preserve many scenic and recreational resources along the County's river corridors. Since the early sixties, the I-75 corridor has been driving residential, commercial, and industrial development along the County's central axis.

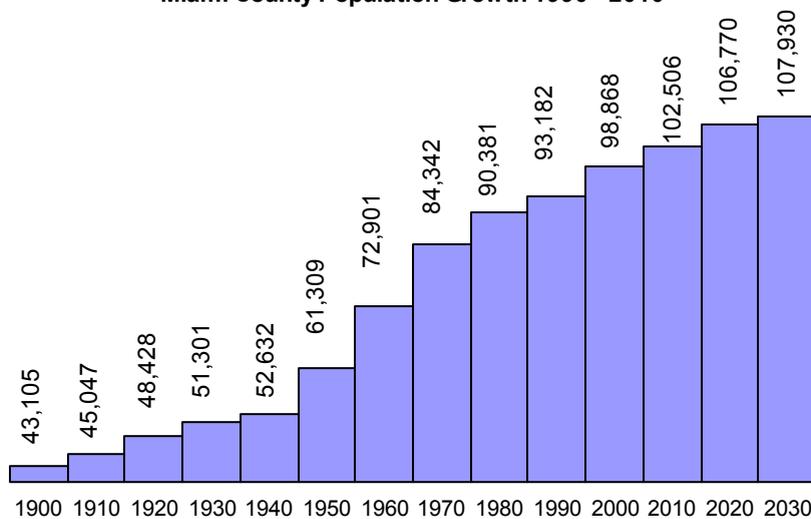
Miami County encompasses approximately 407 square miles of land area. Miami County contains approximately 20 miles of Interstate 75, which is the major north-south highway through Ohio. Other components of Miami County's transportation infrastructure include U.S. Route 36, State Routes 41, 55, 185, 571, and 718, which cross the county east west, and 48, 201, 202, 589, and 721, which run north south. Two (2) commercial airports are also vital to the county's transportation.

Though Miami County contains several miles of highway, there are villages and municipalities with limited access, which could present a problem if those areas were required to evacuate during an emergency situation.

There are two (2) rivers in Miami County: the Great Miami River and the Stillwater River. The Great Miami River flows through the central portion of the county; adjacent to Interstate 75, passing near or through the Cities of Piqua, Troy, and Tipp City. The Stillwater River flows through the western portion of the county, and passes near or through the Villages of Covington, Pleasant Hill, Ludlow Falls, and West Milton, while flowing parallel to State Route 48.

According to the 2010 Census, Miami County has a population of 102,506 which is a 3.5% increase from 2000. There was a large increase in the total population of the County during the 1950-1970 time period, assisted in part by construction of I-75 through Miami County. Between 1990 and 2000, the Miami County population increased by 5,686, a growth of 6.1%. Almost all of this population growth occurred in Tipp City, Troy, Concord Township, and West Milton. These primary growth areas constitute the northern edge of the Dayton Urbanized Areas, particularly along the I-75 corridor. Census figures indicate that there are 42,126 housing units in Miami County. Housing units include both traditional houses and apartments. The county has an average of 2.43 persons per household. Further, the county's per capita personal income in 2009 is listed at \$34,678.

**Miami County Population Growth 1990 - 2010**

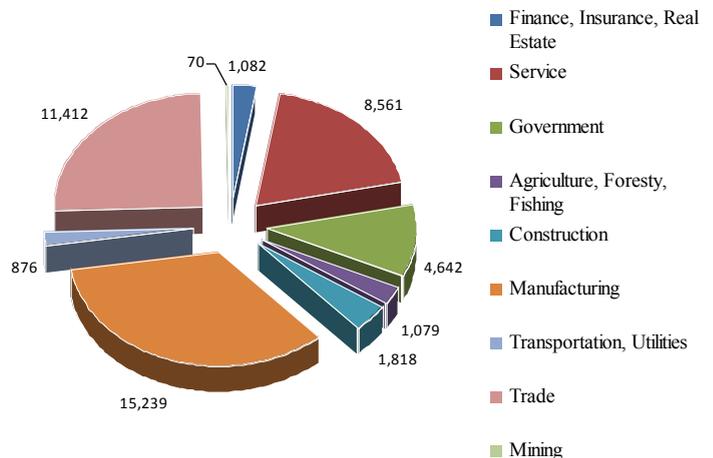


The 2020 and 2030 are projected amounts

The majority of Miami County's land cover is agricultural; land in farms is 197,000 acres. Approximately 1,040 individual farms operate in Miami County, with an average size of 189 acres. Total cash farm receipts are \$108,806,000. Miami County's topography is that of flat, open areas to gently sloping areas, which offers no natural barrier to slow down strong straight-line winds or tornadoes.

Miami County has a very diverse employment background. According to Census information, the largest areas of employment are manufacturing, trade, and services, as illustrated in the chart. Total employment is approximately 48,900 persons. In 2009 the

**Employment by Industry 2000 Census**



County's unemployment rate was at approximately 11.70 percent. In 2008, a total of 189 new businesses opened for a total of 1,928 active businesses in Miami County.

Miami County is the home of several tourist attractions, including the Piqua Historical Area State Memorial, Fort Rowdy Museum at Covington, Union Township Historical Museum and Quaker Research Center at West Milton, Pleasant Hill Civil War Monument, Brukner Nature Center, Hoover Grist Mill, Pickawillany Monument, Charleston Falls Preserve, Stillwater Prairie Reserve, Miami-Erie Canal Locks, and the Scenic Stillwater and Great Miami Rivers.

## 1.1 Community Profile Update Commentary

The Community profile has been updated as the last plan draft was compiled in 2004. This allowed the Miami County Hazard Mitigation Committee (MCHMC) to catch sight of what has changed in the County. The results included:

- Miami County's population was increased 3.5% since 2000.
- The county remains a strong agricultural community.
- The farms decreased in number but grew larger in acreage.
- A few county manufacturers have closed operations such as Panasonic.
- Several new industrial plants have been constructed such as Dye Mill, ConAgra, Honda Distribution, and Sherry Industrial Park.
- Several plants have relocated to Miami County such as Clopay and F&P.
- New residential construction in Tipp City, Monroe Township, Concord Township, southern part of Bethel Township, City of Troy, southeast side of Covington, and west end of Pleasant Hill.
- Construction of Menard's in Tipp City, Troy Town Park, commercial and industrial growth in Troy, northwest Experiment Farm Road area, south end of Piqua/25A, Tipp City 25A/Blouser Road area.
- The total active business remained relatively stable – 1,911 in 2001 and 1,928 in 2008.
- Several of the rural county school districts have replaced their older school buildings with new ones such as Miami East and Newton at Pleasant Hill.
- The JVS and Edison State Community College has expanded.
- Health care facilities and expansions include: Upper Valley Medical Center and Premiere Health.
- New fire departments were constructed in Troy, Covington, and Casstown.
- Three new water treatment facilities were constructed in Bradford, Covington, and Tipp City. New water storage tanks were erected in Bradford and Pleasant Hill.
- The Miami County Parks has grown in size to over 2,000 acres and continues to develop and promote trails, greenspace, and wildlife areas.
- Elderly care facilities within the county continue to expand including Tipp City's Clare Bridge; Sterling House in Troy; and Garbry Ridge in Piqua.
- Miami County residents enjoy a strong business climate with its proximity to I-75 and I-70 location, quality education, great entertainment venues, and numerous recreation opportunities.

## 1.1 Population

Miami County Ohio Profile		
Location: West Central Ohio		
Bordering Counties:		
		Champaign
		Clark
		Darke
		Montgomery
		Shelby
2010 Census Population for Cities, Villages, Townships		
	2010	2000
Miami County	102,506	98,868
Incorporated Places and Balance of County		
Village of Bradford (part)	1,011	1,034
Village of Casstown	267	322
Village of Covington	2,584	2,559
Village of Fletcher	473	510
Huber Heights (part)*	959	35
Village of Laura	474	487
City of Piqua	20,522	20,738
Village of Pleasant Hill	1,200	1,134
Village of Potsdam	288	203
City of Tipp City	9,689	9,221
City of Troy	25,058	21,999
City of Union (part)*	24	4
Village of West Milton	4,630	4,645
Balance of Miami County	35,327	35,767
Townships (not including incorporated municipalities)		
Bethel Township	4,843	4,927
Brown Township	1,122	1,044
Concord Township	5,295	5,336
Elizabeth Township	1,648	1,620
Lost Creek Township	1,409	1,311
Monroe Township	5,864	6,118
Newberry Township	2,854	2,897
Newton Township	2,199	2,220
Springcreek Township	1,948	1,826
Staunton Township	2,090	1,992
Union Township	4,479	4,883
Washington Township	1,576	1,803

\*The City of Huber Heights and the City of Union only have a small portion of their cities within Miami County. These areas have not been profiled into this planning document.

## 1.1 Description of Planning Area

<b>Village of Bradford</b>	
Location	Northwest Portion of County
Township	Newberry Township
Population	1,077
Median Household Income	\$38,125 (2000 Census)
Housing Units	750
Public Schools	Bradford Central Elementary Bradford High School
Major Highways in Proximity to Village	Interstate 75 - 11 miles east State Route 721 through Village
<b>Village of Casstown</b>	
Location	East Central
Township	Lostcreek Township
Population	267
Median Household Income	\$41,250 (2000 Census)
Housing Units	122
Public Schools	Miami East Intermediate Miami East High School
Major Highways in Proximity to Village	State Route 55 State Route 589
<b>Village of Covington</b>	
Location	Northeastern Portion of County
Township	Newberry Township
Population	2,584
Median Household Income	\$41,042 (2000 Census)
Housing Units	1,156
Public Schools	Covington Elementary Covington Middle Covington High School
Major Highways in Proximity to Village	U.S. Route 36 State Route 41 State Route 48

<b>Village of Fletcher</b>	
Location	Northeastern Most Portion of County
Township	Brown Township
Population	473
Median Household Income	\$41,583 (2000 Census)
Housing Units	197
Public Schools	Miami East North Elementary
Major Highways Proximity to Village	U.S. Route 36 State Route 589
<b>Village of Laura</b>	
Location	Southwestern Portion of County
Township	Union Township
Population	474
Median Household Income	\$45,833 (2000 Census)
Housing Units	185
Public Schools	Miami East North Elementary
Major Highways in Proximity to Village	State Route 571 State Route 55 State Route 721
<b>Village of Ludlow Falls</b>	
Location	Southwestern Portion of County
Township	Union Township
Population	210
Median Household Income	\$39,375 (2000 Census)
Housing Units	86
Public Schools	None
Major Highways in Proximity to Village	State Route 48 State Route 55

<b>City of Piqua</b>	
Location	North Central Portion
Township	Washington/Springfield Township
Population	20,522
Median Household Income	\$35,681 (2000 Census)
Housing Units	9,311
Public Schools	Bennett Intermediate Elementary Favorite Hill Primary Elementary High Street Primary Elementary Nicklin Learning Center Piqua High School Piqua Junior High School Springcreek Primary Elementary Upper Valley Vocational Washington Intermediate Elementary Wilder Intermediate Elementary Edison State Community College
Major Highways in Proximity to City	Interstate 75 U.S. Route 36 State Route 66 State Route 185
<b>Village of Pleasant Hill</b>	
Location	West Central Portion of County
Township	Newton Township
Population	1,200
Median Household Income	\$45,703 (2000 Census)
Housing Units	498
Public Schools	Newton Elementary Newton High School
Major Highways in Proximity to Village	State Route 48 State Route 718

<b>Village of Potsdam</b>	
Location	Southwestern Portion of County
Township	Union Township
Population	288
Median Household Income	\$44,375 (2000 Census)
Housing Units	104
Public Schools	None
Major Highways in Proximity to Village	State Route 55
<b>City of Tipp City</b>	
Location	South Central Portion of County
Township	Monroe Township
Population	9,689
Median Household Income	\$48,675 (2000 Census)
Housing Units	4,194
Public Schools	Bethel Elementary Bethel Junior High Bethel High Broadway Elementary LT Ball Junior High Nevin Coppock Elementary Tipp Central Intermediate Tippecanoe High
Major Highways in Proximity to City	Interstate 75 State Route 571

<b>City of Troy</b>	
Location	Center of County - County Seat
Township	Concord Township
Population	25,058
Median Household Income	\$39,531 (2000 Census)
Housing Units	11,166
Public Schools	Concord Elementary Cookson Elementary Heywood Elementary Hook Elementary Kyle Elementary Miami East Junior High Miami East South Elementary Miami East High Van Cleve Troy Junior High Troy High School
Major Highways in Proximity to City	Interstate 75 State Route 55 State Route 41 State Route 202 State Route 589 State Route 718
<b>Village of West Milton</b>	
Location	Southwestern Portion of County
Township	Union Township
Population	4,630
Median Household Income	\$41,905 (2000 Census)
Housing Units	2,102
Public Schools	Milton-Union Elementary Milton-Union Middle School Milton-Union High School
Major Highways in Proximity to Village	State Route 48 State Route 571

## **1.1 Climate, Environment & Geography**

Located in the Miami Valley, Miami County experiences cold winters and fairly warm summers. The average daily high temperature in January is 35°F and the average low temperature is 21°F. The average temperature in July is 87°F and the average low temperature is 67°F. The lowest recorded temperature was -21°F in 1985. Miami County receives about 39.5" of rainfall per year.

The highest elevation point in the County is near Fletcher and is about 1,155 feet above sea level. Miami County lies in the Wisconsin Age glaciated region of Ohio. The topography is broad. It is level to gently rolling and is divided by two major rivers; the Great Miami and the Stillwater and their tributaries. Elevation ranges from about 770 to 1,155 feet above sea level.

The County is well suited for farming because of the deep fertile soils. Corn, soybeans, wheat, and hay are its principle crops. When prime farmland is lost to other uses, farming methods are compromised in that crop production is lost or the farming community is forced to use more erodible or drought prone land. Therefore, it is important to preserve the best suitable farmland as identified in the Soil Survey of Miami County. Miami County has a Comprehensive Plan which helps to protect the quality farmland.

The primary mineral resources found in Miami County are limestone, sand, and gravel. It is important to know where these resources are located for land use planning.

## 1.1 History

Miami County was created in 1807. It was once an Indian stronghold. The name “Miami” comes from the Miami Tribe of Indians. The word “Miami” in Indian language means “Mother”. Many of the early settlers of Troy, the county seat, were from Virginia and Kentucky. During the Civil War the City of Troy was a station for the Underground Railroad. Troy was once known for its wagon and buggy shops.

The City of Piqua was named by the clan of the Shawnee in their Creighton Myth meaning “man who arose from the ashes”.

Tipp City was originally named Tippecanoe in honor of William Henry Harrison whose campaign slogan was “Tippecanoe and Tyler Too”. John Clark developed Tippecanoe in 1840 and purposely situated the town to take advantage of the traffic on the Miami and Erie Canal. The Tipp Roller Mill is situated at Lock #15 on the canal.

The Eldean Covered Bridge is one of the only two “long truss” covered bridges remaining in the County. It was built in 1860 and spans the Great Miami River at 224 feet in length. The bridge was placed on the Register of Historic Places in 1975.

The 1869 home of former slave York Ryal still stands as a monument to freedom as it tells the history of the 383 slaves freed by John Randolph of The Roanoke Plantation in Virginia; their journey north; and the injustices they endured.

The Quakers also played a large role in Miami County history from their religious freedom to being a part of the Underground Railroad.

## 1.1 Tourism and Points of Interest

### Miami County Places of Interest

A.B. Graham Memorial Center  
 African Jackson Cemetery  
 Andrew Sheets House- Elizabeth Township  
 Arrowston-Piqua  
 Benjamin Iddings Log House- Newton Township  
 Bradford Junction Interlocking Tower- Bradford  
 Bradford Railroad Museum  
 Bruckner Nature Center  
 Callahill and Priscilla Weddle House- Elizabeth Township  
 Casstown Lutheran Stone Church- Casstown  
 Charleston Falls Preserve  
 Covington Historic Government Building  
 Detrick Milling and Distilling Company- Tipp City  
 E.A. Hobart House- Troy  
 Elizabeth Sheets Saunders Farm- Elizabeth Township  
 Elizabeth Township Rural Historic District  
 First Presbyterian Church- Troy  
 Fort Piqua Hotel  
 Fort Rowdy Historical Museum- Covington  
 Fulton Farms  
 Historic Eldean Covered Bridge  
 Historic WACO Field & Aircraft Museum  
 Hobart Circle Historic District- Troy  
 Hoover Grist Mill  
 John Minor Dye Stone House- Elizabeth Township  
 Johnston Farm & Indian Agency  
 Judge Henry Williams House- Troy  
 Lockington Locks Historical Area- Washington Township  
 Mary Jane Hayner House- Troy  
 McKinley School- West Milton  
 Miami County Courthouse and Power Station- Troy  
 Miami County Recreation Trails  
 Miami Erie Canal Locks  
 Museum of Troy History  
 Old Tippecanoe Main Street Historic District- Tipp City  
 Overfield Tavern- Troy  
 Pickawillany Monument- Piqua  
 Piqua Bike Path  
 Piqua Historical Area State Memorial  
 Piqua-Caldwell Historic District

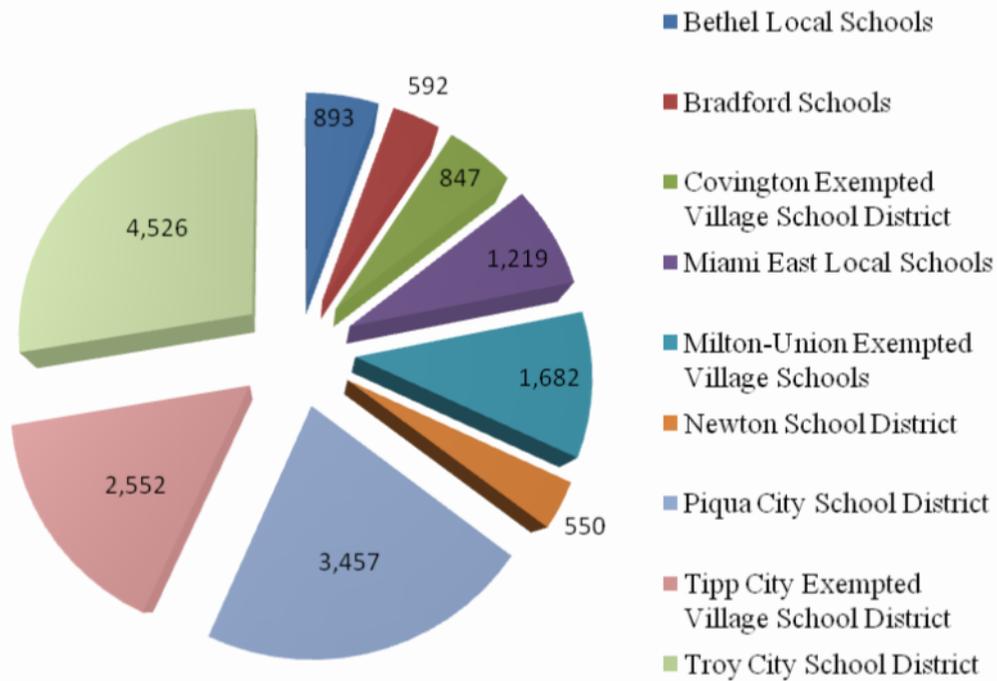
## Miami County Places of Interest

Pleasant Hill Civil War Memorial  
Pleasant Hill United Church Of Christ  
Robert Culbertson House- Troy  
Saunders Seed Company- Elizabeth Township  
Scenic Stillwater River  
Staley Farm- Bethel Township  
Stillwater Prairie Preserve  
Tippecanoe Historical Museum  
Troy Hayner Cultural Center  
Troy Public Square  
Twin Arch Stone Culvert- Concord Township  
Union Township Historical Museum and Quaker Research Center  
William Baumgardner House and Farm Buildings  
William Hobart Vacation House- Troy  
William K. Dunlap House- Troy  
York Ryal House- Springcreek Township

### 1.1 Education

#### Public Schools

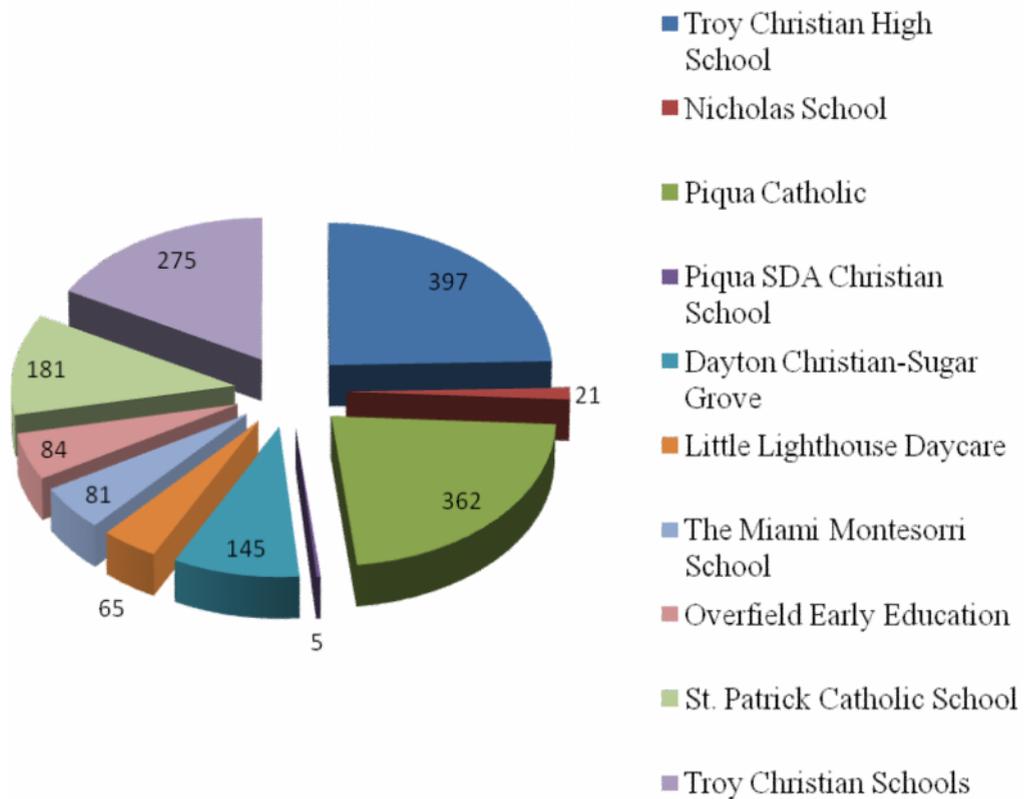
Bethel Local Schools	893
Bradford Schools	592
Covington Exempted Village School District	847
Miami East Local Schools	1,219
Milton-Union Exempted Village Schools	1,682
Newton School District	550
Piqua City School District	3,457
Tipp City Exempted Village School District	2,552
Troy City School District	4,526



### Private Schools

Troy Christian High School	397
Nicholas School	21
Piqua Catholic	362
Piqua SDA Christian School	5
Dayton Christian-Sugar Grove	145
Little Lighthouse Daycare	65
The Miami Montesorri School	81
Overfield Early Education	84
St. Patrick Catholic School	181
Troy Christian Schools	275

### Miami County Private Schools



## 1.1 Employers/Health Care/Communications/ Parks/Transportation

### Major Employers

<u>Company</u>	<u>Type</u>
AO Smith	Mfg
ConAgra	Mfg
Crane	Mfg
F-Tech Inc./F&P America	Mfg
Goodrich Corp	Mfg
Illinois Tool Works Inc/Hobart	Mfg
Meijer Inc.	Trade
Piqua City Schools	Gvt
Troy City Schools	Gvt
Upper Valley Medical Center	Service

---

### Health Care

	<u>Total</u>
Physicians (MDs & DOs)	131
Registered hospitals	1
Number of beds	195
Licensed nursing homes	6
Number of beds	758
Licensed residential care	4
Number of beds	249

---

### Communications

	<u>Total</u>
Television stations	0
Radio stations	1
Daily newspapers	2
Circulation	18,000

---

**State Parks, Forests, Nature Preserves, and  
Wildlife Areas**

	<u>Total</u>
Areas/Facilities	3
Acreage	148.1

---

**Transportation**

	<u>Total</u>
Interstate highway miles	19.95
U.S. highway miles	28.33
State highway miles	153.22
County, Twp, & municipal road miles	1009.94
Commercial airports	2

## 1.1 Business and Industry

Miami County has a large business and industrial base due to its close proximity to Interstates I-70 and I-75. It has a well-established background in technology and innovation including plastic technology, aerospace, and research development. Over 25,000 engineers and scientists live and work within Miami County. Miami County also has a large agriculture presence with production of soybeans, wheat, corn, hogs, beef, and dairy products. Miami County has approximately 76% of its land in farms and total agricultural cash receipts of \$108,806,000.

In 2010 the average private sector total employment for all industries in Miami County was 35,346 persons with manufacturing claiming the largest percent.

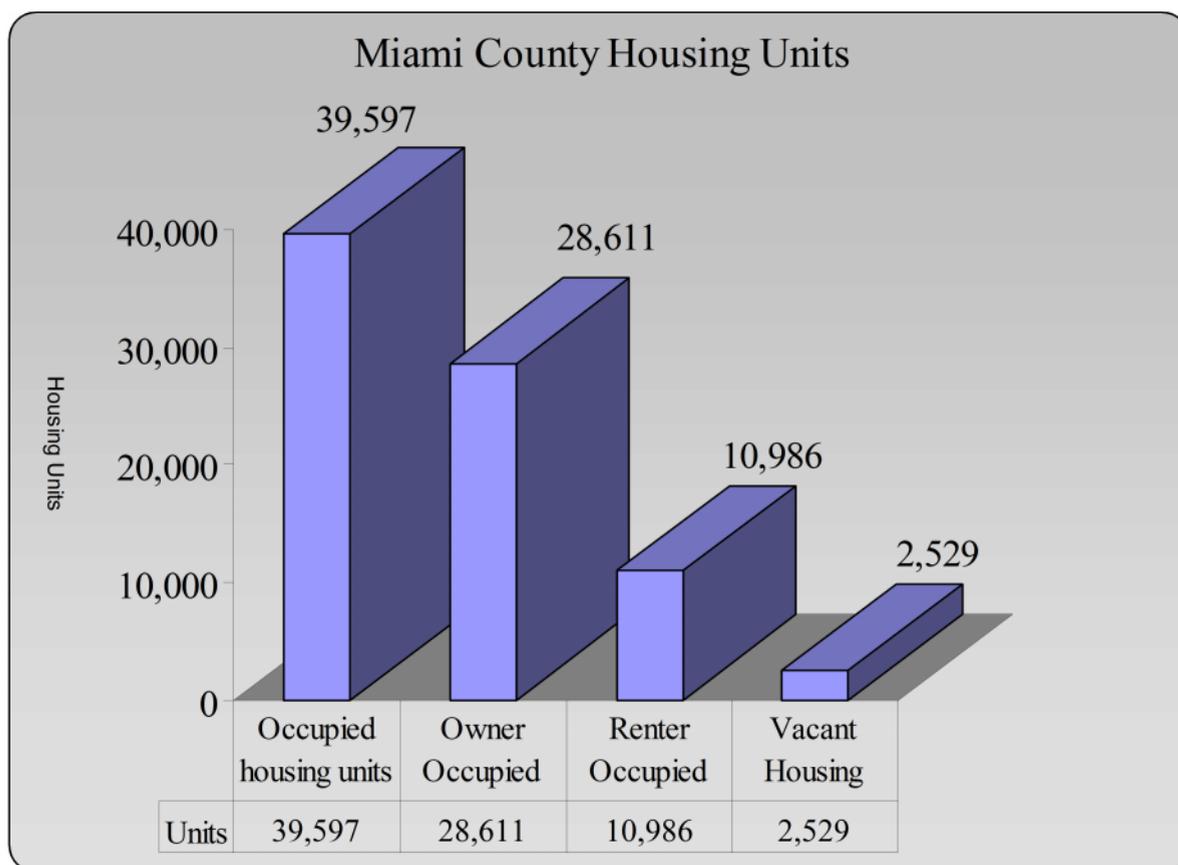
<u>Employment by Industry</u>	<u>Average Employment</u>
Private Sector	35,346
Goods-Producing	11,860
Natural Resources and Mining	205
Construction	1,725
Manufacturing	9,930
Service-Providing	23,485
Trade, Transportation and Utilities	8,644
Information	291
Financial Services	1,229
Professional and Business Services	3,733
Education and Health Services	4,550
Leisure and Hospitality	3,851
Other Services	11,833
Federal Government	209
State Government	157
Local Government	4,847

<u>Major Employers</u>	<u>Location</u>	<u>Type</u>	<u>Number of Employees</u>
Upper Valley Medical Center	Troy	Hospital/Health Care	1,700
Illinois Tool Works, Inc./Hobart	Troy	Manufacturing	1,000
Goodrich Corp.	Troy	Manufacturing	750
Meijer, Inc.	Tipp City	Warehouse Distribution	750
E-Tech, Inc./F & P America	Troy	Manufacturing	600
A.O. Smith	Tipp City	Manufacturing/Sales	450
ConAgra Foods	Troy	Food Processing	450
Troy City Schools	Troy	Gov.	not available
Piqua City Schools	Piqua	Gov.	370
Crane	Piqua	Manufacturing	320
Jackson Tube Service	Piqua	Manufacturing	270

Total Active Business (2008): 1,928

### 1.1 Residential Housing

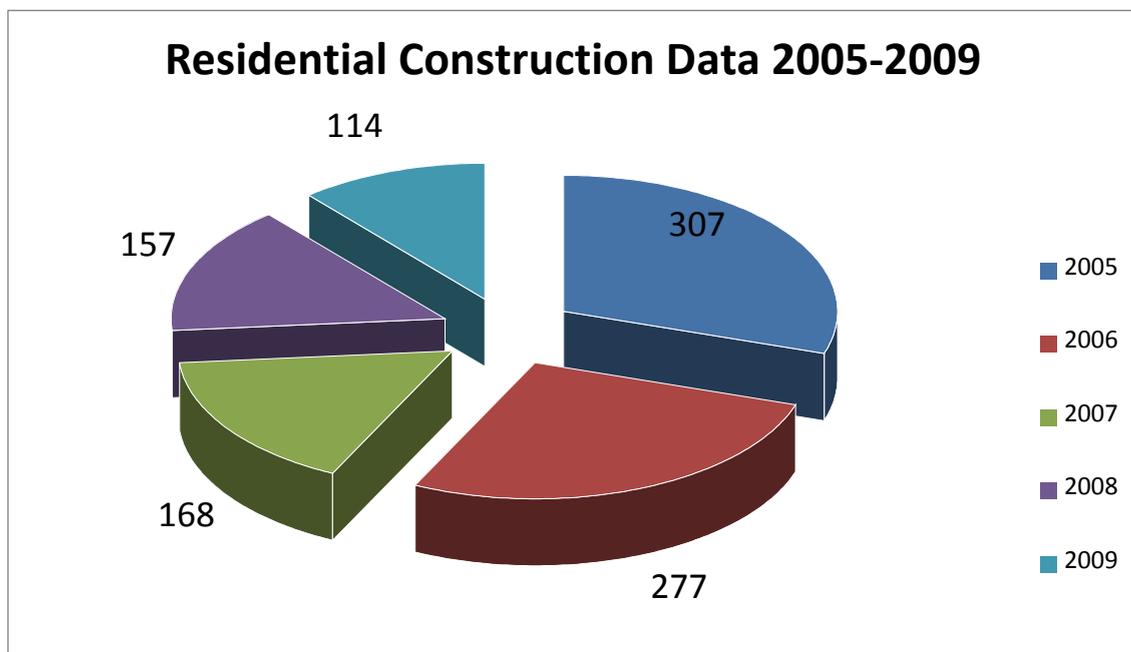
Housing Units	Number	Percentage
Total Housing Units	42,126	100%
Occupied housing units	39,597	94%
Owner Occupied	28,611	72.30%
Renter Occupied	10,986	27.70%
Vacant Housing Units	2,529	6%



### 1.1 Residential Construction

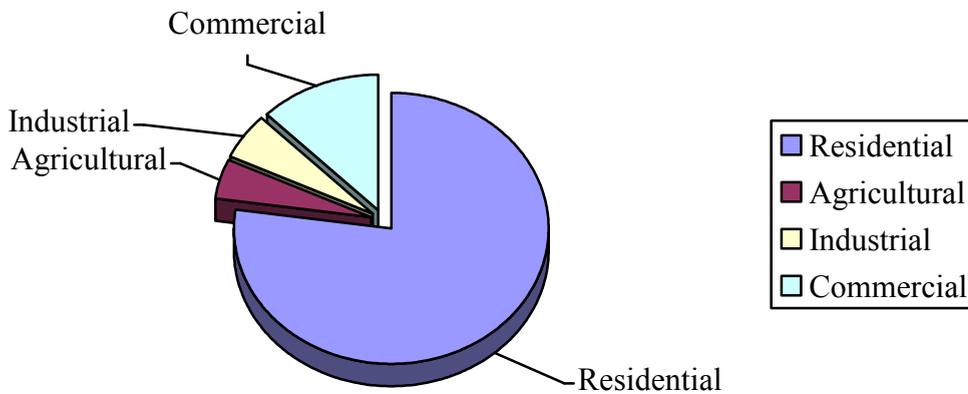
#### Residential Construction Data for 2005- 2009

<u>Year Structure Built</u>	<u>No. Built</u>
2005	307
2006	277
2007	168
2008	157
2009	114



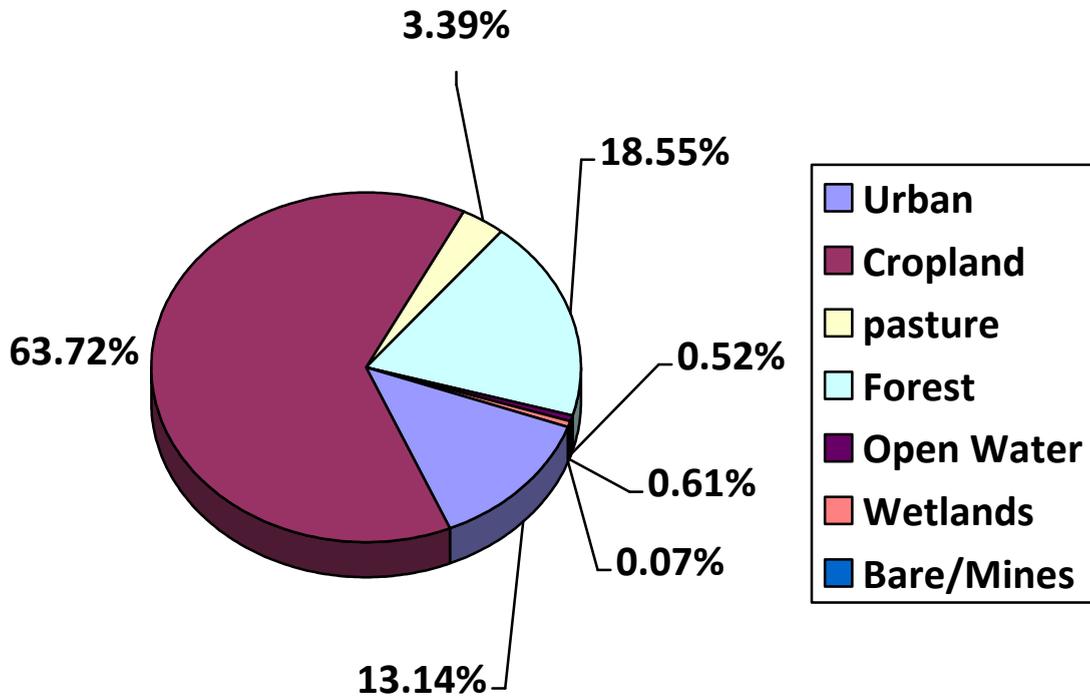
**1.1 2010 Taxable Value of County Real Property  
2009 Agricultural Data  
2010 Land Cover in Acres**

Residential	\$1,604,527,510
Agricultural	\$99,903,820
Industrial	\$111,061,120
Commercial	\$261,028,110
<u>Total:</u>	<u>\$2,076,520,560</u>



Agricultural Data	
Land in Crops	197,000 acres
Number of Farms	1,040
Average Size	189 acres
Total Cash Receipts	\$108,806,000

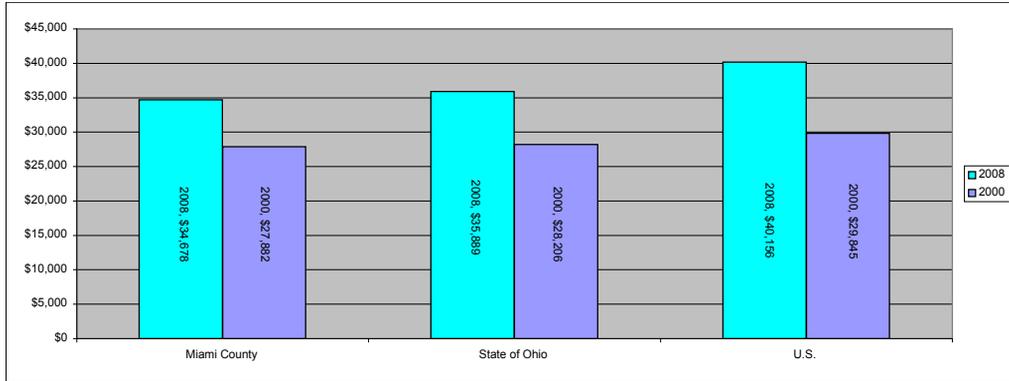
<u>Land Use/Land Cover (2010) in Acres</u>	<u>Percent</u>
Urban (Residential/Commercial/Industrial/ Transportation and Urban Grasses)	13.14%
Cropland	63.72%
Pasture	3.39%
Forest	18.55%
Open Water	0.52%
Wetlands (Wooded/Herbaceous)	0.61%
Bare/Mines	0.07%



### 1.1 Workforce Labor Statistics

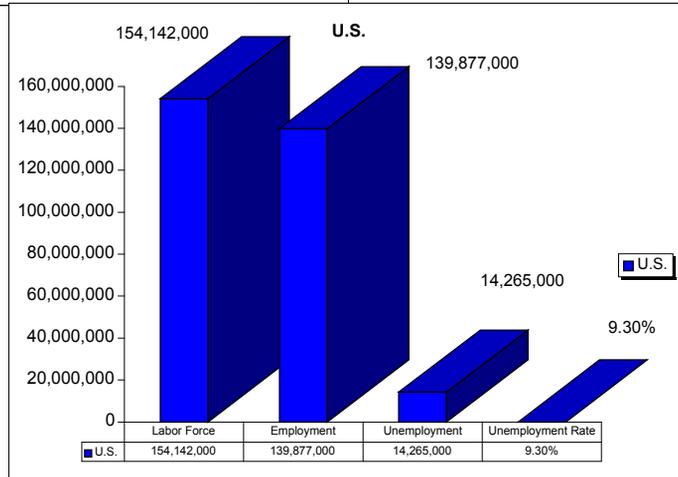
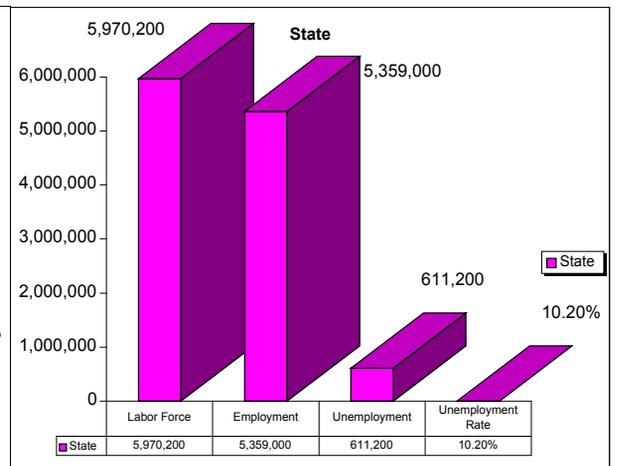
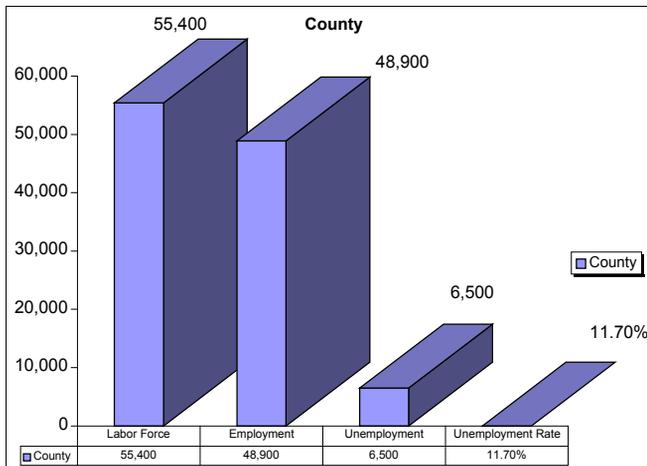
**Income**

Per Capita Income Comparisons	Miami County	State of Ohio	U.S.
Per Capita Income 2000	\$27,882	\$28,206	\$29,845
Per Capita Income 2008	\$34,678	\$35,889	\$40,156



**Labor Force and Employment**

	CY 2009		
	County	State	U.S.
Labor Force	55,400	5,970,200	154,142,000
Employment	48,900	5,359,000	139,877,000
Unemployment	6,500	611,200	14,265,000
Unemployment Rate	11.70%	10.20%	9.30%



Information Source for this Section: Ohio Department of Development

## 1.2 Documentation of the Planning Process

### Organizing the Process

The planning process to update the Miami County Hazard Mitigation Plan has been ongoing since the 2006 Plan Approval. The Miami County Hazard Mitigation Committee met yearly as part of the Plan Maintenance Process under the leadership of:

- Ken Artz Miami County EMA
- Chris Cook Miami County Health District
- Sarah Hippensteel Miami Conservancy District
- Stan Kegley City of Troy Project Director
- Ben Herron West Milton Public Works
- Robert Shook Citizen-At-Large
- Rick Looker Bradford Village Administrator
- Jacob Hoover Miami County Planning
- Paul Huelskamp Miami County Engineering
- Dale Gade Miami County Park District
- Scott Myers Miami County Park District
- Dan Weaver Miami County Park District
- Phil Cox Monroe Township Trustee
- Dave Burtner City of Piqua Wastewater Plant
- Mark Senseman City of Tipp City EMS
- Catherine Reed American Red Cross
- James McGarry Miami County Economic/Comm. Dev.
- Michael Henderson Mote & Associates, Inc.
- Ron Darrow Mote & Associates, Inc.
- Jack Evans Miami County Commissioner
- Tom Mercer Concord Township Trustees
- Michael Beamish Mayor, City of Troy
- Charles Cox Miami County Sheriff
- Melody Vallieu Troy Daily News

The MCHMC members, through the planning process of November 2010 through June 2011, reviewed the current Miami County Hazard Mitigation Plan and addressed the county's mitigation needs in order to:

- Put together a good cross representation of public, community, and stakeholders representing all of Miami County.
- Researched consensus on how to achieve a desired outcome of the county's hazard mitigation challenges.
- Gain widespread support for directing the countywide financial, technical, and human resources towards an agreed upon course of action.
- Describe the planning process and intended outcome so that the description of the planning process serves a permanent record on how decisions were reached.
- Develop a strategy to reduce losses which have been developed by consensus in a methodical and reasonable way.
- Search for alternate mitigation funding sources.

## Involving the Public

The MCHMC held seven open public planning meetings from November 2010 through May 2011. Public notices and minutes of the meetings were sent to Melody Vallieu of Troy Daily News and the Piqua Daily Call (See Appendix A). A special public presentation meeting was held on “Calamityville”. The presentation was made by Mr. Jack Smith representing Calamityville. Public notices for planning meetings were sent to Troy Daily News, Piqua Daily Call and Dayton Daily News Northern Bureau. The public monthly meetings are intended to educate the community about the benefits of hazard mitigation planning and seek the input of citizens during the planning process. The following public planning meetings were held at the conference room of the Miami Communications Center which was centrally located in the county.

### List of Public Planning Meetings

For 5 year update

Meeting	Date	Purpose	Invited/Attending
1	November 18, 2010	Planning Meeting	Public / MCHMC
2	December 21, 2010	Planning Meeting	Public / MCHMC
3	January 10, 2011	Planning Meeting	Public / MCHMC
4	February 15, 2011	Planning Meeting	Public / MCHMC
5	March 15, 2011	Planning Meeting	Public / MCHMC
6	April 25, 2011	Draft Plan Discussion	Public / MCHMC
	1 meeting 1 presentation	Special Public Presentation	Public / MCHMC Other County Agencies
7	May 26, 2011	Draft Plan Discussion	Public / MCHMC

The Miami County Hazard Mitigation Committee met yearly in February and held special meetings on call of the Chairman since FEMA granted approval to the initial 5 year plan in 2006. The following are dates for these meetings.

### Miami County Hazard Mitigation Committee Meetings 2006 - 2010

Meeting	Date	Purpose
1	February 2, 2006	Annual Mitigation Meeting
2	February 14, 2007	Annual Mitigation Meeting
3	March 6, 2007	Planning Mitigation Workshop
4	February 13, 2008	Annual Mitigation Meeting
5	January 22, 2009	Special Mitigation Funding Meeting
6	February 11, 2009	Annual Mitigation Meeting
7	April 29, 2009	Special Mitigation Meeting
8	July 23, 2009	Special Mitigation Meeting
9	February 18, 2010	Annual Mitigation Meeting
10	June 8, 2010	Special Mitigation Meeting

Copies of the notices, public meeting minutes, and agendas can be found in Appendix A.

Copies of the Draft Plan are available for review on the Miami County Emergency Management website: [www.miamicountyema.org](http://www.miamicountyema.org). Hard copies are available for review at the County Emergency Management Agency, 210 Marybill Drive, Troy, OH, 45373, or the Miami County Board of Commissioners, County Safety Building, 201 West Main St, Troy, OH, 45373, 937-440-5910.

Having a functioning mitigation committee of community leaders and representatives of various agencies, public entities, and citizens with many years of experience living and working in Miami County has helped to make mitigation implementation a success. The committee has helped identify and promote all of the positive mitigation activities that have been completed by various agencies over the past several years since the completion of the initial Miami County Hazard Mitigation Plan which was approved in 2006. The total collaboration of various county officials and organizations has had a positive impact on Miami County.

### **Neighboring Community Involvement**

The Miami County Emergency Management, in addition to the public announcement, also involved all of the neighboring counties' Emergency Management Agencies to participate in the planning process. Copies of the invitations are included in Appendix A. In addition, several community agencies and businesses were invited to participate in the public planning meetings. Some of the agencies represented included:

- Miami Conservancy District
- Miami County Health District
- Miami County Board of Commissioners
- Miami County Township Trustees
- Northern Miami Valley Red Cross
- City and Village Mayor Representation
- Miami County EMA
- Miami County Engineer

### **The Planning and Review Process**

During the seven months of the plan update review process and plan update process the Miami County Hazard Mitigation Committee evaluated each section of the 2006 plan and made recommendations for updating the 2006 Miami County Hazard Mitigation Plan. Some of the planning documents referenced to assist the MCHMC in the planning process included:

- Current Miami County Mitigation Plan Document and Risk Assessment
- FEMA's local Multi-Hazard Mitigation Planning Guidance
- The local Mitigation Plan Review Crosswalk
- The 2011 State of Ohio Enhanced Hazard Mitigation Plan
- Available planning documents from County and Local Municipalities

The MCHMC reviewed draft sections of the Plan and developed the mitigation strategy for the 2011 Plan update process as outlined below:

1: Review of Initial Planning Process:

Note: The Miami County Hazard Mitigation Committee has met on a regular basis generally meeting several times a year and continues to use the 2006 Mitigation Plan as a “Living Document” with changes being made as needed on a continual basis.

- The Committee recommended the community profile be updated.
- Reviewed hazards to determine if there were any changes to be made or additional hazards that need to be added.
- Reviewed the following referenced Plans to ensure coordination with other Agencies:
  - Miami County Emergency Operations Plan.
  - Miami County Comprehensive Plan, Zoning Plans, and Capital Improvement Plans.
  - Review and inclusion of new updated countywide Floodplain Maps.
  - Review of State Mitigation Planning Documents.
  - Coordination with other County Agencies’ progress with mitigation activity including the Bike Path Task Force, Miami County Parks, Miami County Board of Health, and Miami County Engineer to make sure future planning for Miami County is all aligned.

2: Review of Risk Assessment Strategy Section:

- Determine if there is missing data or if more data is needed for future plan updates.
- Determine if change of conditions over the past five years warrants change of hazard priorities.
- Determine if other hazards should be added and profiled.
- Update last five years of weather history.
- Review repetitive losses for the county.
- Update presentation format.
- Update all hazard maps.

3: Re-assessment of Hazard Vulnerability:

- Discuss what new events have occurred in the past five years and what new problems have come up.
- Discussion on what has changed.
- Re-evaluate vulnerability of the hazards that can affect the County.
- Identify and incorporate the changes into the updated Plan.
- Analyze probability of future events.
- Re-evaluate County development trends.

4: Review 2006 Plan Goals and Objectives:

- Discussion on what has changed in the last five years that may have affected vulnerability issues.
- Identify and discuss new problems.

- Review progress of current action items and classify as ongoing, deleted, completed or unchanged.
  - Verify if current strategy goals and objectives are accurate or if need revised.
  - Identify new action items.
  - Task out action items for priority projects.
- 5: Evaluate Plan Maintenance Process:
- Continuance of the process of making the mitigation planning a countywide collaborative effort.
  - Update the detail process on how the local government will incorporate the mitigation strategy into other planning mechanisms.
  - Review and modify process as necessary to continue public participation in the Plan, especially with newer technology methods of the Internet, Facebook, Twitter, etc.
- 6: Draft a Revised Plan Document:
- Review by stakeholders.
  - Modifications as recommended by stakeholders.
  - Modifications as recommended by the public.
- 7: Plan Adoption:
- Reviews by State Emergency Management Agency, Federal Emergency Management Agency, & FEMA.
  - Make recommended revisions as requested by State EMA and FEMA.
  - Formal adoption by the Miami County Board of Commissioners and all participating communities.

Every Miami Hazard Mitigation Committee member significantly contributed to this Plan update. Some examples of how each mitigation committee member contributed to the success of the planning process are as follows:

- Jacob Hoover of Miami County Planning and Zoning provided updated county map bases, planning documents, and general planning information.
- Kenneth Artz, Jim Bowell, and Art Blackmore of the Miami County EMA provided invaluable information on the emergency operations of the county; past event history; and a summation of current technology updates throughout the county as it relates to emergency response; assisted with the hosting of meetings; and set up the special Calamityville presentation for the community
- Robert Shook, Citizen-At-Large – former Concord Township Trustee – Miami Valley Regional Planning Commission member, has been invaluable in helping to set up a network of coordinating organizations, seeking matching funding for both past, current and future mitigation projects. Mr. Shook has also been an ardent leader in assisting to secure funding for purchase of green space along the Miami County rivers and streams to preserve for wildlife and for recreation purposes.
- Commissioner John F. Evans has been an active participant and promoter of the mitigation process throughout the county to advocate participation by all Miami County communities and numerous county agencies.

- Mr. Paul Huelskamp, Chairperson and County Engineer, provided important facts and countywide dates for much of the infrastructure systems throughout the county and assisted in helping prioritize mitigation actions within the plan.
- The entire Mitigation Committee has been supportive in many similar ways and they have volunteered their time and talents to provide leadership in the mitigation process for Miami County. Their actions have led to the completion of numerous mitigation activities as well as the promotion of the continuous countywide mitigation planning efforts.

The MCHMC reviewed many existing planning documents, studies reports, and technical information to determine if all of the previous plan referenced documents are still pertinent and have made suggested changes and have added new documents and planning mechanisms to update the plan.

### Community Plans

A summary of the known community documents to be incorporated included those shown in the following table:

Municipality Name	Population	Planning Commission	Zoning	Comprehensive Plans	Flood Plain Ordinance	Building Code - Residential	Building Code - Commercial	NFIP Participation	5 Year Capital Improvement Plan	Downtown Architectural Review District
Piqua	20,522	X	X	X	X	X	X	X	X	X
Tipp City	9,689	X	X	X	X	X	X	X	X	X
Troy	25,058		X	X	X	X	X	X	X	X
Bradford (part)	1,077		X			X	X			
Casstown	267		X			X	X			
Covington	2,584	X	X		X	X	X	X		X
Fletcher	473		X		X	X	X	X		
Laura	474		X			X	X			
Ludlow Falls	208		X			X	X			
Pleasant Hill	1,200									
West Milton	4,630	X	X	X*	X	X	X	X		
Huber Heights (part)	959	X	X		X	X	X		X	
Unincorporated areas of Miami County including all townships	35,365	X	X	X**	X	X	X	X	X	N/A

102,506

\* West Milton - Union Township Comprehensive Plan

\*\* Bethel Township has own Comprehensive Plan

County or Plans referenced and to be a part of the Plan include:

- 2011 updated Miami County FIRM Maps.
- Miami County Comprehensive Plan

### 1.3 Planning Committee

The Miami County Hazard Mitigation Planning Committee held seven public meetings and one special public presentation from November 2010 through May 2011 to guide and participate in the 2011 planning update process of the Miami County Hazard Mitigation Plan. The Committee consists of representatives from the following public and private sectors of Miami County.

- Miami County Emergency Management Agency
- Miami County Health District
- Miami County Engineering
- Miami County Planning
- Miami County Board of Commissioners
- Miami Conservancy District
- Miami County Economic/Community Development
- Miami County Park District
- Miami County Sheriff's Office
- Northern Miami Valley Red Cross
- Miami County Newspaper/Media Representative
- Citizens-at-Large
- City of Troy Mayor and Project Director
- Miami County Township Trustees
- West Milton Public Works
- Bradford Village Administrator
- City of Piqua Wastewater Plant
- City of Tipp City EMS

The Cities of Piqua, Tipp City and Troy; Board of Miami County Commissioners; and numerous villages had representatives or public officials present and participating on the Miami County Hazard Mitigation Planning Committee. In addition, participation from all smaller villages and communities were documented by:

- Responses received from letters and questionnaires sent to each community mayor, clerk, or village administrator.
- Providing community action item update responses returned to the Miami County EMA.
- Receipt of updated community information provided by local fire department personnel, volunteers, or village officials.
- Participation by volunteers from the communities attending hazard mitigation meetings and special public meetings.
- Participation from Miami County Planning.

Attached is the 2011 Miami County Hazard Mitigation Members list. Copies of the community documentation can be found in the Appendix.

## Miami County 2011 Hazard Mitigation Committee Member List

<b>Name</b>	<b>Agency</b>	<b>Phone</b>	<b>Ext.</b>	<b>Fax</b>	<b>E-mail</b>
Ken Artz	Miami County EMA	332-8560		440-9004	<a href="mailto:kartz@miamicountyema.org">kartz@miamicountyema.org</a>
Chris Cook	Miami County Health District	440-5455		440-8106	<a href="mailto:ccook@miamicountyhealth.net">ccook@miamicountyhealth.net</a>
Sarah Hippensteel	Miami Conservancy District	223-1271		223-4730	<a href="mailto:shippensteel@miamiconservancy.org">shippensteel@miamiconservancy.org</a>
Stan Kegley	City of Troy Project Director	335-1725		339-8601	<a href="mailto:stan.kegley@troyohio.gov">stan.kegley@troyohio.gov</a>
Ben Herron	West Milton Public Works	698-1500	116	698-3900	<a href="mailto:herron@ci.west-milton.oh.us">herron@ci.west-milton.oh.us</a>
Robert Shook	Citizen-At-Large	339-2637			<a href="mailto:robertshook@netzero.net">robertshook@netzero.net</a>
Rick Looker	Bradford Village Administrator	448-2718		448-0221	<a href="mailto:rlooker@swohio.twcbc.com">rlooker@swohio.twcbc.com</a>
Jacob Hoover	Miami County Planning	440-8123		440-8124	<a href="mailto:jhoover@co.miami.oh.us">jhoover@co.miami.oh.us</a>
Paul Huelskamp	Miami County Engineering	440-5656		440-5659	<a href="mailto:phuelskamp@co.miami.oh.us">phuelskamp@co.miami.oh.us</a>
Dale Gade	Miami County Park District	667-1086		667-0919	<a href="mailto:miamicoprk@aol.com">miamicoprk@aol.com</a>
Scott Myers	Miami County Park District	335-6273		335-6221	<a href="mailto:smyers@miamicountyparks.com">smyers@miamicountyparks.com</a>
Dan Weaver	Miami County Park District	335-6273		335-6221	<a href="mailto:dweaver@miamicountyparks.com">dweaver@miamicountyparks.com</a>
Phil Cox	Monroe Township Trustee	667-4716		667-3136	<a href="mailto:monroetwp@woh.rr.com">monroetwp@woh.rr.com</a>
Dave Burtner	City of Piqua Wastewater Plant	778-2088		778-5167	<a href="mailto:dburtner@piquaoh.org">dburtner@piquaoh.org</a>
Mark Senseman	City of Tipp City EMS	667-1680		667-5816	<a href="mailto:sensemanm@tippcity.net">sensemanm@tippcity.net</a>
Catherine Reed	American Red Cross	332-1414		332-1441	<a href="mailto:creed@nmvredcross.org">creed@nmvredcross.org</a>
James McGarry	Miami County Economic/Comm. Dev.	440-8110		440-8124	<a href="mailto:jmcgarry@co.miami.oh.us">jmcgarry@co.miami.oh.us</a>
Michael Henderson	Mote & Associates, Inc.	548-7511		548-7484	<a href="mailto:mhenderson@moteassociates.com">mhenderson@moteassociates.com</a>
Ron Darrow	Mote & Associates, Inc.	548-7511		548-7484	<a href="mailto:rdarrow@moteassociates.com">rdarrow@moteassociates.com</a>
Jack Evans	Miami County Commissioner	440-5910		440-5911	<a href="mailto:commissioners@co.miami.oh.us">commissioners@co.miami.oh.us</a>
Tom Mercer	Concord Township Trustees	308-2591		332-1828	<a href="mailto:tmercerc@woh.rr.com">tmercerc@woh.rr.com</a>
Michael Beamish	Mayor, City of Troy	339-1221		339-8601	<a href="mailto:mayor.beamish@troyohio.gov">mayor.beamish@troyohio.gov</a>
Charles Cox	Miami County Sheriff	440-6078			<a href="mailto:adminassist@miamicounty.so.com">adminassist@miamicounty.so.com</a>
Melody Vallieu	Troy Daily News	440-5265			<a href="mailto:vallieu@tdnpublishing.com">vallieu@tdnpublishing.com</a>

## **1.4 Plan Adoption by the Board of County Commissioners**

### **Adoption by the Board of County Commissioners**

“Formal adoption of the local and governing bodies has not been provided as a part of this draft plan. It is intended that formal adoption for all participating communities will be completed within one year after FEMA’s approval pending adoption”.

#### **Resolution**

#### **In the Matter of Resolution of Adopting the 5-Year Plan Update for Miami County Multi-Jurisdictional Hazard Mitigation**

**WHEREAS**, the Miami County Emergency Management Agency desires to be compliant with the Disaster Mitigation Act of 2000 (DMA2K) and 44CFR Section 201.6(d)(3). Said Act requires that a Hazard Mitigation Plan meeting program criteria be developed in order that the participating Miami County communities and townships will be eligible for future pre-disaster and post-disaster mitigation program funds (i.e. Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, etc.)

**FURTHER**, the mitigation planning regulation at 44CFR Section 201.6(d)(3) states:

A local jurisdiction must review and revise its Hazard Mitigation Plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five (5) years in order to continue to be eligible for mitigation project grant funding.

**WHEREAS**, the Miami County Emergency Management Agency established the Miami County Hazard Mitigation Committee and they have, through an organized planning process, identified local problems and mitigation activities to help reduce hazards, damages, and loss of life during a natural hazard event. Public meetings were held and a Countywide Multi-Jurisdictional Hazard Mitigation updated Plan was prepared and submitted to the Ohio Emergency Management Agency for review and comments in August 2010. Said Plan has been completed per the Ohio Emergency Management Agency recommendations. Said Plan is on file at the office of the Miami County Emergency Management Agency and is hereby formally adopted.

**WHEREAS**, by adopted Resolution R-47-99, the Miami County Emergency Management Agency has entered into an agreement, in the manner provided by law, under the Ohio Revised Code, as amended, and has the power to coordinate and unify the comprehensive Emergency Management activities of the participants, thereof, including the various municipal corporations and townships of Miami County, Ohio.

For the reasons stated in the preamble hereto, which is hereby made a part hereof, this Resolution (or Ordinance) is hereby declared to be an emergency measure and shall take effect and be in force from and after its passage by the Miami County Board of

Commissioners, and its adoption by the respective legislative bodies of the majority of the other Political Subdivisions of Miami County.

\_\_\_\_\_  
John F. Evans, President

\_\_\_\_\_  
John W. O'Brien, Vice President

Signed:\_\_\_\_\_

Effective:\_\_\_\_\_

JL\_\_\_\_\_ Page\_\_\_\_\_

\_\_\_\_\_  
Ron Widener

**Municipal Resolution No. \_\_\_\_\_**

**A RESOLUTION ADOPTING THE MIAMI COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION 5 -YEAR PLAN UPDATE**

WHEREAS, Miami County has experienced severe damage from several natural hazards on many occasions in the past century, resulting in property loss, loss of life, economic hardship, and threats to public health and safety; and

WHEREAS, the Miami County Emergency Management Agency has established the Miami County Hazard Mitigation Planning Committee and they have, through an organized planning process, identified local problems and mitigation activities to help reduce hazards, damages, and loss of life during a natural hazard event; and

WHEREAS, the 5-Year Plan Update recommends many hazard mitigation actions that will protect the people and property affected by the natural hazards that face Miami County; and

WHEREAS, public hearings were held to review the Plan as required by law; and will hereby be implemented, monitored, evaluated, and updated annually by the Miami County Hazard Mitigation Committee. The Miami County Board of Commissioners will be the public authority to promote and oversee the continued maintenance of this Plan.

NOW, THEREFORE, BE IT RESOLVED by the Commission of the Village of \_\_\_\_\_, Miami County, Ohio, the majority of all members elected thereto concurring, that:

- Section 1: The Miami County Hazard Mitigation 5-Year Plan Update is hereby adopted as an official Plan of Miami County, Ohio;
- Section 2: The Miami County Emergency Management Agency has entered into an agreement, in the manner provided by law, under the Ohio Revised Code, as amended, and has the power to coordinate and unify the comprehensive emergency management activities of the participants, thereof, including the various municipal corporations and townships of Miami County, Ohio; and
- Section 3: The respective County, Township, District, City, and Village officials identified in the strategy of the Plan are hereby directed to implement the recommended actions assigned to them. These officials will report annually on their activities, accomplishments, and progress to the Miami County Hazard Mitigation Committee under the direction of the Miami County Board of Commissioners. This report shall be submitted to the Miami County Board of Commissioners by February 28<sup>th</sup> of each year.
- Section 4: This resolution shall take effect and be in force from and after the earliest period allowed by law.

Passed: \_\_\_\_\_

Attest: \_\_\_\_\_

## 1.5 Plan Adoption

### Adoption by Multi-Jurisdictional

It is anticipated the following public entities will adopt the final FEMA approved 5-Year Plan Update for the Miami County Multi-Jurisdiction Hazard Mitigation Plan.

#### Multi-Jurisdictional Plan Participation Miami County, Ohio

Participating Jurisdiction	2006 Plan		2011 Plan		Date of Adoption
	Yes	No	Yes	No	
<b>Incorporated Areas</b>					
Village of Bradford	X		X		
Village of Casstown	X		X		
Village of Covington	X		X		
Village of Fletcher	X		X		
Village of Laura	X		X		
Village of Ludlow Falls	X		X		
City of Piqua	X		X		
Village of Pleasant Hill	X		X		
Village of Potsdam	X		X		
City of Tipp City	X		X		
City of Troy	X		X		
Village of West Milton	X		X		
Miami County Board of Commissioners					
Unincorporated areas of Miami County	X				

## **Hazard Identification, Risk Assessment & Vulnerability Analysis**

- 2.1 Overview & Hazard Identification Summary
- 2.2 Identifying Hazards
- 2.3 Tornado/Windstorm
- 2.4 Severe Winter Storm/Blizzards/Ice/Sleet
- 2.5 Flooding
- 2.6 Earthquake
- 2.7 Severe Thunderstorm and Lightning/Hail
- 2.8 Temperature Extreme & Heat Wave
- 2.9 Epidemic/Disease Impact
- 2.10 Drought
- 2.11 Infestation/Invasive Species
- 2.12 Wildfire
- 2.13 Terrorism
- 2.14 Utility/Communication Failures
- 2.15 Hazardous Materials Incident
- 2.16 Transportation Accident
- 2.17 Dam/Levee Failure
- 2.18 Addressing Repetitive Loss Structures
- 2.19 Updating Asset Inventory
- 2.20 Multi-Jurisdictional Risk Assessment
- 2.21 Analyzing Development Trends

## 2.1 Overview & Hazard Identification Summary

Miami County, Ohio, is prone to many natural and manmade hazards. Miami County has experienced hundreds of hazard events resulting in millions of dollars in losses and casualties, and seven State disaster declarations between 1977 and 2010. In 2003, as part of an overall effort to reduce future exposure to damages and meet the planning requirements of the DMA 2000, Miami County of Ohio began the development of the initial Hazard Identification and Risk Assessment (HIRA). The HIRA has been subsequently reviewed and updated in 2010-2011.

This section will cover separate requirements of Section 201.(c)(2) including overview, identifying hazards, profiling hazards, addressing repetitive loss structures, identifying structures, estimating potential losses and analyzing development trends. These requirements are integrated into each hazard for which it is detailed.

### Identifying Hazards

Section 201.6(c)(2)(i) requires the risk assessment include a description of the type of all natural hazards that can affect Miami County. This section of the plan presents a list of potential hazards that may likely impact Miami County. Due to the county's mix of urban and rural areas, it is vulnerable to a number of hazards that threaten its' communities, businesses, public entities, and environment. To determine the hazards that pose the greatest threat to the county, the Miami County Mitigation Committee updated the list of potential hazards by conducting a review of several key resources which include:

- Review of historical data on events that have occurred in the last 50 years.
- Review of 2006 Miami County plan data.
- Review of the State Hazard Mitigation Plan.
- Collaboration with community experts and agencies on different hazards including representatives from County Board of Commissioners, County Trustee Representatives, County EMA, County Engineers, Miami Conservancy District, County Health District, City/Village Representatives, County Planning & Zoning, County Park District, Community EMS Agencies, Public at Large, Northern Miami Valley Red Cross Chapter, Miami Conservancy District, and other State and Local Agencies.
- Review of past events and declared disasters through NOAA/NCDC
- United States Geological Survey (USGS) and Ohio Seismic Network
- Newspaper articles and internet research.
- County Auditor data.

### Profiling Hazards

Section 201.6(c)(2)(i) requires that the risk assessment shall include a description of the location and extent of all natural hazards that can affect Miami County including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate. The risk assessment relies upon

information about past hazard events from published sources such as NOAA, USGS, USACE, Ohio EMA, ODNR, and Miami County Records, among other agencies.

The risk assessment section for each hazard in this plan includes a description of the location or geographic area that would be affected and areas where it could occur; the extent of magnitude or severity of potential hazard events; the range of magnitude or severity expected of the hazard; past occurrences; and a discussion of probability of future hazard events.

### **Assessing Vulnerability of Miami County**

Section 201.6(c)(2)(ii) requires a description of each jurisdiction's vulnerability to the hazards described and the description shall include an overall summary of each hazard and its impact on the community.

### **Addressing Repetitive Loss Structures**

Section 201.6(c)(2)(ii) requires that the risk assessment also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods. Miami County has identified seven repetitive loss structures located within the City of Troy and unincorporated areas of Miami County.

### **Identifying Structures**

Section 201.6(c)(2)(ii) of the risk assessment should include a description of vulnerability in terms of and analysis of the county's vulnerability to the hazards described in this paragraph (c)(2) based on estimates provided in local risk assessments. The county shall describe vulnerability in terms of the communities most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. The methodology for this section varies by hazard due to available data and will be more thoroughly discussed within the results of the section for each hazard. The Fire Department Jurisdiction Teams determined which structures were considered critical facilities during a disaster. Critical facilities are defined as a facility whose use is necessary during recovery efforts following a disaster.

### **Estimating Potential Losses**

Section 201.6(c)(2)(ii) of the risk assessment should include a description of vulnerability and analysis of potential losses to identified structures based on estimates. The methodology for this section varies by hazard due to available data and will be more thoroughly discussed within the section for each hazard.

### **Analyzing Development Trends**

Section 201.6(c)(2)(ii) of the risk assessment should describe vulnerability in terms of providing a general description of land uses and development trends within each community participating in the plan. The County development is generally along the North/South I-75 corridor but is discussed in more detail within the analyzing development trends section.

**Multi-Jurisdictional Risk Assessment**

Section 201.6(c)(2)(ii) indicates that the risk assessment must assess each jurisdiction's risk where they vary from the risks facing the entire planning area. This requirement is addressed in detail within the section.

**Update Summary**

The 2003 HIRA identified a comprehensive list of hazards, both manmade and natural. Developing this data was a collaborative process involving several county and state agencies. For the 2011 update, the existing analyzed hazards were reviewed for accuracy and availability of improved data. Based on the review it was determined that the following updates be made:

- Data updates for the following hazards: Floods, Tornadoes, Winter Storms, Earthquakes, Droughts, Severe Summer Storms, and Invasive Species.
- Reduced the hazards list from 30 to 15 (10 natural hazards and five other hazards). Because many of the hazards have similar outcomes, the hazards were combined. For example, high winds events and tornadoes were combined as one category. Another example is power outages were combined with water/sewer failures into a single category as utility/communication failures.

## 2.2 Identifying Hazards

The Miami County Hazard Mitigation Committee reevaluated the identified hazards in its previous FEMA approved plan to address any newly identified hazards that have been determined to pose a threat. These hazards were identified through an extensive research process that utilized input from the following sources:

- Miami County EMA
- Miami County Health District
- Miami Conservancy District
- City of Troy Project Director
- West Milton Public Works
- Citizens at Large
- Miami County Planning and Zoning
- Miami County Engineering
- Miami County Park District
- Township Trustees
- City of Tipp City EMS
- American Red Cross
- Miami County Economic/Community Development
- Miami County Commissioners
- Concord Township Trustees
- Reviews of newspapers ranging in date from 2004-2010
- Discussions conducted with local officials/experts.
- Reviews conducted of the updated Flood Insurance Rate Maps (FIRMs) for Miami County and the Villages of Bradford, Casstown, Covington, Fletcher, Laura, Ludlow Falls, Pleasant Hill, Potsdam, West Milton, and the Cities of Piqua, Tipp City, and Troy.
- Searches of multiple Internet sites concerning hazard mitigation and planning (The following sites are general listings that were revisited at the onset of the project. Sites that were searched regarding specific hazards are listed with those hazards below):
  - American Red Cross – Local Chapters  
[www.redcross.org/where](http://www.redcross.org/where)
  - Disaster Center  
[www.disastercenter.com](http://www.disastercenter.com)
  - Federal Emergency Management Agency  
[www.fema.gov](http://www.fema.gov)
  - HAZUS Instruction and Technical Information  
[www.fema.gov/hazus](http://www.fema.gov/hazus)
  - Socio-Economic Data Resources  
[www.csc.noaa.gov/products/nchaz/htm/dinfo\\_4.htm](http://www.csc.noaa.gov/products/nchaz/htm/dinfo_4.htm)
  - USDA Natural Resources Conservation Service
  - National Oceanic Atmospheric Administration

The Miami County Hazard Mitigation Committee re-evaluated the following Natural and Technological hazards to determine if they could potentially affect the county:

- Severe Thunderstorm
- Hail Storm
- Blizzard
- Flooding
- Tornadoes
- High Wind Events
- Severe Winter/Ice Storms
- Droughts
- Earthquakes
- Extreme Temperatures
- Disease (Human/Animal)
- Animal/Insect Infestation
- Wildfire
- Levee/Dam Failure
- Avalanche
- Coastal Storm
- Mine Subsistence
- Volcano
- Coastal Erosion
- Hurricane
- Tsunami
- Landslides
- Power Outages/Blackouts
- Water/Sewage System Failures
- Structure Fires
- Structural Collapse
- Transportation Accidents – Road, Rail and Air
- Cyber Terrorism
- Communication/Network Interruptions
- Acts of Terrorism
- Natural Gas Leaks/Spills
- Heating Emergencies
- HAZMAT Incidents (spills)
- Air/Water Contamination
- Bomb Threats/Bombing
- Active Shooter, Workplace
- Civil Disturbances
- Arson

Several hazards were deleted from the list based on the unlikely hood of occurrence and the potential for a negligible impact on the County should they occur. Other hazards were combined as many of them are factors in larger hazards.

After evaluation and study the Miami County Hazard Mitigation Committee eliminated the following Natural Hazards, which were determined to be very low or insignificant risks to the County:

- Avalanche – The general elevation is not high enough and the climate not suitable for snow to cap mountains year round. Therefore, avalanches are not a significant hazard. Sliding rock and/or earth is considered a landslide for the purpose of this report.
- Coastal Erosion – Miami County is a landlocked county and does not have any coastal boundaries
- Coastal Storm – Miami County is positioned inland from large bodies of water (see also Hurricane)
- Hurricane – While Miami County sometimes receives precipitation and high winds as hurricanes hit the southern coastal states, the county does not experience intense hurricane conditions. The precipitation and wind that is received can be classified as a severe thunderstorm or high wind event.

- Mine Subsidence – According to the Ohio Department of Natural Resources, there are no abandoned mines in Miami County.
- Tsunami – Miami County is located inland from large bodies of water and not affected by tsunamis.
- Volcano – Research shows no volcanic activity in Miami County
- Landslides – Due to flat terrain of the County the occurrence of a landslide has been determined to very low.

Upon identifying the hazards that can affect Miami County, a second element is the assessment of the vulnerability that can be associated with that hazard. The risks associated with each hazard were further assessed using the following factors which were assigned numerical risk values:

For the purposes of ranking hazards affecting the county, in order of importance for mitigating their effects, a hazard assessment was completed on a scale of 0 - 4, with four being the highest priority for considering mitigation goals. This index takes into account:

- Magnitude of hazard classification
- Frequency of occurrence
- Average warning response duration
- Impact on life safety and well being
- Community preparedness for event
- Consequences of impact

Numerical values were applied to provide a basis to compare hazards and to assign risk value.

<b>Magnitude of Hazard Classification</b>		
<b>Magnitude</b>	<b>Description</b>	<b>Mishap Definition</b>
4	Catastrophic	Death or major structural loss
3	Critical	Severe injury, severe illness, or marginal structural damage
2	Marginal	Minor injury, minor illness, or structural damage
1	Negligible	Less than minor injury, illness, or structural damage

Frequency of Occurrence	
High	Near 100 Percent probability in the next year
Likely	Between 10 percent and 100 percent probability in the next year, or at least one chance in 10 years
Low	Between 1 and 10 percent probability in the next year, or at least one chance in the next 100 years
Unlikely	Less than 1 percent probability in the next year, less than one chance in the next 100 years
Highly Unlikely	Little or no probability in next 100 years

Source: FEMA, 1997

Average Warning Response Duration: Examines the probable amount of warning time associated with an impending incident and whether or not viable warning systems are in place	
4	Excessive
3	Long
2	Medium
1	Short

Impact On Life Safety and Well Being: Examines overall impact the hazard will have on life safety
<p><b>Catastrophic:</b> If such an event would occur the number of injuries would be numerous and the severity of the injuries would be mostly life threatening injuries.</p> <p><b>Critical:</b> If such an event would occur the number of injuries would be numerous and the severity of the injuries would be a mix of life threatening and non-life threatening injuries.</p> <p><b>Limited:</b> If such an event would occur the number of injuries would be limited and the severity of the injuries sustained would not be life threatening injuries.</p> <p><b>Negligible:</b> Injuries and/or illness treatable with first aid kit.</p>

**Community Preparedness:** Examines overall preparedness that County Emergency response agencies have when responding to a specific hazard

**Not Prepared:** There is no emergency plan, or written policies or procedures in place. The emergency response personnel have inadequate equipment or no equipment at all. Response personnel have not received any training or participated in any emergency exercises. There is no emergency notification system to warn the public. No mutual aid agreement signed with local emergency response agencies.

**Poorly Prepared:** No Emergency Plan, some written policies and procedures are in place but have not been reviewed and revised recently. The emergency response personnel are not adequately equipped and properly trained in the necessary steps to be taken to deal with a specific emergency. Single or a few antiquated emergency notification systems are employed to alert the public of incoming hazards. Mutual aid agreement is signed, but is out of date.

**Adequately Prepared:** Emergency Plan, written policies and procedures are in place, but have not been reviewed annually. Emergency response personnel have equipment but it may be inadequate. The response personnel have received some training but do not regularly participate in disaster response drills. There are a few emergency notification systems employed, to notify the public of oncoming hazards. Mutual aid agreements are signed.

**Well Prepared:** Emergency Plan, written policies, procedures are in place and are revised annually. Emergency response personnel have the proper equipment that they need to respond to a specific hazard. The response personnel have been properly trained and participate in disaster drills regularly. There is several emergency notification systems employed to alert the public of oncoming hazards. Mutual aid contracts have been signed and are current.

### Consequences of Impact

Catastrophic	Multiple deaths, complete shutdown of facilities for 30 days or more, more than 50 percent of property is severely damaged.
Critical	Multiple severe injuries, complete shutdown of critical facilities for at least two weeks, more than 25 percent of property severely damaged.
Limited	Some injuries, complete shutdown of critical facilities for more than one week, more than 10 percent of property severely damaged.
Negligible	Minor injuries, minimal quality-of-life impact, shutdown of critical facilities and services for 24 hours or less, less than 10 percent of property is severely damaged

Source: FEMA, 1997

The final natural hazard list included 10 hazards which are listed in order of priority:

**1. Tornado/Windstorm (15.18)**

Miami County has endured fifteen tornados from the period of 1950 through June 2010. The most damaging tornado was an F-1 on the Fujita scale occurring in June of 1989 causing \$2,500,000 in damage over portions of Miami County.

Miami County has experienced frequent high wind events throughout the county. The magnitude of these events has ranged from 50-66 knots. The most significant wind storm occurred as a result of Tropical Storm Ike which was experienced countywide on September 14, 2008 resulting in approximately \$12,000,000 in property damage throughout county.

**Sources:** NOAA/NCDC Event Records. Local newspaper coverage. National Weather Service.

**Why Identified:** Numerous past occurrences in the county. Past federal disaster declarations.

**2. Severe Winter Storm/Blizzards/Ice/Sleet (14.64)**

Miami County is susceptible to severe winter weather conditions as it experienced the Blizzard of 1978, blizzard conditions of December 19, 1995, and three Level Three (3) snow emergencies in January 1999. Winter Storm events with heavy snow, ice and winter weather conditions occur frequently throughout the Miami County area. The open rural areas of the county are subject to blowing and drifting snow with poor visibility. Per event, snowfalls in the 6-12" range are common during the winter months, and the frequency is generally a yearly occurrence. Two deaths and six injuries were attributed to severe winter weather on January 21, 1995. There were two deaths on January 6, 1996, that cause \$14,600,000 in damages to the County. There was also one death due to a winter storm on March 19, 1996. An accident due to icy road conditions seriously injured three on December 26, 2010 along St. Rt. 718 near Pleasant Hill. There have been no winter weather reported deaths to the National Climatic Data Center between the years of 2004-2010.

**Sources:** NOAA/NCDC Event Records. Local newspaper coverage. National Weather Service. Review of past disaster declarations.

**Why Identified:** Frequent occurrences in the county.

**3. Flooding (14.29)**

Miami County's drainage areas include the Great and Miami River basins, which include the Great Miami, Stillwater, and Mad Rivers. Miami County experienced flooding as evidenced by the August 25, 1995 flooding when 10.7" of rain fell over a 24-hour period whereby the County had more roads closed than the County had "high water" signs. This event resulted in the Presidential Declaration. Then on June 29, 1998, the flooding incident resulted in closing down Interstate 75 near Tipp City and

caused widespread flooding to the area. The Miami County Hazard Risk Assessment includes one residential repetitive loss structure located near Troy. It has recorded two losses.

**Sources:** Review of updated FIRM maps. Local newspaper coverage.  
NOAA/NCDC Event Records. Miami County EMA records.  
Review of past disaster declarations.

**Why Identified:** Past occurrences in Miami County. Past federal disaster declarations.

#### **4. Earthquake (14.29)**

Miami County's immediate neighboring county to the north, Shelby County, has been the site of at least 40 earthquakes, including a 5.0 magnitude earthquake in 1988. Other earthquake events in 1875, 1930, 1931, and two quakes in 1937 caused minor to moderate damage in Shelby County. Many of these quakes were felt in Miami County. Most recent Shelby County earthquake centered in western Shelby County and felt in Miami County was September 30, 2008.

**Sources:** Division of Geological Survey – Ohio Seismic Network. Internet search. Local newspaper coverage.

**Why Identified:** Several previous documented tremors occurred in the County.

#### **5. Severe Thunderstorm & Lightning/Hail (14.12)**

Occur frequently throughout the county causing widespread damage as recorded in the NOAA event records. A severe thunderstorm with lightning occurred on June 2, 2007 causing three injuries at the Troy Strawberry Festival. The hailstorm of May 18, 2000 struck the Miami County communities of Bradford, Pleasant Hill, Piqua and Troy with significant damage reported. One person was killed by lightning in Piqua on April 9, 2001.

**Sources:** NOAA/NCDC Event Records. Local newspaper coverage.  
National Weather Service.

**Why Identified:** Several past occurrences in the county. Past federal disaster declarations.

#### **6. Temperature Extreme & Heat Wave (12.65)**

The last known extreme heat occurrence to affect Miami County was the hot and humid period in July 1999. 13 heat related deaths were recorded across Ohio. Extreme heat and cold temperatures are a terser hazard that can be a hazard in Miami County. The highest recorded temperature in Ohio through 2010 was 113 degrees Fahrenheit which was reported in the southeastern portion of the state.

**Sources:** NOAA/NCDC event records, previous past disaster declarations, local newspaper coverage, internet research.

**Why Identified:** Previous occurrences in county.

#### 7. Epidemic/Disease Impact (12.35)

Miami County is susceptible to many epidemics as witnessed by the West Nile virus which has struck the county.

**Sources:** Local newspaper coverage, Ohio Department of health records.

**Why Identified:** Previous occurrence in the County.

#### 8. Drought (11.06)

Miami County experienced a severe drought in July and August 1999. Whereby most of the county was 6 – 8” below normal precipitation levels. Miami County also experienced moderate drought conditions in August and September 2007 and September 2010.

**Sources:** NOAA/NCDC Event Records. Local newspaper coverage. National Weather Service. Palmer Drought Severity Index. Ohio Department of Natural Resources, Division of Water.

**Why Identified:** Previous occurrences in the county.

#### 9. Infestation/Invasive Species (10.59)

This is of concern as evidenced with the 2003 gypsy moth infestation. In addition, the Emerald Ash Borer insect from Asia was discovered in Ohio in 2003. In 2010, Ohio began experiencing a resurgence of bed bugs which were eradicated from the U.S. around the end of World War II but in the last decade have made a steady comeback. The scratch inducing pests can live without feeding for up to 18 months. An infestation of the Asian Longhorned Beetles (ALB) has been discovered in Southwest Ohio near Cincinnati in the spring of 2011. The U.S. Department of Agriculture says Ohio is the 5th state to detect ALB. These beetles attack a wide variety of broadleaf trees particularly Maples. Invasive plants include Bush Honeysuckle which is prevalent across woodlands of Miami County.

**Sources:** Local newspaper coverage, internet research, Ohio Department of Agriculture, Department of Natural Resources, Ohio Division of Forestry.

**Why Identified:** Previous documented occurrence within County.

#### 10. Wildfire (10.18)

Miami County is susceptible to wildfire in fields and woodlands during extensive dry conditions, mainly in the late summer and early fall seasons. On September 24,

2010 wind conditions and extreme dry conditions accompanied by dry crops field many field fires in Miami and surrounding counties. In nearby Darke County a house and barn were lost due to wildfire.

**Sources:** Local newspaper coverage. Fire and Emergency Service records. Ohio Department of Natural Resources. Ohio Division of Forestry. Internet search. Palmer Drought Severity Index.

**Why Identified:** Several previously documented occurrences in the County.

The final other hazard list included five hazards which are listed in order of priority:

### 1. Terrorism (15.53)

Miami County has identified individual potential terrorist target sites, is located close to Wright-Patterson Air Force Base, and is positioned close to two large cities which make the county a possible terrorist threat.

**Sources:** County Emergency Management.

**Why Identified:** Close proximity Wright Patterson Air Force Base.

### 2. Utility/Communication Failures (14.82)

With technology dependence, many residents, industries and businesses rely on uninterrupted utilities and communications.

**Sources:** Local newspapers and media coverage, Miami County EMA records, internet research.

**Why Identified:** Parts of Miami County experienced up to five days without power after Tropical Storm Ike winds did wide spread damage to the utility communications systems on Sept. 14, 2008. With increased reliance on technology, other periodic utility and communication outages within the county have caused increased economic and social concerns for Miami County residents.

### 3. Hazardous Materials Incident (14.82)

Miami County has many sites with stored hazardous materials. Transportation and shipment of these chemicals over Interstate 75 and the Miami County highways are of concern.

**Sources:** Emergency Management information, County transportation Study.

**Why Identified:** Concerns outlined in County Transportation Study.

**4. Transportation Accident (13.98)**

20 miles of Interstate highway, 30 miles of U.S. highways, 154 miles of State highways, rail systems, and two commercial airports in or near the county increase the potential for a transportation accident to occur.

**Sources:** Local newspaper coverage, State and County Transportation records

**Why Identified:** Frequent occurrence of accidents on Interstate 75.

**5. Dam/Levee Failure (13.29)**

Miami County has three Class I dams and a total of thirteen dams which pose a real threat to loss of life, serious health hazard and structural damage should a failure occur.

**Sources:** County records, Ohio Department of Natural Resources, Local newspaper coverage.

**Why Identified:** Thirteen dams exist within Miami County and pose a threat to several communities should a failure occur. The City of Piqua has three Class I dams that are not flood capacity compliant or dam integrity compliant.

### 2.3 Tornado/Windstorm

#### Overview

A windstorm is a storm with high winds or violent gusts, sometimes called wind shears or microbursts, but with little or no rain.

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one mile wide and 50 miles long.

Several methods of research identified severe wind and tornadoes as natural hazards in Miami County. General severe wind and tornado information was obtained from the following sources:

- State and Local Mitigation Planning How-To-Guide Understanding Your Risks (FEMA)
- National Oceanic & Atmospheric Administration (NOAA)
- Miami County Emergency Operations Plan
- Local media and newspaper articles

#### Risk Assessment

Ohio falls into the “high” category for tornado risk and the highest category for wind zones in the United States, which is illustrated in Figure 1.1. Most sources have only been recording tornado activity since 1950. Miami County has reported sixteen tornadoes, with at least two of those being category F2. The entire county is in a Zone IV wind zone, according to the Design Wind Speed for Community Shelters Map. This wind zone places Miami County in a category that could experience devastating tornadoes with 207-260 mph wind speeds, which indicates that significant damage will be sustained to structures with solid foundations. With no mountainous terrain to break

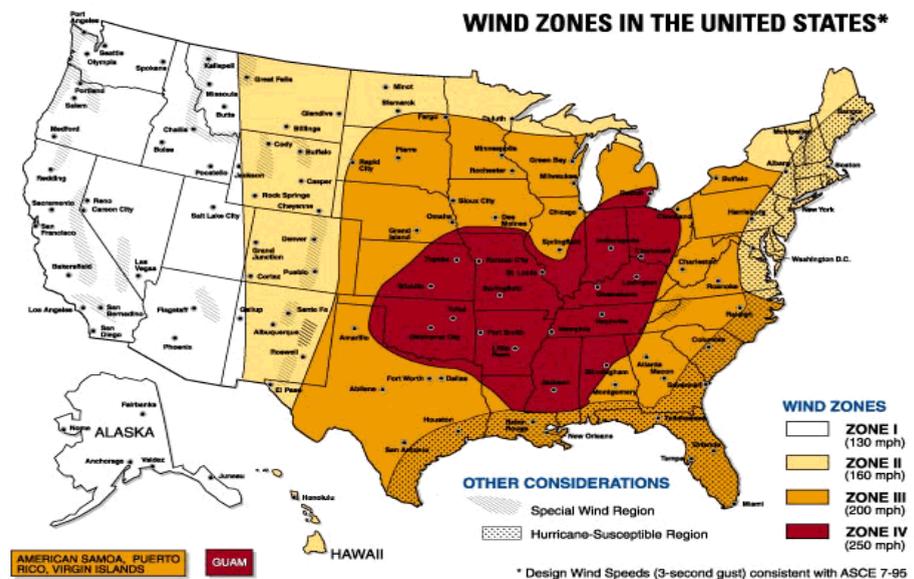


Figure 1.2 Wind zones in the United States

Figure 1.1

up tornadoes that actually form and touch down in Miami County, tornadoes and other wind hazards are present in the flat open areas that exist throughout the county.

In 1971, Dr. T. Theodore Fujita of the University of Chicago devised a six-category scale to classify U.S. tornadoes into six damage categories, called F0-F5. F0 describes the weakest tornadoes and F5 describes only the most destructive tornadoes. The Fujita tornado scale (or the “F-scale”) has subsequently become the definitive scale for estimating wind speeds within tornadoes based upon the damage caused by the tornado. It is used extensively by the National Weather Service (NWS) in investigating tornadoes, by scientists studying the behavior and climatology of tornadoes, and by engineers correlating damage to different types of structures with different estimated tornado wind speeds.

The devastating tornadoes in Jarrell, Texas on May 27, 1997 and Moore/Oklahoma City on May 3, 1999 demonstrated to many engineers, emergency managers and meteorologists that the wind estimates in the original F-scale may be too high. Their findings are described in the FEMA document #342: “Building Performance Assessment Team Report, Midwest Tornadoes of May 3, 1999, Observation, Recommendations and Technical Guidance”.

The enhanced Fujita tornado scale or EF-scale was unveiled by the NWS to the public and the full meteorological community early in 2006. On February 1, 2007, the Enhanced Fujita scale replaced the original Fujita scale in all tornado damage surveys in the United States. It is important to note that, despite the improvements, the EF-scale still remains a set of *wind estimates* based on eight levels of damage to twenty-eight different types of structures and vegetation.

Below is a table comparing the estimated winds in the original F-scale and the operational EF-scale that is currently in use by the NWS.

**The Enhanced Fujita Tornado Scale**

Fujita Scale			Operational EF-Scale	
F Number	Fastest ¼-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85
1	73-112	79-117	1	86-110
2	113-157	118-161	2	111-135
3	158-207	162-209	3	136-165
4	208-260	210-261	4	166-200

Damages one might expect from the varying intensities are as follows:

- F-0 Light damage to trees and buildings
- F-1 Moderate damage to trees and buildings, roofs peeled off, mobile homes disturbed
- F-2 Considerable damage to trees and buildings, roofs torn off frame houses, mobile homes destroyed, large trees down
- F-3 Severe damage to trees and buildings, roofs and walls torn off well-constructed buildings, trees uprooted, trains overturned
- F-4 Devastating damage, well-constructed houses leveled, large missiles generated
- F-5 Incredible damage, strong houses lifted off foundations and carried considerable distances to disintegration, trees debarked, automobiles fly through the air and become missiles

While tornadoes are relatively short lived in duration, they are intensely focused, making them one of the most destructive of the natural hazards. Ohio is positioned geographically on the eastern-most edge of what has come to be known as “tornado alley” and is no stranger to tornado sightings. According to a map created by NOAA, Ohio averaged 14 tornadoes per year from 1950 - 1995.

### **Past Occurrences**

According to a May 23, 1982 article from the Miami Valley Sunday News, a tornado touched down in southern Elizabeth Township and northern Bethel Township causing one injury and extensive damage to several homes, businesses, and other structures. Law enforcement officials’ rescue efforts were hampered due to the large number of sight-seeing motorists causing traffic jams on debris laden, partially blocked roads.

A NOAA Event Record indicated that on March 9, 2002, a widespread area of high winds blew down trees, power poles, and various other smaller structures and signs. At one time, approximately 100,000 people were without power. One man was killed when his semi tractor-trailer overturned, and several others were injured in automobile accidents. Two people were briefly trapped in a mobile home when a tree fell on it.

A NOAA event record indicated that on September 14, 2008, Miami County and a large portion of Ohio experienced a prolonged severe windstorm event as a result of Tropical Storm Ike. The windstorm caused \$2,500,000 in damages countywide and left many residents without power for 4-5 days. There were many downed limbs, trees, power lines, and damaged roofs reports. Two motorcyclists were killed in a nearby county from a falling tree.

The following charts indicate past history of high winds and tornado events in Miami County:

<b>Miami County Tornado Events 1955-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Countywide	3/1/1955	Tornado	F1	0	1	\$250,000	\$0
Countywide	5/22/1959	Tornado	F2	0	0	\$3,000	\$0
Countywide	6/8/1961	Tornado	F2	0	0	\$250,000	\$0
Countywide	7/28/1961	Tornado	F1	0	0	\$25,000	\$0
Countywide	7/2/1978	Tornado	F0	0	0	\$25,000	\$0
Countywide	5/22/1982	Tornado	F1	0	0	\$25,000	\$0
Countywide	5/22/1982	Tornado	F1	0	1	\$25,000	\$0
Countywide	6/16/1992	Tornado	F0	0	0	\$0	\$0
Countywide	6/20/1984	Tornado	F1	0	0	\$25,000	\$0
Countywide	6/3/1989	Tornado	F1	0	0	\$250,000	\$0
Countywide	6/3/1989	Tornado	F1	0	0	\$2,500,000	\$0
Countywide	6/18/1992	Tornado	F1	0	0	\$250,000	\$0
Tipp City	4/9/1999	Tornado	F1	0	0	\$250,000	\$0
Potsdam	7/9/1999	Tornado	F0	0	0	\$10,000	\$0
Piqua	4/4/2003	Tornado	F0	0	0	\$0	\$3,000
West Milton	7/3/2004	Tornado	F0	0	0	\$25,000	\$0
<b>TOTALS:</b>				<b>0</b>	<b>2</b>	<b>\$3,913,000</b>	<b>\$3,000</b>

Source: National Climatic Data Center (NCDC)

<b>Miami County High Wind Events 1994-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Countywide	11/1/1994	High Winds	0 kts.	0	1	\$500,000	\$0
Countywide	11/27/1994	High Winds	0 kts.	0	1	\$50,000	\$0
Countywide	4/11/1995	High Winds	0 kts.	0	0	\$150,000	\$0
Countywide	4/6/1997	High Wind	60 kts.	0	0	\$19,000	\$0
Countywide	11/10/2000	High Wind	40 kts.	1	6	\$25,000	\$0
Countywide	12/11/2000	High Wind	58 kts.	1	0	\$100,000	\$0
Countywide	3/9/2002	High Wind	73 kts.	1	12	\$971,000	\$0
Countywide	12/1/2006	High Wind	50 kts.	0	0	\$10,000	\$0
Countywide	9/14/2008	High Wind	52 kts.	0	0	\$12,000,000	\$0
<b>TOTALS:</b>				<b>3</b>	<b>20</b>	<b>\$13,825,000</b>	<b>\$0</b>
<a href="#">Source: National Climatic Data Center (NCDC)</a>							

According to NOAA/NCDC Records, the reported property damage that has occurred from 1994 – 2010 is \$13,825,000 property damages.

### Probability of Future Events

Between 1950 and 2010, Miami County has experienced 16 tornadoes. This is an average of one every 3.75 years. The percentages, based on magnitude to date, have been:

F-0	5	31%
F-1	9	56%
F-2	2	13%
F-3	0	0%
F-4	0	0%
F-5	0	0%

The percentages of tornadoes by season to strike Miami County since 1955 have been:

Spring:	March 21 – June 20	11	69%
Summer:	June 21 – September 20	4	25%
Fall:	September 21 – December 20	0	25%
Winter:	December 21 – March 20	1	6%

The paths of the tornadoes have occurred throughout the County including northern, central, and southern portions, so no part of the County is exempt from a tornado strike. Most vulnerable to damage are mobile homes, camping trailers, temporary shelters, and poorly constructed buildings. From past data, it is most likely that a future tornado event may occur in the spring or summer months.

### **Vulnerability Analysis and Loss Estimation**

Strong windstorms, especially tornadoes, can cause significant damage to structural assets. Miami County's topography is that of flat and open to gently sloping, which offers no natural barriers to breakup severe wind or tornados that form. The following information was developed based on historic hazard events as well as statewide wind zone designations.

Because tornadoes are a random event, no one area in Miami County is more susceptible to damage than another. The typical tornado events in Miami County are considered moderate with 16 occurring since 1955. Because the occurrence is moderate, the damage of businesses and residences is considered to be of moderate damage. The property damage from the past 16 tornado events with magnitude ranging from F-0 – F-2 has been \$3,193,000 with no deaths and two injuries. The worst event was an F-1 tornado in 1989 causing \$2,500,000. Based on today's dollar value the cost if a similar event was to occur in Miami County would be \$4,400,000 in property damages. Based on the infrequencies of tornadoes in Miami County, the County is at moderate risk relating to property damage and low risk for loss of life. It is anticipated that a tornado would be a localized event affecting a limited area of the County.

In reviewing the vulnerability to the County for straight-line windstorm damage to the County, no one area is more susceptible to property damage from high winds. However, some physical factors may affect the amount of damage such as large trees may become uprooted and limbs and trees may fall across houses. Features such as open fields may affect the wind intensity on a structure in which case mobile homes become especially vulnerable to windstorms.

Based on NCDC past wind events, there have been 12 high wind events since November 1, 1994, causing \$13,800,000 in damages with three deaths and 20 injuries. That is about an average of one wind event every 15 months. These damages are more than four times the amount of property damage suffered from the total County tornadoes. The amount of injuries and deaths are also greater.

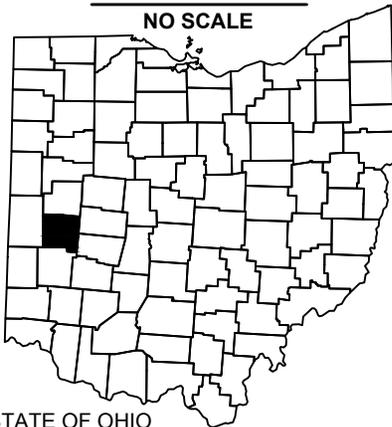
The worst single windstorm event to strike Miami County in terms of property damage was in September 2008 when the remnants of Tropical Storm Ike caused \$12,000,000 in damages with no deaths or injuries reported. In today's value, that is approximately \$12,200,000 in property damage. A high wind event can be a localized event affecting areas of the County; or, as in the case with the remnants of Tropical Storm Ike in 2008, it can be a countywide event which can affect the entire County. The anticipated economic losses anticipated for future county high wind events can range from light damage to moderate damages with injuries and loss of life possible.

**Mapping**

See the Miami County Severe Wind and Tornado Map for a graphical representation of hazard risk areas with regard to tornadoes and windstorms.

**VICINITY MAP**

NO SCALE

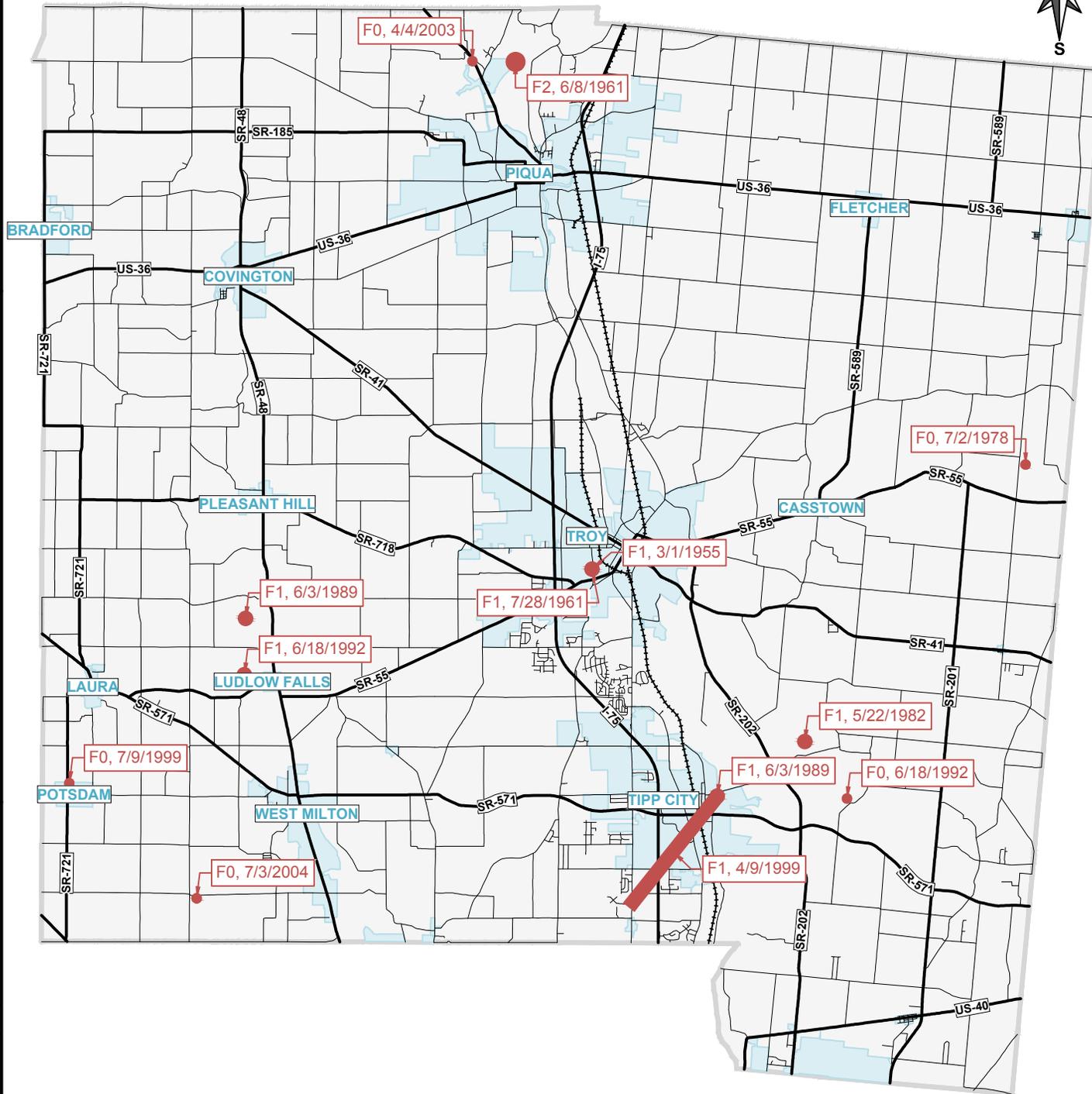
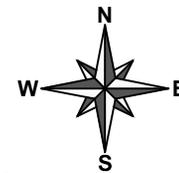


STATE OF OHIO

**MAP LEGEND**

- F0 TORNADO - START LOCATION
- F1 TORNADO - START LOCATION
- F2 TORNADO - START LOCATION
- ▬ F1 TORNADO PATH
- MAJOR ROADWAY
- MINOR ROADWAY
- ACTIVE RAILROAD
- CITY / VILLAGE
- COUNTY

**MIAMI COUNTY TORNADO/WINDSTORM**



**Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 16,000'



16,000 FEET 0 16,000

## **2.4 Severe Winter Storm/Blizzards/Ice/Sleet**

### **Overview**

One or more of the following characterizes a winter storm: Heavy snow, ice storms, strong winds, extreme cold, and, in certain areas, coastal flooding and beach erosion.

Several methods of research identified winter storms as a hazard in Miami County, including reviews of newspaper coverage, reviews of past disaster declarations, and interviews with local officials and reviewing the NOAA/NCDC Miami County weather events.

A severe winter storm could affect the entire county at the same time, virtually bringing all county operations to a stand still. Miami County is highly vulnerable to the wide-ranging effects of snowstorms, blizzards, ice storms, sleet, and severe cold snaps. This type of hazard creates a difficult emergency response effort due to adverse road conditions which impede or prohibit vehicle movement.

### **Risk Assessment**

Research indicates that all of Miami County is equally susceptible to winter storms. Driving is treacherous during winter storms as roadways freeze and become covered with snow and slush. During severe winter storms, heavy snow may cause property damage and power outages. Also, the aforementioned adverse driving conditions may lead to additional property damage. According to a FEMA Winter Storm Fact Sheet, the leading cause of death during winter storms is from automobile and other transportation accidents. Roads are sometimes blocked, stranding some rural residents from the incorporated areas where medical and other emergency services are centered. Heavy snowfall and blizzards can trap motorists in their cars. Attempting to walk for help in a blizzard can be a deadly decision. Disorientation and confusion come very quickly in blowing snow.

The severity of the storm can vary from one end of the County to the other, but generally it will affect the entire County. Winter storms can adversely affect streets, highways, disrupt power lines, and can be the cause of property damage accidents and injuries or loss of life. Frostbite is also possible for individuals that are exposed to cold temperatures. The severity of storms as termed by FEMA is as follows:

### **Freezing Rain**

Rain that freezes when it hits the ground creating a coating of ice on roads, walkways, trees, and power lines.

### **Sleet**

Rain that turns to ice pellets before reaching the ground. Sleet also causes moisture on roads to freeze and become slippery.

### **Winter Storm Watch**

A winter storm is possible in your area. Tune in to NOAA Weather Radio, commercial radio, or television for more information.

**Winter Storm Warning\***

A winter storm is occurring or will soon occur in your area.

\* Heavy snowstorm is usually an accumulation of four inches or more in a six-hour period or six inches in a twelve-hour period.

**Blizzard Warning**

Sustained winds or frequent gusts to 35 miles per hour or greater and considerable amounts of falling or blowing snow (reducing visibility to less than a quarter mile) are expected to prevail for a period of three hours or longer.

**Frost/Freeze Warning**

Below freezing temperatures are expected.

Health hazards generated from severe winter storms include frostbite and hypothermia. Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in fingers, toes, or the nose and ear lobes are symptoms of frostbite.

Hypothermia is a condition brought on when the body temperature drops to less than 55 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.

**Location**

It is difficult to predict the exact location of a winter storm. It can affect the entire County with the same magnitude and intensity or it may vary from one end of the County to the other. Because snow and ice storms generally occur countywide the entire County is considered susceptible. During heavy snow and ice events, I-75 and the state highways may be more susceptible to property damages, injury, and death due to a higher volume of traffic using these roadways.

**Past Occurrences**

Research indicates that winter storms are the third leading weather threat in Ohio. The storms of 1950 and 1978 were of a duration that required extensive mass sheltering or statewide response and recovery efforts. A total of 269 winter storms from 1923-1994 have been classified as severe.

Four presidential declarations have been issued for Miami County as a result of severe winter weather. They include:

- February 2, 1977 Snowstorm
- January 25-27, 1978 Blizzard
- March 24, 2003 Ice and Snow Storm
- January 11, 2005 Snow Removal and Snow Storm

A January 3, 1996 article from the Troy Daily News stated that the weather was severe enough to be considered a blizzard in some areas. According to the National Weather Service (NWS), blizzard conditions include snow, winds of 15 mph or greater, visibility of less than one quarter mile, and temperatures below 20 degrees. The deluge of snow

and the resulting hazardous driving conditions caused schools and some businesses to close. The county was expected to be under a level three (3) snow emergency, which means only emergency vehicles are allowed on the roads. Vehicles on the road during a snow emergency can be cited. The harsh weather has also drained the salt supply, and hampered plowing efforts.

According to a NOAA/NCDC Event Record dated December 19, 1995, the first major snowstorm of the season developed over central and west central Ohio as a deep low-pressure system tracked from the Lower Mississippi Valley to the Mid-Atlantic States. Rain changed to snow, with a period of sleet and freezing rain. Across west central areas, the precipitation fell mainly as snow, and blizzard conditions were experienced. Total snow accumulations in west central Ohio ranged between 8 and 14 inches. For parts of west central Ohio, this was the worst storm since the blizzard of 1978.

According to a NOAA/NCDC Event Record dated February 2, 2007, heavy snow blanketed Miami County causing \$80,000 in damages and leaving many motorists stranded. Miami County also experienced an ice storm on December 19, 2008 and heavy snow on February 5, 2010.

The following tables summarize the winter storms experienced in Miami County, including ice, freezing rain, winter storms, and snow events.

<b>Miami County Winter Storm Events 1996-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Southwest/ Northeast	3/9/1994	Heavy Snow	N/A	0	0	\$500,000	\$0
Countywide	1/6/1995	Ice Storm	N/A	0	26	\$400,000	\$0
Countywide	1/21/1995	Snow	N/A	2	6	\$500,000	\$0
West Central/ Central	12/19/1995	Heavy Snow	N/A	0	0	\$100,000	\$0
Countywide	1/2/1996	Winter Storm	N/A	0	0	\$750,000	\$0
Countywide	1/11/1996	Heavy Snow	N/A	0	0	\$26,000	\$0
Countywide	1/6/1996	Winter Storm	N/A	2	0	\$143,000,000	\$0
Countywide	3/19/1996	Winter Storm	N/A	1	0	\$0	\$0
Countywide	12/22/2004	Winter Storm	N/A	0	0	\$451,000	\$0
Countywide	2/13/2007	Heavy Snow	N/A	0	0	\$80,000	\$0
<b>TOTALS:</b>				<b>5</b>	<b>32</b>	<b>\$145,807,000</b>	<b>\$0</b>

Source: National Climatic Data Center (NCDC)

<b>Miami County Freezing Rain Events 1995-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Southern/Central	12/13/1995	Freeze Rain	N/A	0	2	\$25,000	\$0
<b>TOTALS:</b>				<b>0</b>	<b>2</b>	<b>\$25,000</b>	<b>\$0</b>

Source: National Climatic Data Center (NCDC)

### Probability of Future Events

The average mean snowfall for Miami County in accordance with the National Climate Data Center figures is 24"-36" for Miami County.

According to NOAA/NCDC, there were 56 recorded winter events in Miami County from March 1, 1994 to February 24, 2001, or a span of approximately seventeen years. This would be an average occurrence of about 3.3 significant winter events per year. 2008 and 2010 had the most events, with 10 each. Miami County can expect future winter hazard events to occur. The entire County's population is susceptible and during snow declared emergencies motorists should refrain from driving on the County's roadways.

### Vulnerability Analysis & Loss Estimation

Damage as a result of winter storms is associated with building damage or structural collapse due to the weight of heavy snow and ice. Other factors include water infiltration into buildings due to ice dams; freeze/thaw damage to infrastructures and buildings; water systems damage due to power outages; debris removal, damage to overhead power and utility lines and property damage due to downed trees; and losses due to hazardous driving conditions.

According to NOAA/NCDC Reports from March 9, 1994 through February 24, 2011, there were 56 severe winter weather events that affected Miami County and caused \$17,082,000 in property damage. Five deaths and 34 injuries were reported with these hazard events. No crop damage was reported. Dividing these damages over an approximate 17-year period equates to an approximate loss of \$1,050,000 per year. With a County population of 102,506, this is about \$10.24 in damages per person per year. A death would occur about every 3.4 years and injuries occur on average of two per year. It is difficult to estimate a pattern of emergency due to snow and ice storms; however, the intensity of heavy snow and ice storms that strikes the area results in a high susceptibility to property damage and will cause occasional injury and death.

### Mapping

See the Miami County Severe Winter Storm, Blizzard, Ice, and Sleet Map for a graphical representation of the moderate hazard risk that will affect all of Miami County.

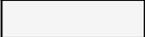
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  MODERATE HAZARD
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

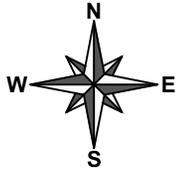
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000    FEET    0    16,000

# MIAMI COUNTY WINTER STORM, BLIZZARD, ICE, & SLEET



## 2.5 Flooding

### Overview

Floods occur when streams or waterways overflow their banks and spill onto adjoining floodplain land areas. Loss of life and property can result when structures are placed in floodplain areas. Prolonged periods of rainfall, frozen ground, inadequate snow melt, and soil conditions affect West Central Ohio every year. Floods are one of the most prevalent hazards in the United States. Nationwide, hundreds of floods occur each year, making it one of the most common hazards in all 50 states and U.S. territories. Every several years serious flooding occurs along one or more of Ohio's rivers and streams. The history of flooding within Miami County indicates that flooding can occur at any time of the year. Most injuries or deaths occur when people are swept away by flood currents. Most damage results from inundation of sediment-filled water and the flooding locations.

### Risk Assessment

Several factors determine the severity of floods including intensity and duration of rainfall. A large amount of rainfall over a short time span can create flashflood conditions especially where soil is saturated or frozen on large areas of impermeable surfaces.

Several methods of research identified flooding as a hazard in Miami County, including review of recently updated FIRM maps, reviews of newspaper coverage, reviews of past disaster declarations, discussions with local officials, and public input. The following internet sites were also used to gain information on flooding:

- Association of Dam Safety Officials
- Federal Emergency Management Agency
- Flood Risk and Map Information
- Floodplain Management Association
- General Flood Information
- Latest Hydrological Information (Flooding, Droughts, Snow Conditions, and Water Supply)
- Regional River Forecast Centers
- State Floodplain Managers
- United States Army Corps of Engineers (USACOE)
- USGS Streamflow Data Historical

Flooding continues to be a concern in Miami County as a result of the Great Miami and Stillwater Rivers which flow through Miami County. The Great Miami River flows through the three cities of Piqua, Troy and Tipp City and the Stillwater River flows through or near the villages of Covington, Pleasant Hill, Laura and West Milton. Miami County has received one Presidential Declaration in August of 1995 for damage as a result of flooding over the past 20 years.

Miami County is susceptible from minor to moderate riverine flooding of low lying properties along the paths of the Great Miami River, the Stillwater River, and their collective tributaries. The Villages of Bradford, Casstown and Fletcher have tributaries that flow through or near these communities. Many of the Miami Valley Communities have

structures that are located within the floodplains of these rivers and tributaries as indicated on the FIRM floodplain maps.

Riverine flooding is usually caused by a significant amount of rainfall over a period of days and can be worsened by snowmelt conditions. Riverine flooding is very likely to continue striking these same areas. Areas near the paths of the Great Miami and Stillwater Rivers are particularly low-lying areas. Local officials have enacted regulations to prevent future building and limited appropriate development in these areas. When a severe storm produces a large amount of rainfall in a short time flash flooding may occur. The intensity is generally great but the duration of time is relatively short. Because the majority of Miami County is of relatively flat or gently rolling topography, Miami County is not as vulnerable to flash flooding as is the case in southern and eastern Ohio.

Small stream and urban flooding are usually a widespread event, as storm sewer systems, small streams, ditches, retention and detention ponds overflow their banks. City sewers may back up and inundate sump pumps and overload drains. Basements and low lying yard areas are subject to this type of flooding. Drainage problems may also occur on the back side of levees when rainfall capacities exceed the capacity of pumps or other features designed to drain the areas that are protected by the levees.

In the rural portions of Miami County flooding can occur due to broken field tile. Rural flooding can also occur when rainfall exceeds the design capacities of the drainage system. Open fields, past channelization, and removal of woodlands along streams have allowed faster and increased stream runoff. Drainage structures can also become covered and clogged by field debris including corn shocks and soybean residue after harvest as a result of the no-till policies. Roads and bridge structures can also impede the natural flow of water.

Miami County has utilized the river systems in the county from early days for such uses as transportation, commerce, recreation and water supply and energy purposes. Because of this long term use many structures were constructed within the natural flood plains. After several centuries of these changes to the original riparian ecosystem has been changes and has resulted in increased runoff and flooding of these areas.

Before the 1960's it was generally the philosophy to get the water off the land as quickly as possible and the government invested much effort constructing dams, levees, reservoirs and flood control projects but with little success of controlling the flooding. From the 1960s forward it was realized that it is a natural process of water to utilize the rivers and overflow their banks into the floodplains. Erosion control, floodplain management, quality water management, agricultural responsibility, wetlands, wildlife habitat and recreational use programs became the focus of how to manage the flooding issues of the rivers and streams.

The Miami County river system offers many benefits that have contributed to the development of the county including: recreational water ways with canoeing and kayaking and extensive recreational trail systems and park systems. Wetland and conservation areas have been developed along these river corridors which has included numerous recent

mitigation activities and projects. Removal of several commercial businesses and residences within the floodplain north of Troy along the Miami River 25A corridor has allowed for construction of Barbee Park in Concord Township and the Great Miami River Recreational Trail (GMRRT) from Troy north to Piqua. The removal of numerous flood prone residences and on-site septic systems has greatly improved this scenic corridor, will reduce flood damages, and will allow the recreational use of the trail system.

Many residents of Miami County recognize the important benefits and natural factors of preserving floodplains to be used for natural flood and erosion control, water quality management, wildlife habitat, ground water resources, and agricultural production. The County has in place flood plain management ordinances in most of its communities with the intent to reduce future flood damage.

Miami County recently received updated FEMA Flood Maps and most all flood prone communities are eligible to be in the National Flood Insurance Program (NFIP). The Miami County Communities currently participation in the NFIP include: The Miami County cities of Piqua, Tipp City and Troy and the villages of Covington, Fletcher, Laura and West Milton and the unincorporated areas of Miami County are listed as participating in the National Flood Insurance Program (NFIP). Those communities that participate in the NFIP are eligible to receive financial assistance but is the intent of the program to reduce future flood damage within a community through flood plan management ordinances, and provide an insurance alternative to federal disaster relief.

### **Repetitive Loss**

The Miami County cities of Piqua, Tipp City and Troy and the villages of Covington, Fletcher, Laura and West Milton and the unincorporated areas of Miami County are listed as participating in the National Flood Insurance Program (NFIP).

Under the NFIP Repetitive Loss Structures are those for which two or more losses of at least \$1,000 each have been paid under the NFIP within any ten-year program since 1978. In Miami County there are seven properties that are known to be repetitive loss structures. Three are located in the unincorporated areas and have had a total of nine losses. Total building payments have been \$164,342.23. Total content payments have been \$58,053.30 for a total payment amount of \$222,395.53. Four are located with the incorporated area of the City of Troy and have had a total of nine losses. Total building payments have been \$150,426.64. Total content losses have been \$25,500.05 for a total payment of \$175,926.69. The total of all repetitive loss structures in Miami County is \$398,322.22.

### **Location**

Sources of information used to determine flood locations in Miami County are FEMA, Floodplain maps and studies, NOAA data information provided by the Ohio Department of Natural Resources, Division of Soil & Water Resources, State Hazards data and local newspaper articles and past historical data. The primary source is the Flood Hazard Boundary Map (FHBM) and the Flood Insurance Rate Map (FIRM). The maps generally identify 1%-annual chance flood elevations and boundaries for a stream or river reaches into community. The FIRM will include flood elevation information for various flood frequencies and may also delineate floodway boundaries.

Flooding occurs throughout Miami County. See Flood Maps at the end of this section which indicate the designated flood plains within each Miami County Community and the unincorporated areas of Miami County

### **Past Occurrences**

In March of 1913, the Miami Valley witnessed a natural disaster unparalleled in the region's history. Three storms converged on the state, dumping 9 to 11 inches of rain March 23-25 on ground already saturated from the melting of ice and snow of a hard winter. A 90-percent runoff rate caused the Great Miami River and its tributary streams to overflow. Every city along the river was inundated with floodwaters. More than 360 people lost their lives; property damage exceeded \$100 million (nearly \$2 billion in today's value). In the wake of this tragedy, Miami Valley citizens rallied to initiate plans to prevent future flooding. Some 23,000 citizens contributed more than \$2 million to begin a comprehensive flood protection program on a valley-wide basis. The result was an unflinching flood protection system of five dry dams – Germantown, Englewood, Lockington, Taylorsville, and Huffman – and levees that has protected the Miami Valley, including Miami County, from severe riverine flooding by the Great Miami River since 1922. The Miami Conservancy District (MCD) owns levees in several Miami County communities. The cities of Piqua, Troy, and Tipp City all have provisionally accredited levy agreements approved by FEMA in 2009. The success of the Miami Conservancy District has served as a model to reduce flood risk and damages throughout Miami County and the Miami Valley area.

According to a NCDC Storm Event Record, dated June 29, 1998, several hours of heavy rainfall caused several roads to be closed, including Interstate 75 near Tipp City.

An August 8, 1995, article taken from the Troy Daily News indicated that Miami County emergency personnel and street maintenance department kept busy trying to combat the aftermath of flooding brought on by torrential record rains of 10.7 inches in a 24-hour period. The County Engineer reported that more roads were closed for which the county had "high water" signs available. Flooding of roadways that traverse the county appears to be a reoccurring problem. On several occasions, roadways have been reported flooded in NCDC Event Records. A federal disaster declaration was issued due to this flood event.

The table below indicates the flooding event history in Miami County since 1993. It includes those NCDC recorded flooding events in which property damages were reported.

<b>Miami County Flood Events 1993-2010*</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Countywide	11/14/1993	Flash Flood	N/A	0	0	\$50,000	\$0
Countywide	5/24/1995	Flash Flood	N/A	0	0	\$3	\$0
Countywide	6/24/1995	Flash Flood	N/A	0	0	\$3,000	\$0
Countywide	6/29/1995	Flash Flood	N/A	0	0	\$20,000	\$0
Mechanicsburg	8/8/1995	Flash Flood	N/A	0	0	\$5	\$0
Countywide	4/29/1996	Flash Flood	N/A	0	0	\$4,000	\$0
Countywide	6/11/1998	Flood	N/A	0	0	\$5,000	\$0
Countywide	4/7/2000	Flood	N/A	0	0	\$5,000	\$0
Countywide	7/7/2003	Flood	N/A	0	0	\$600,000	\$0
Countywide	9/1/2003	Flood	N/A	0	0	\$37,000	\$0
Countywide	1/5/2005	Flood	N/A	0	0	\$585,000	\$0
Countywide	1/11/2005	Flood	N/A	0	0	\$295,000	\$0
Covington	12/1/2006	Flood	N/A	0	0	\$3,000	\$0
Troy	3/2/2007	Flood	N/A	0	0	\$3,000	\$0
Ginghamsburg	6/4/2008	Flash Flood	N/A	0	0	\$2,000	\$0
Piqua Airport	7/12/2008	Flash Flood	N/A	0	0	\$3,000	\$0
Piqua Airport	7/13/2008	Flood	N/A	0	0	\$1,000	\$0
Troy	7/11/2009	Flash Flood	N/A	0	0	\$2,000	\$0
Piqua	6/14/2010	Flash Flood	N/A	0	0	\$3,000	\$0
Piqua	6/15/2010	Flood	N/A	0	0	\$1,000	\$0
Piqua	2/28/2011	Flood	N/A	0	0	\$5,000	\$0
Troy	2/28/2011	Flood	N/A	0	0	\$5,000	\$0
<b>TOTALS:</b>				<b>0</b>	<b>0</b>	<b>\$1,632,008</b>	<b>\$0</b>

Source: National Climatic Data Center (NCDC)

\* Through April 2011

### **Probability of Future Events**

It is important to establish the probability of occurrence of flooding so the County and its communities can make informed decisions about the sustainability of future development within land areas and to determine the feasibility of proposed mitigation projects.

Typically, FEMA Flood Insurance surveys, FIRM maps, and information are useful tools. Most of the Miami County communities that have 100-year flood zones within their communities participate in the NFIP Program whereby the floodplain maps identify the areas that have a 1% annual chance of being equaled or exceeded in any given year. Smaller floods occur more frequently than larger floods. Therefore, a 10-year flood or 25-year flood has a much greater chance of occurring than a 100-year flood. The following is a table of flood probability.

<b>Flood Occurrence</b>	<b>Chance of Occurrence in Any Given Year</b>
10 years	10%
25 years	4%
50 years	2%
100 years	1%
500 years	.2%

There are several other possible data sources for determining the area affected by a particular probability flood event. The Ohio Department of Natural Resources, Division of Soil and Water Resources, is the state repository for flood hazard information and has copies of flood hazard information generated by various federal, state, local, and private entities. The State of Ohio Floodplain Management Program maintains current copies of all FEMA; FIS's and flood maps in the State.

### **Vulnerability Analysis & Loss Estimation**

The flood vulnerability assessment for the County focused on each community's assets that are located in the 100-year floodplain. While greater and smaller floods are possible, this Plan's estimate of property damages from flooding are limited to the 100-year floodplain events.

All of the structures in the floodplain were identified using the most recent County's GIS data and Flood Insurance Rate Maps (FIRM). At this time no base flood elevations (BFE) or depth of flooding elevations were calculated. Within this plain individual parcels have not been coordinated with parcel ID and tax information.

The total residential and commercial structures in the floodplain by municipality and surrounding area are as follows:

### Miami County Flood Zone Structure Count

#### **Tipp City Flood Map**

Residential	27
Multi-Family Residential	9
Commercial	0
<b>TOTAL</b>	<b>36</b>

#### **Ludlow Falls Flood Map**

Residential	0
Multi-Family Residential	0
Commercial	0
Unincorporated Residential	0
<b>TOTAL</b>	<b>0</b>

#### **Covington Flood Map**

Residential	26
Multi-Family Residential	0
Commercial	2
Unincorporated Residential	1
<b>TOTAL</b>	<b>29</b>

#### **Laura Flood Map**

Residential	0
Multi-Family Residential	0
Commercial	0
Unincorporated Residential	0
<b>TOTAL</b>	<b>0</b>

#### **Potsdam Flood Map**

Residential	0
Multi-Family Residential	0
Commercial	0
Unincorporated Residential	0
<b>TOTAL</b>	<b>0</b>

#### **West Milton Flood Map**

Residential	16
Multi-Family Residential	0
Commercial	0
Unincorporated Residential	10
<b>TOTAL</b>	<b>26</b>

#### **Pleasant Hill Flood Map**

Residential	0
Multi-Family Residential	0
Commercial	0
Unincorporated Residential	0
<b>TOTAL</b>	<b>0</b>

#### **Fletcher Flood Map**

Residential	15
Multi-Family Residential	0
Commercial	1
Unincorporated Residential	0
<b>TOTAL</b>	<b>16</b>

#### **Bradford Flood Map**

Residential	0
Multi	0
Commercial	0
Unincorporated Residential	0
<b>TOTAL</b>	<b>0</b>

#### **Casstown Flood Map**

Residential	0
Multi-Family Residential	0
Commercial	0
Unincorporated Residential	1
<b>TOTAL</b>	<b>1</b>

**Piqua Flood Map**

Residential	40
Multi-Family Residential	0
Commercial	7
Industrial	6
Unincorporated Residential	4
<b>TOTAL</b>	<b>57</b>

**Troy Flood Map**

Residential	244
Multi-Family Residential	13
Commercial	1
Industrial	2
Unincorporated Residential	86
Unincorporated Commercial	36
<b>TOTAL</b>	<b>382</b>

**Unincorporated \***

Agricultural	32
Unincorporated Residential	105
Multi-Family Residential	3
Commercial	3
Industrial	2
<b>TOTAL</b>	<b>145</b>

**Totals**

Agricultural	32
Residential	600
Commercial	50
Industrial	10
Utility	13
<b>TOTAL</b>	<b>705</b>

*\* Not Included in Above Municipality and Surrounding Area Maps*

Based on flood information from the NCDC, flooding events in Miami County has caused \$1,632,000 in property damage from 1993 through February 2011. This is an average of \$90,166 per year in property damages. This also includes the years 1994 and 1997 in which no property losses were recorded.

Loss of contents has been included based on the values shown in the table below. A value for loss of use or “down time” of the buildings has not been included in this estimate. The amount of residential population displaced from a flood disaster would be approximately 2,050 residents. At risk structures in areas prone to of urban and small stream or flash flooding (and that are not within the 100-year Flood Plain) have not been mapped or included in the vulnerability analysis.

**Contents Value as a Percentage of Structure Value**

<b>Occupancy Class</b>	<b>Value (%)</b>
Residential	50%
Commercial	100%
Industrial/Utility	150%
Medical Facilities	150%
Emergency Services	150%
General Government	100%
Schools/Libraries	100%
Colleges/Universities	150%
Religion/Non-profit	100%
Shelters	100%
Agricultural	100%

The above values are as recommended by FEMA guidance documents.

The flood vulnerability count showed that a total of 705 structures are located in the 100-year floodplain. Approximately 600 of these structures are residences; 50 of these are commercial; 10 are industrial; 32 are agricultural; and 13 are utility structure. There are a total of residential housing units in Miami County. Therefore, about 2% of the total housing stock is located within the 100-year floodplain. The current medium house value in Miami County is \$137,000 with land value and \$96,410 not including land value. The latter value was used to evaluate the following losses for the residential damages per 100-year flood event. Municipality damage ranges considered were slight, moderate, and extensive. In addition, content losses as a percentage of the property damage value were included. The entire County collectively has approximately \$138,905,222 in total building exposure to flooding for 1% -annual-chance event. A total of 705 structures can be expected to be damaged. Approximately six critical facilities could be impacted. The overall estimated losses including residential, commercial, industrial, agricultural, utility structure losses and content losses is estimated to be \$138,905,222. See table below:

Estimate of Potential Losses Due to Riverine Flooding in Miami County							
Number of Structures	Type of Structure	Total Market Value in County	Average Value each Structure	Reflected (2%) Number Estimated Floodplain Structures	Damage @ 100%	Loss of Contents	Total damages
35,393	Residential	\$1,604,527,510	\$96,470	600	\$57,882,000	\$28,941,000	\$86,823,000
2,484	Commercial	\$261,028,110	\$230,912	50	\$11,545,600	\$11,545,600	\$23,091,200
480	Industrial	\$266,028,110	\$554,979	10	\$54,549,790	\$8,324,685	\$13,874,475
1,609	Agricultural	\$181,063,700	\$112,531	32	\$3,600,992	\$3,600,992	\$7,201,984
632	Utility	\$153,908,270	\$243,525	13	\$3,165,825	\$4,748,738	\$7,914,563
							\$138,905,222

### Presidential Disaster Declaration

One Presidential Disaster Declaration DR-1065 was issued for the severe storms and flooding that struck eleven Ohio Counties including Miami County on August 25, 1995.

### Mapping

See the following Miami County Floodplain Maps which indicate the graphical representation for floodplain hazards. The Flood Maps are found on the following pages.

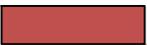
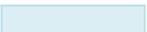
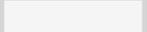
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOOD HAZARD
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

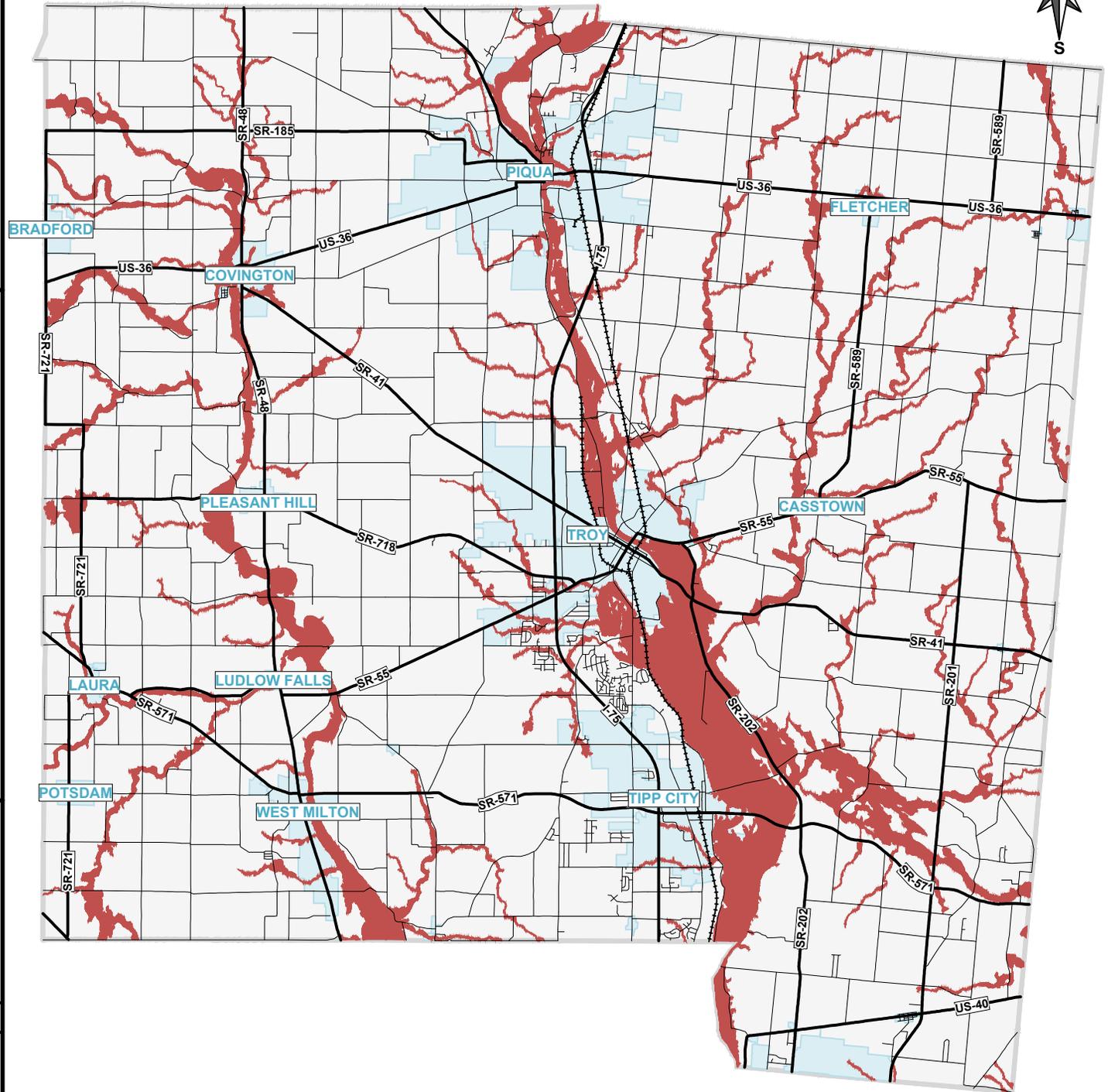
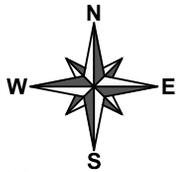
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000    FEET    0    16,000

# MIAMI COUNTY FLOOD



# BRADFORD FLOOD



## VICINITY MAP

NO SCALE



STATE OF OHIO

## MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

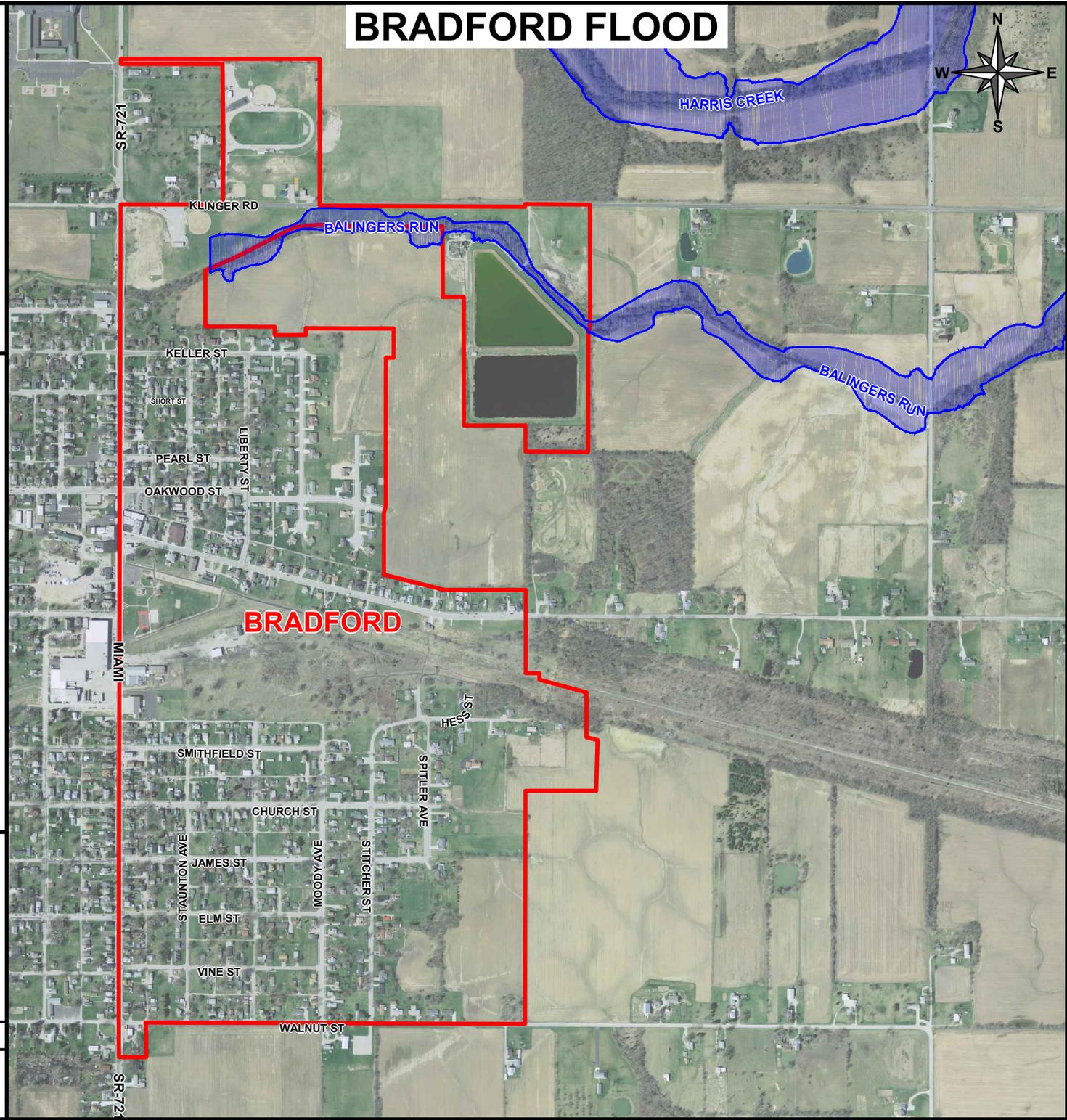
-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 900'



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

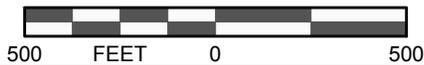
-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

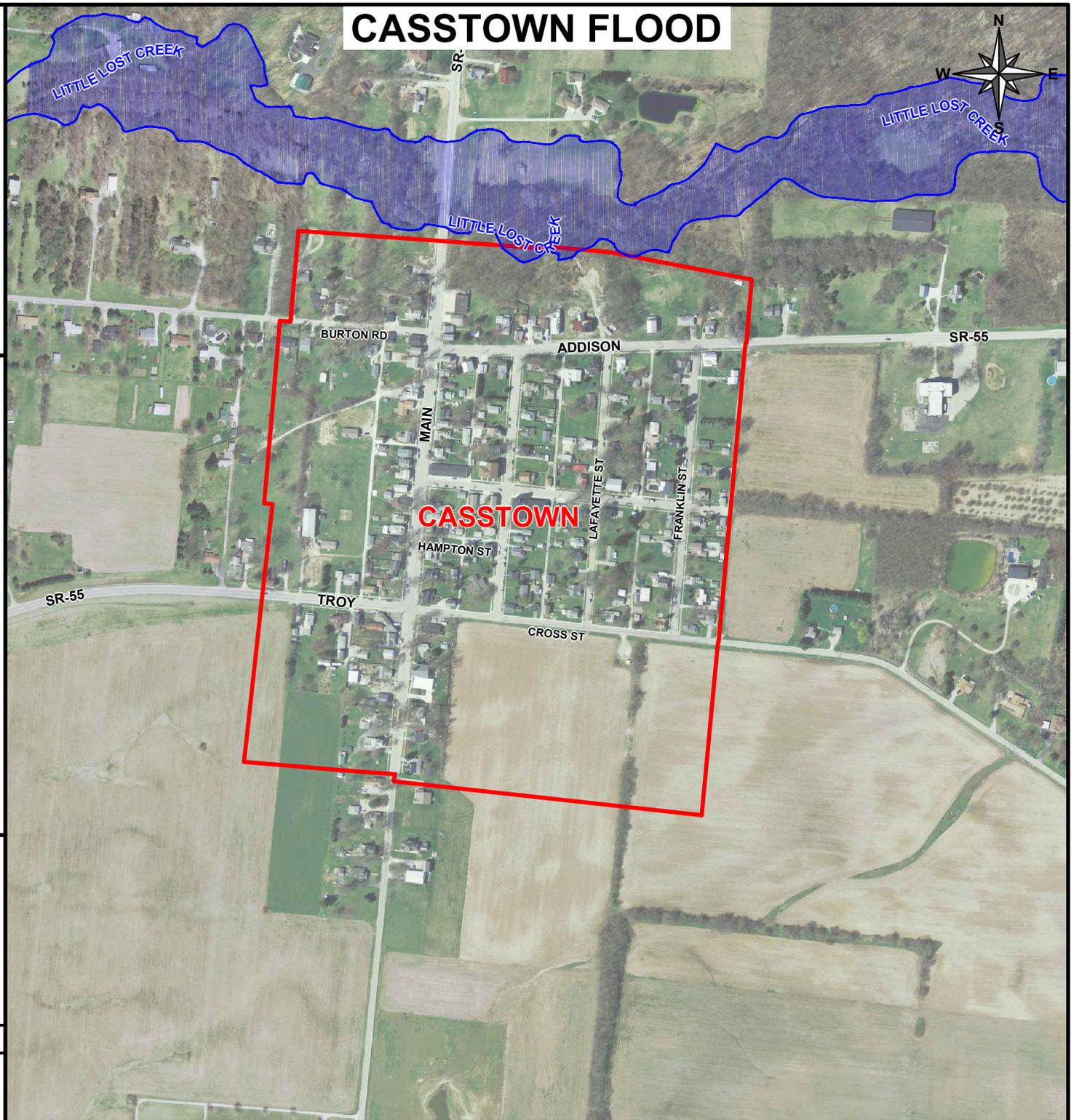
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 500'



# CASSTOWN FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

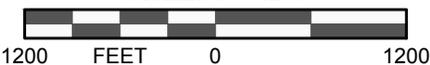
-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

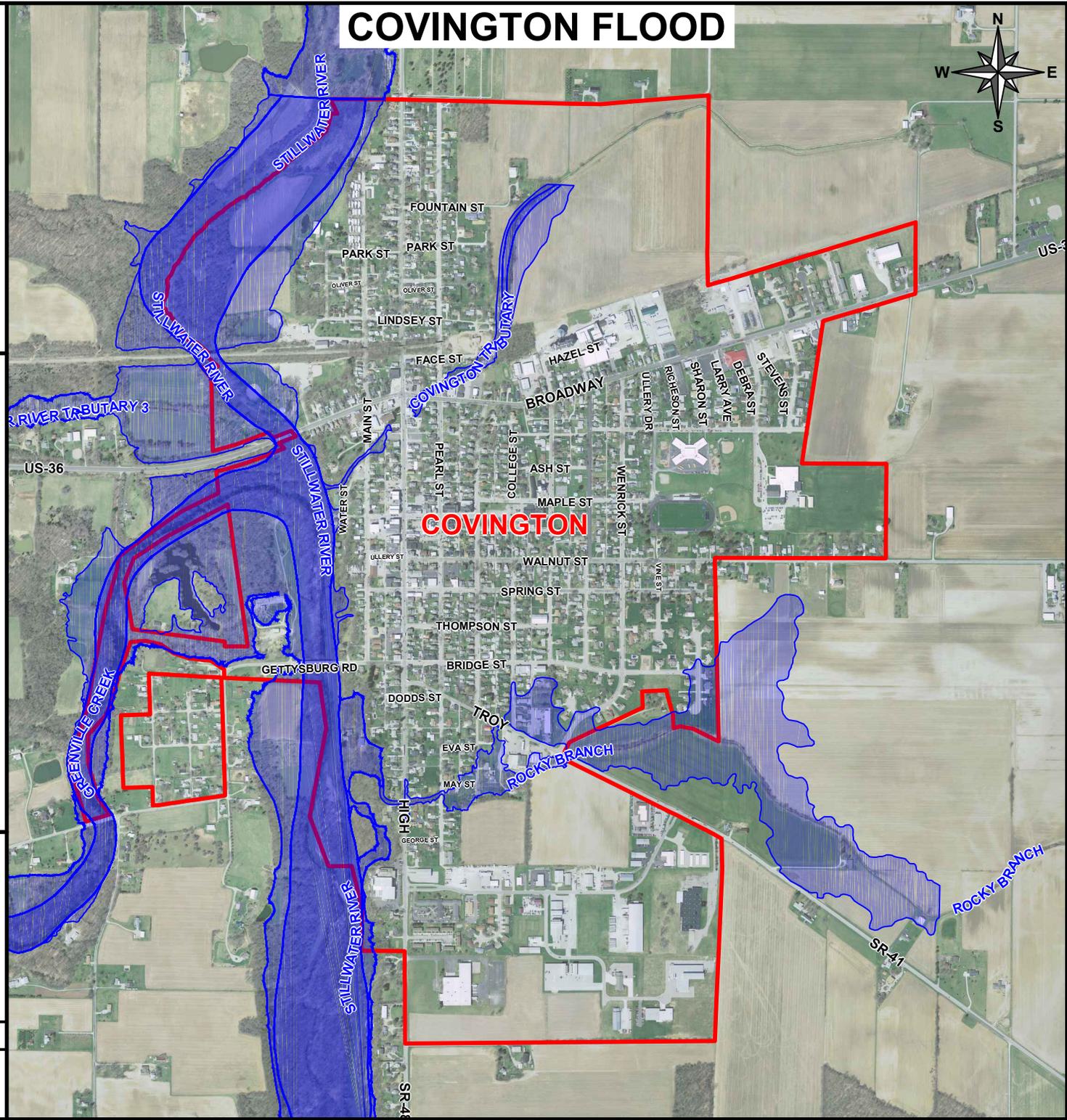
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 1200'



# COVINGTON FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

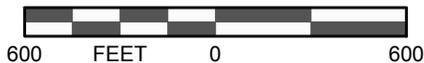
-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

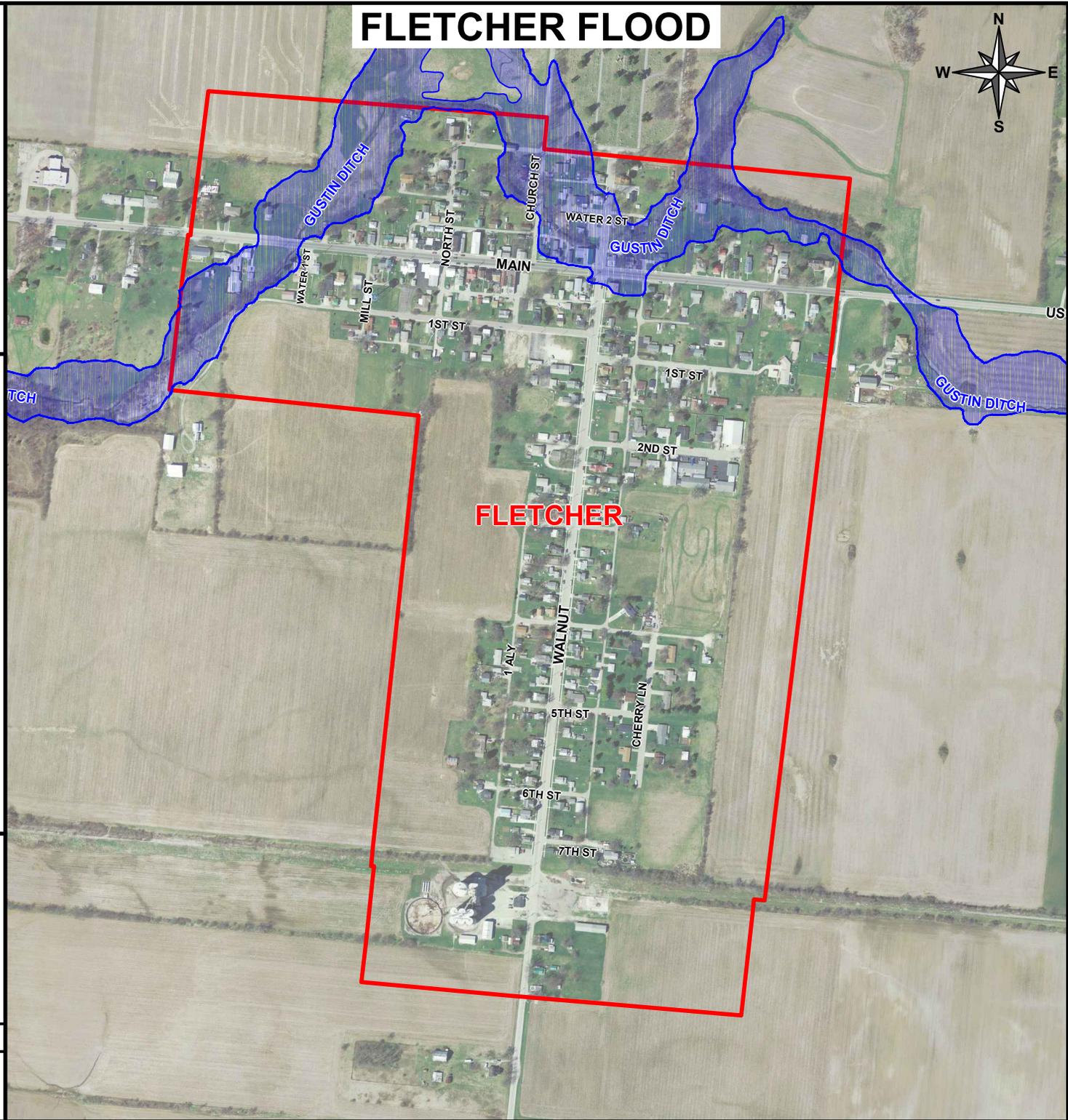
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 600'



# FLETCHER FLOOD



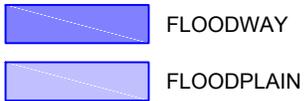
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

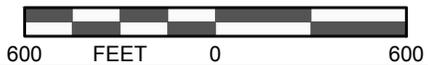


**Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

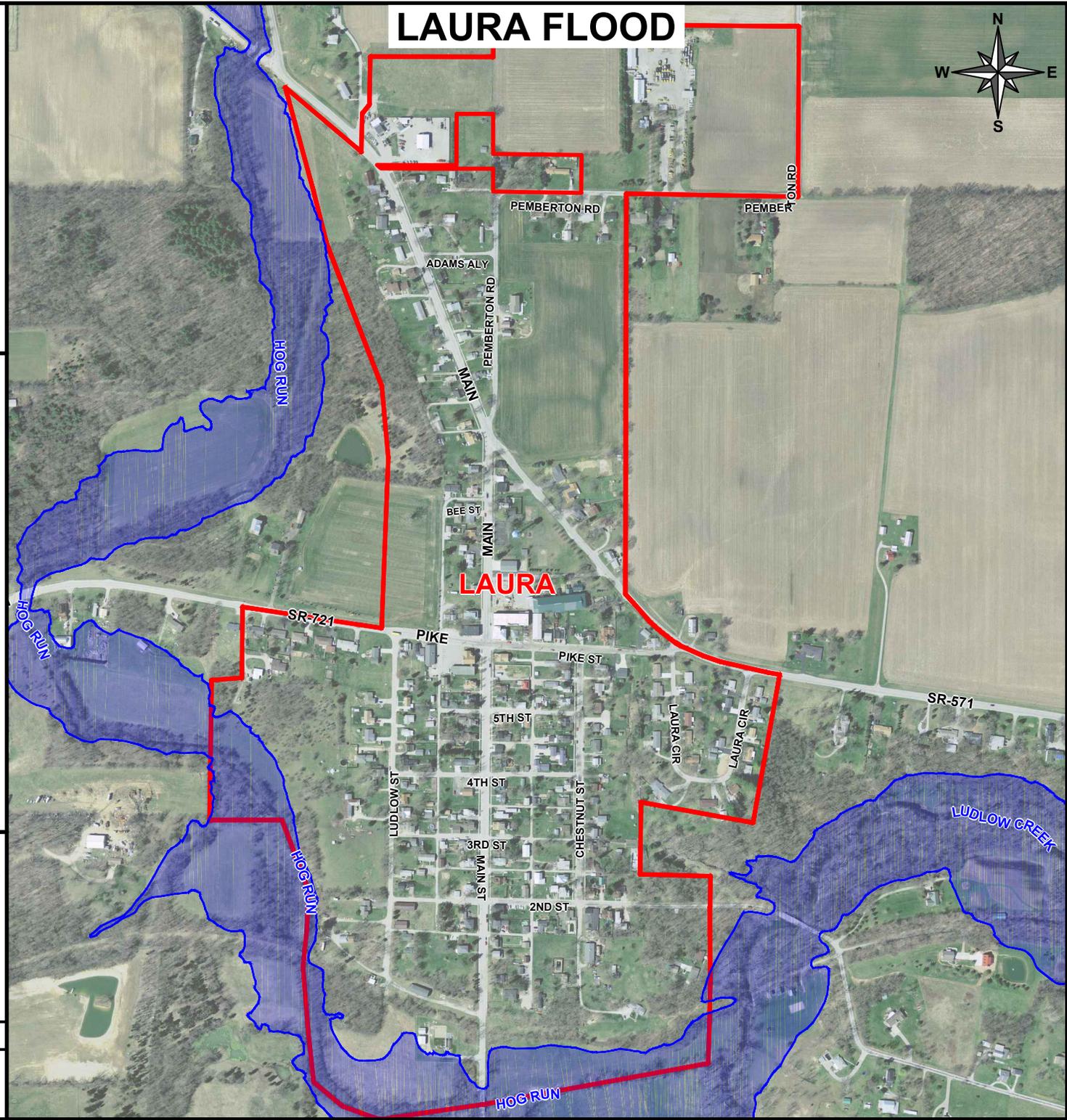
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 600'



# LAURA FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND



FLOODWAY



FLOODPLAIN



CITY / VILLAGE  
CORPORATION LIMITS



**Mote & Associates, Inc.**

ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331

Phone: (937)-548-7511

Fax: (937)-548-7484

Email: [info@moteassociates.com](mailto:info@moteassociates.com)

Website: [www.moteassociates.com](http://www.moteassociates.com)

DRAWN BY: SMK

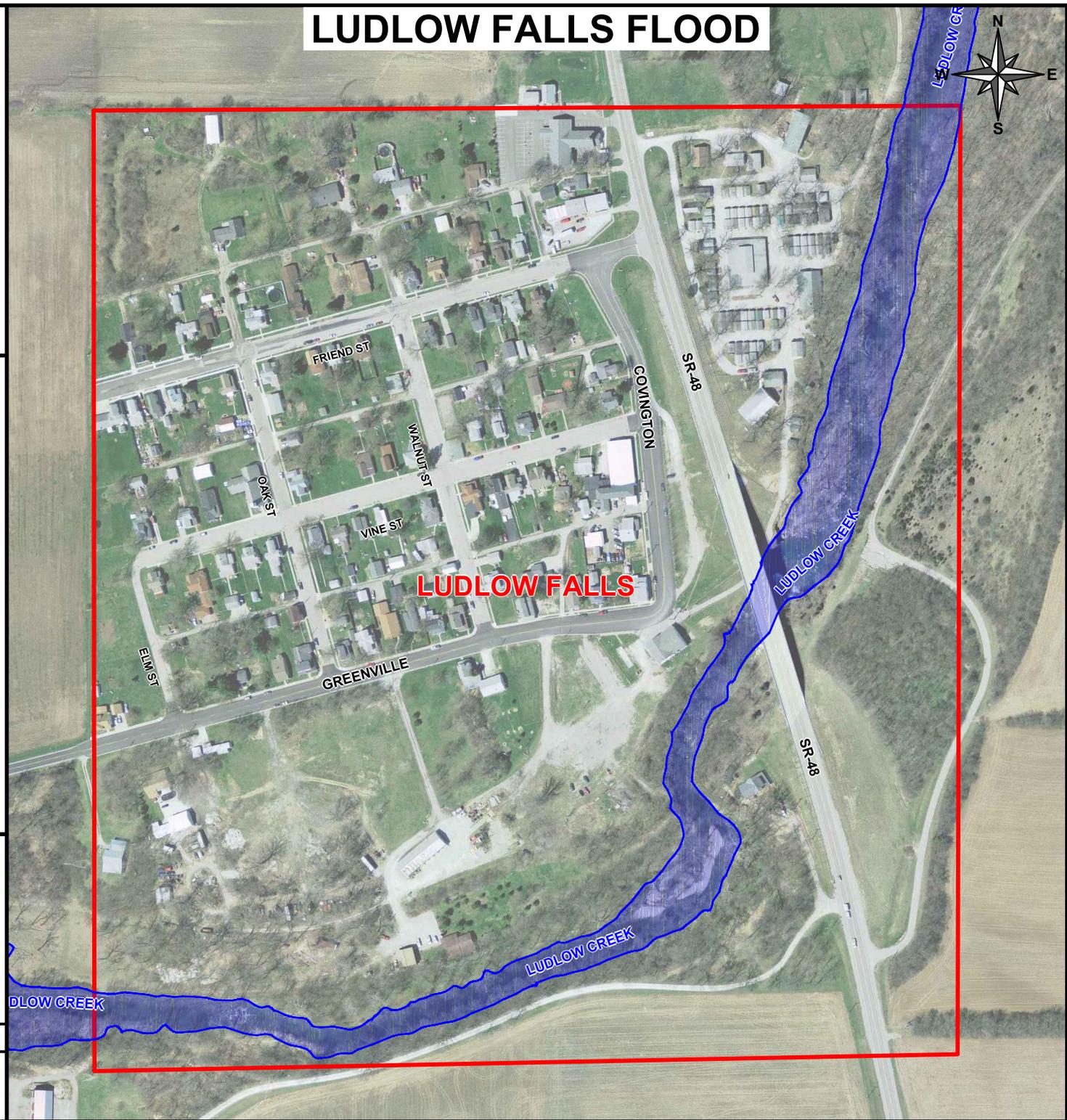
DATE: 8/9/11

SCALE: 1" = 300'



300 FEET 0 300

# LUDLOW FALLS FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

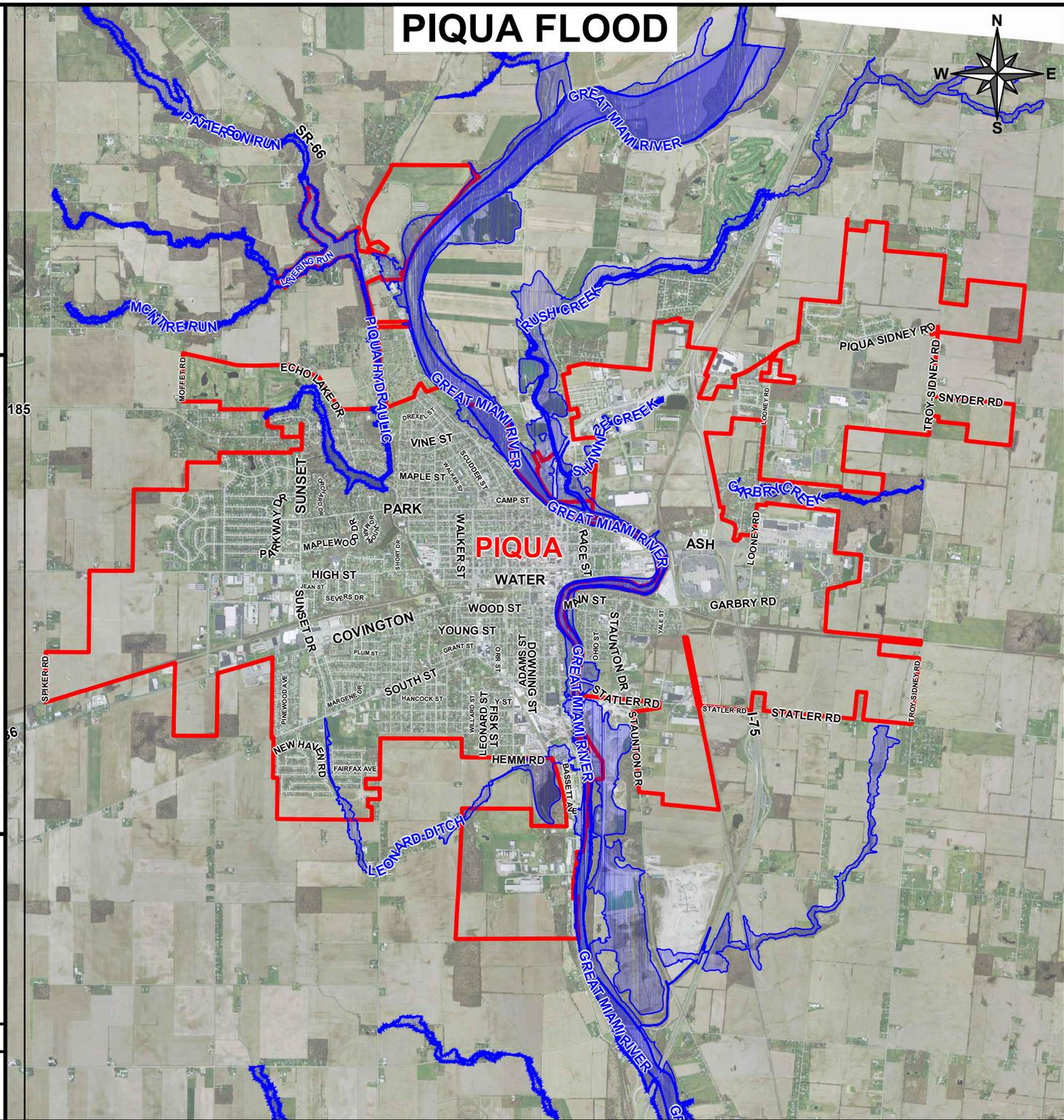
DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 4500'



4500    FEET    0    4500

# PIQA FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

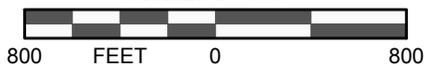
-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

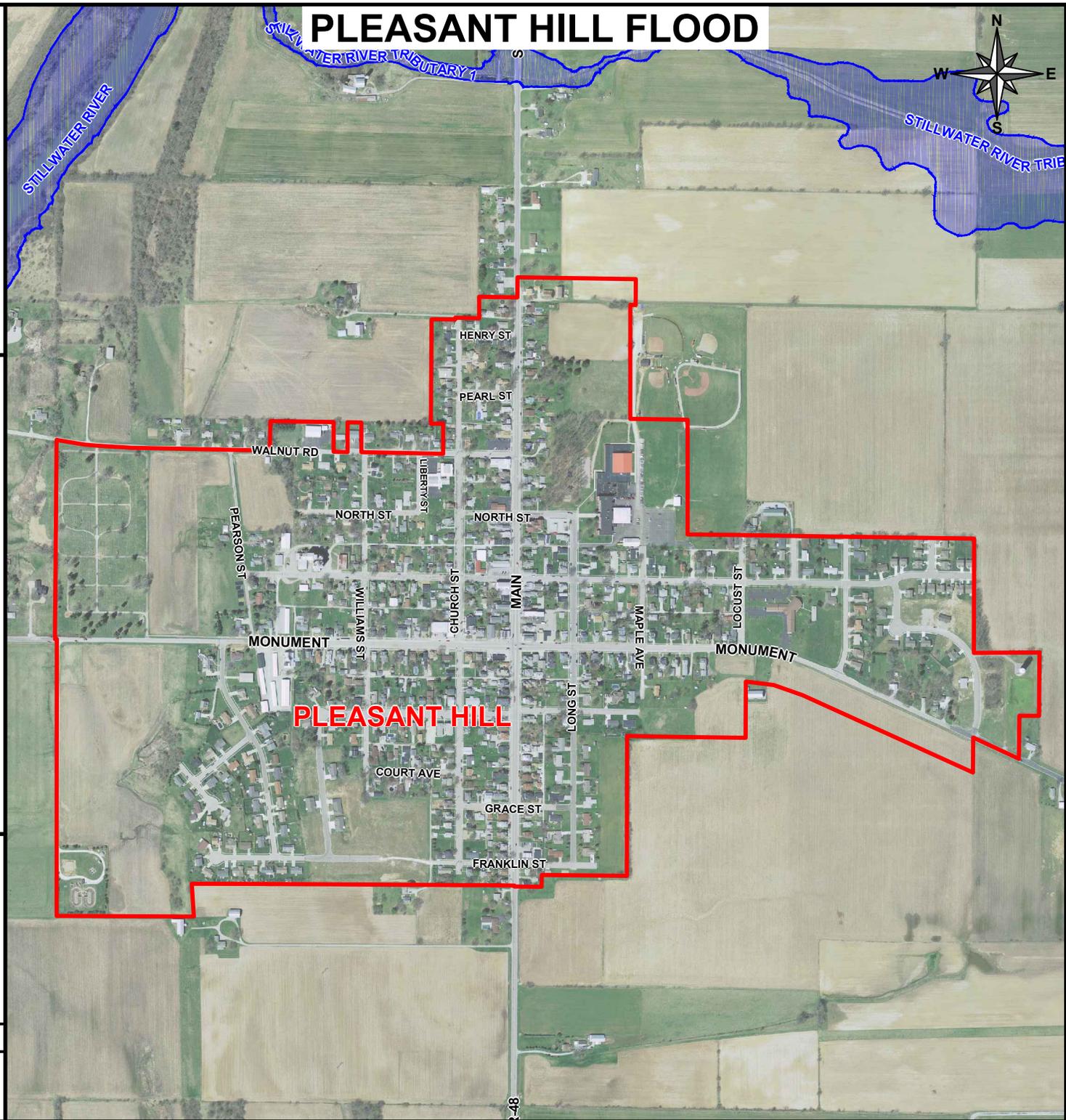
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 800'



# PLEASANT HILL FLOOD



**VICINITY MAP**

NO SCALE



STATE OF OHIO

**MAP LEGEND**

-  FLOODWAY
-  FLOODPLAIN

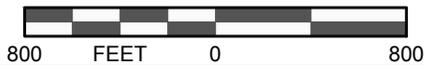
-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

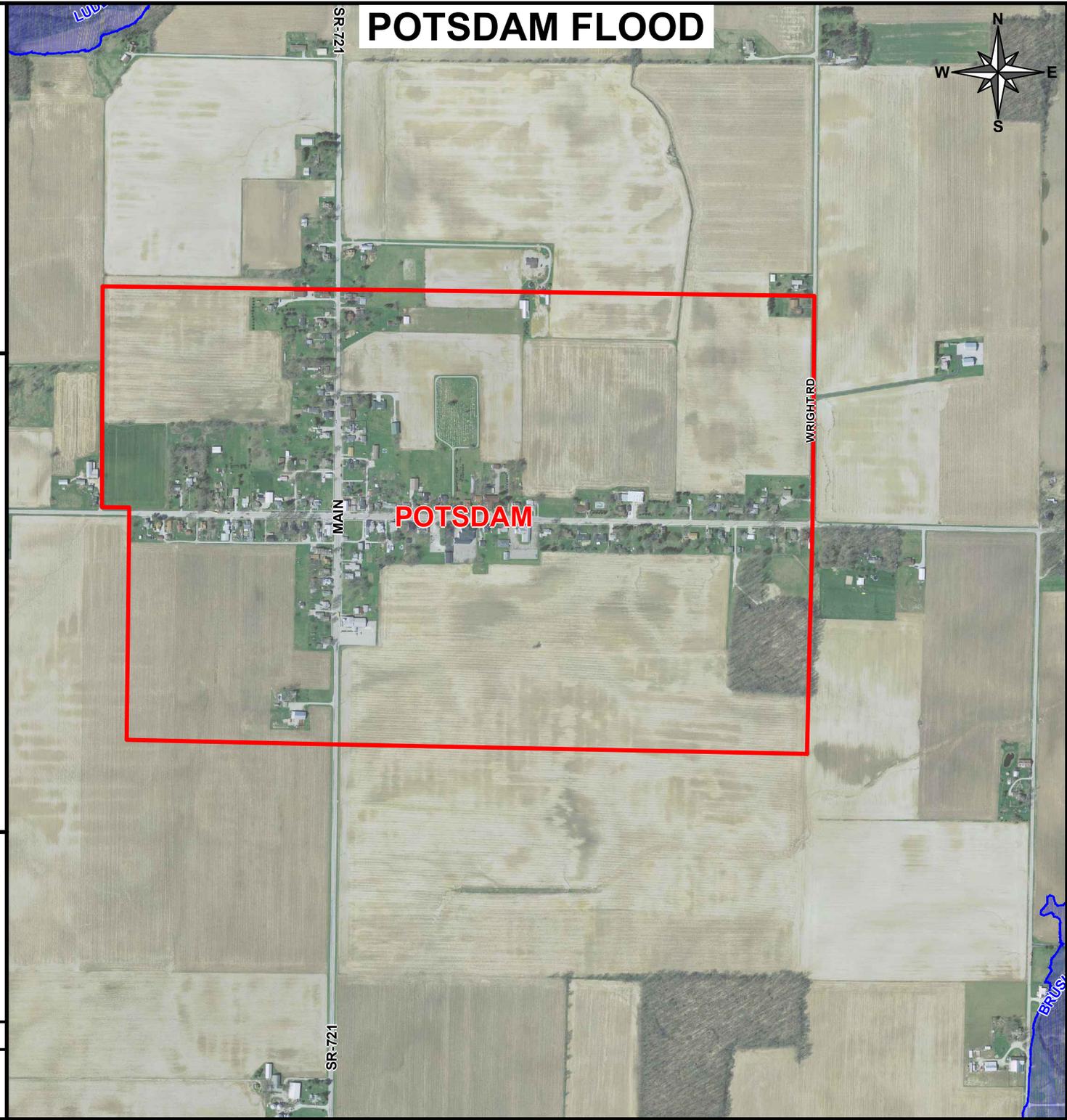
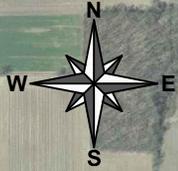
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 800'



**POTSDAM FLOOD**



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

-  CITY / VILLAGE CORPORATION LIMITS

**Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

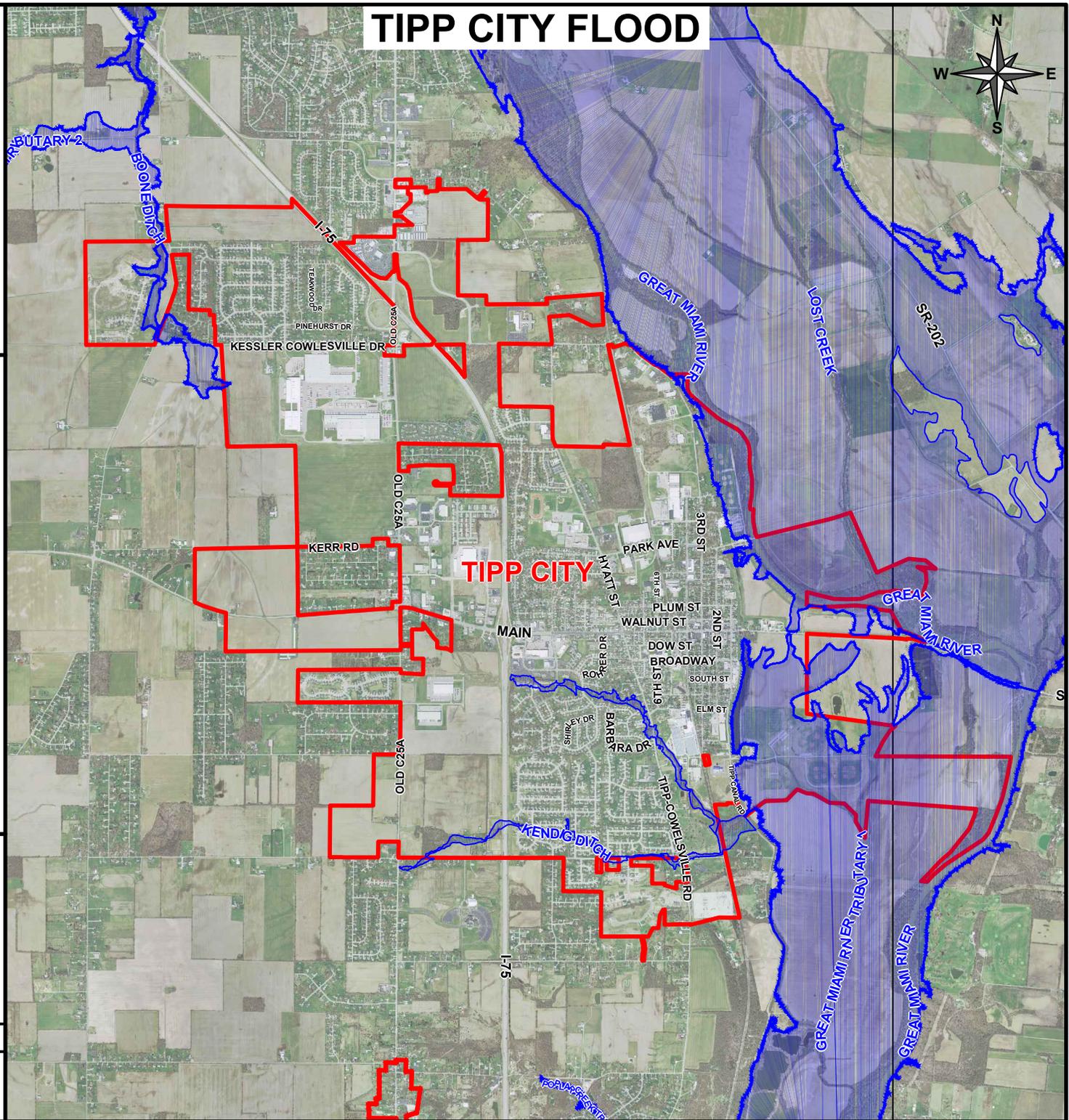
DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 3600'



3600    FEET    0    3600

# TIPP CITY FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

-  CITY / VILLAGE CORPORATION LIMITS

**Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

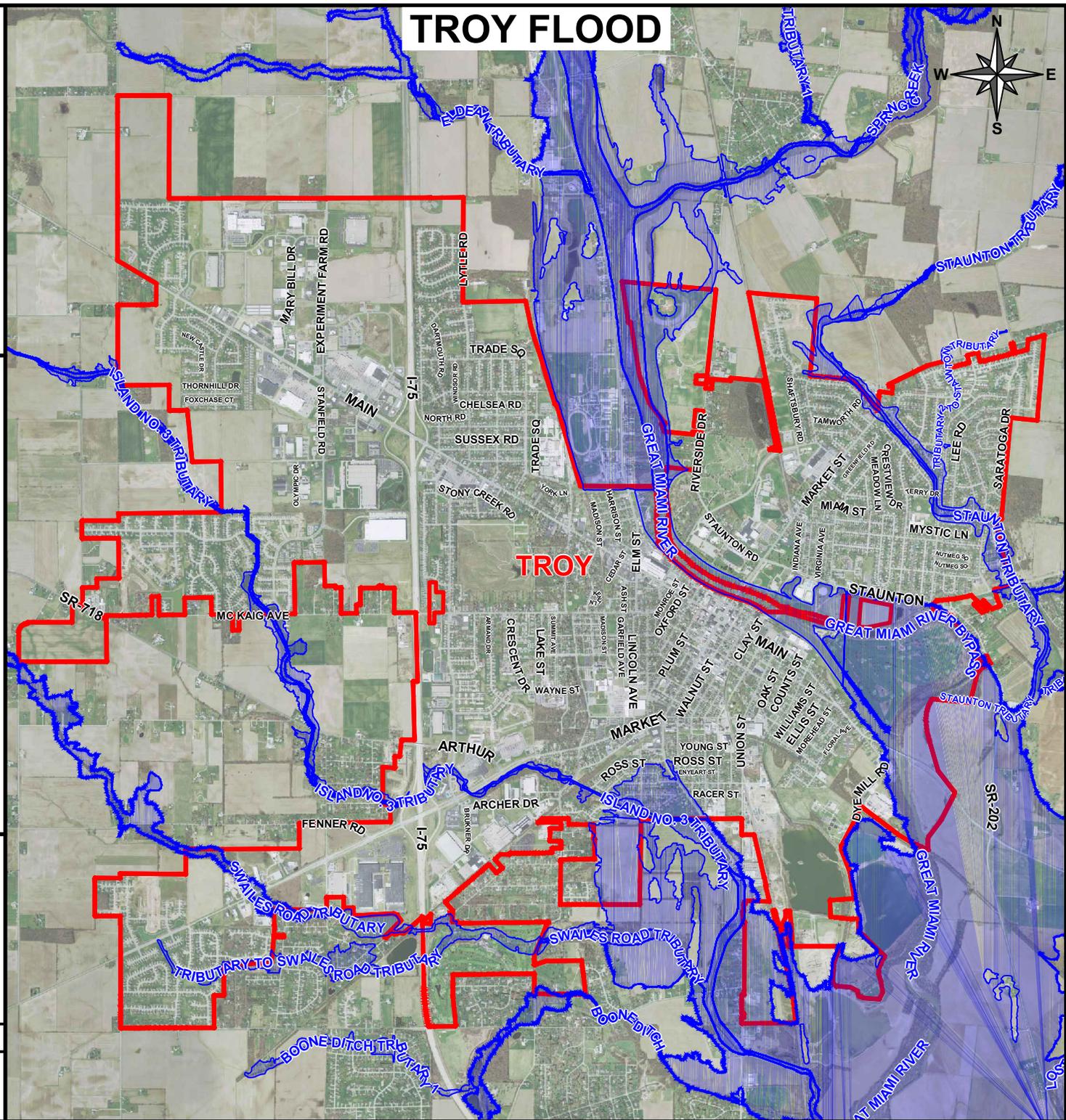
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 3,600'



3,600 FEET 0 3,600

# TROY FLOOD



### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  FLOODWAY
-  FLOODPLAIN

-  CITY / VILLAGE CORPORATION LIMITS

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

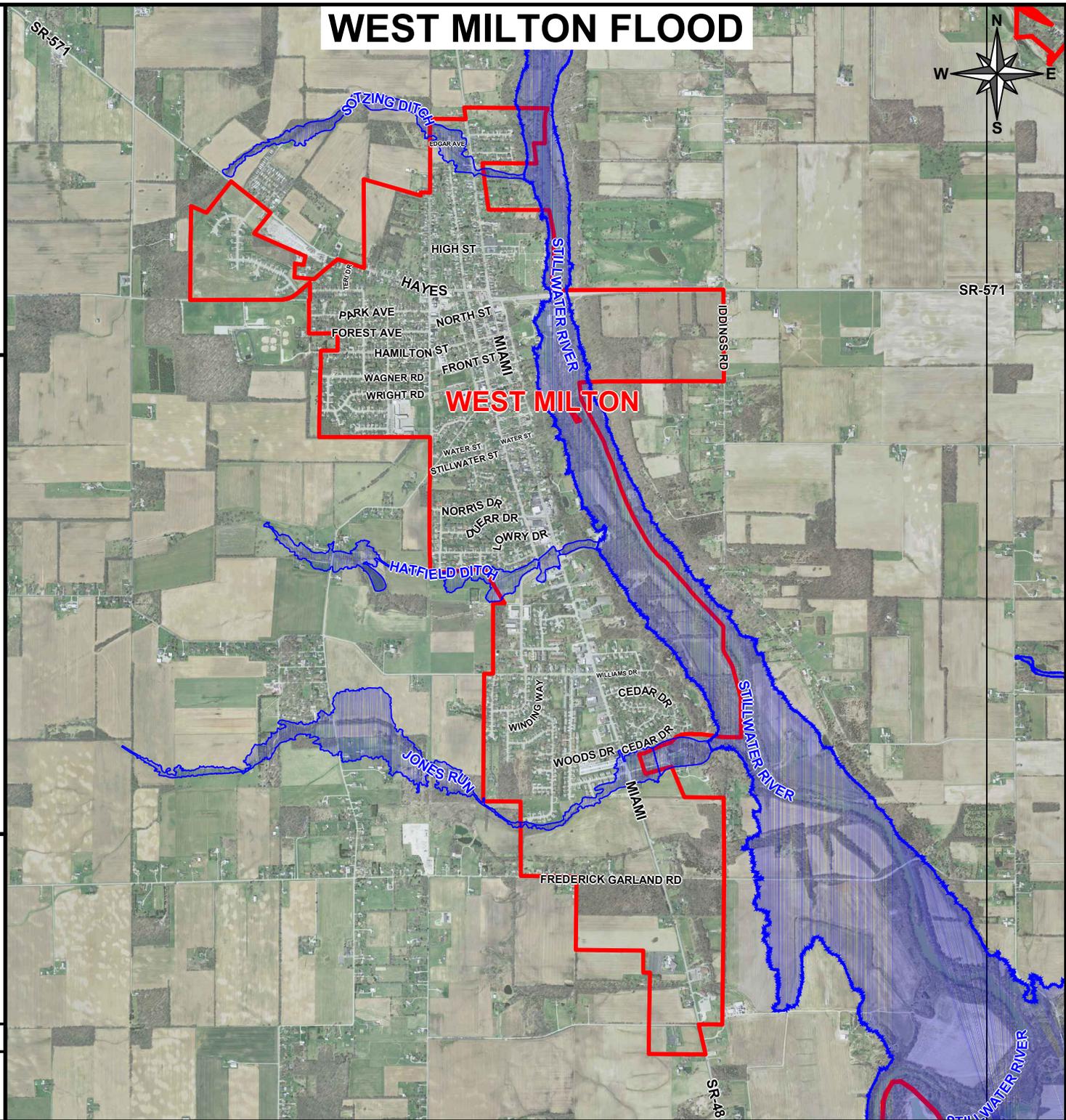
DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 2500'



2500    FEET    0    2500

# WEST MILTON FLOOD



## 2.6 Earthquake

### Overview

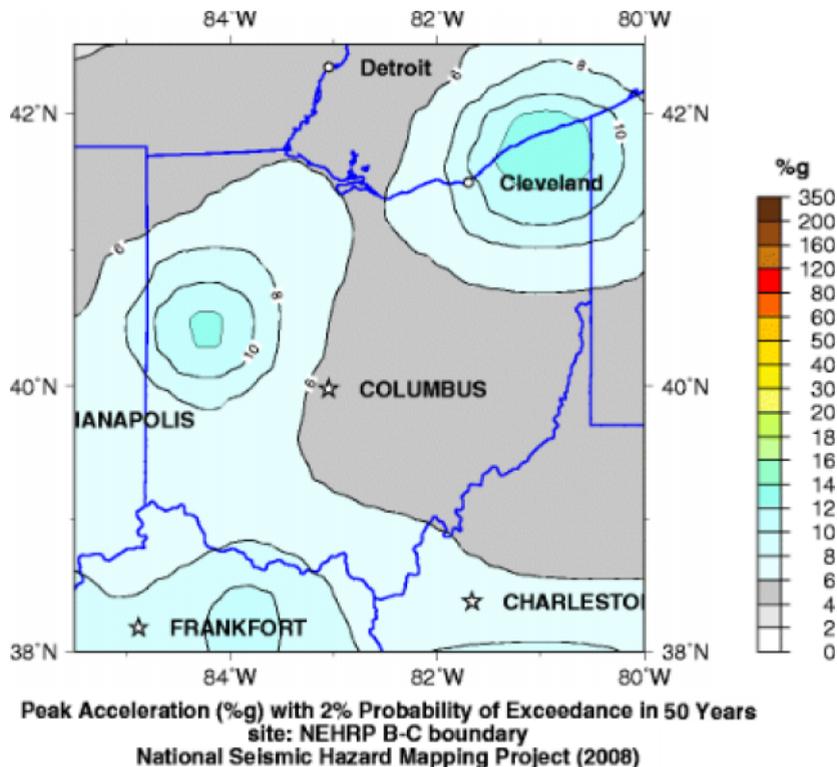
An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and after just a few seconds can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Earthquakes are considered a low probability high risk event.

Earthquakes are one of nature's most damaging hazards, and are more widespread than is often realized. The area of greatest seismic activity in the United States is along the Pacific Coast in the states of California and Alaska; however, as many as 40 states can be characterized as having moderate earthquake risk.

### Risk Assessment

Although most people do not think of Ohio as an earthquake-prone state, at least 160 earthquakes with epicenters in Ohio have been felt since 1776. Most of these events caused no damage or injury. Fifteen earthquakes have resulted in property damage. Several methods of research identified earthquakes as a low to moderate hazard for the County, including the USGS Hazards Earthquake Program.

According to the USGS, Miami County is listed in the 8-16% g hazard range in regards to earthquakes (see map below).



Earthquake activity in Miami County would probably stem from the nearby seismic zone in neighboring Shelby County or from an event in the New Madrid Missouri Seismic Zone. Ohio is on the periphery of the New Madrid Seismic Zone. An area in Missouri and adjacent states was the site of the largest earthquake sequence to occur in historical times in the continental United States.

The table to the right is the Modified Mercalli Scale, which is the general relationship between epicentral Modified Mercalli intensities and magnitude. Intensities can be highly variable depending on local geologic conditions. The Mercalli Scale is a semi-quantitative linear scale, whereas the Richter Scale is a quantitative logarithmic scale. The Richter Magnitude Scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. It is illustrated in the table to the right. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded between the various seismographs. Adjustments are located for the variation in the distance between the various seismographs and the epicenter of the earthquake. On the Richter scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude.

Modified Mercalli Scale		Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibrations like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some awaken; dishes, windows, doors disturbed; standing autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames, walls, monuments, chimneys fall; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up into air	7
		7.5
		8

Severity	Scale	
	Magnitude	Mercalli
Mild	0-2.9	I-III
Moderate	2.9-4.1	IV-V
Intermediate	4.1-5.4	VI-VII
Severe	5.4-7.3	VIII-X
Catastrophic	7.3 +	XI-XIII

The Ohio Department of Natural Resources Division of Geological Survey has set up 23 monitoring stations throughout the State of Ohio to continuously monitor and record earthquake activity. These monitoring stations are concentrated in the most seismically active areas and are all part of the Ohio Seismic Network. Although the network does not provide any warning of impending earthquakes it will provide valuable data to help improve future structure design and reduce risk.

### **Past Occurrences and Locations**

At least 14 moderate sized earthquakes have caused minor to moderate damage in Ohio. (See Earthquake Epicenters in Ohio and Adjacent Areas Map provided by State of Ohio, Department of Natural Resources, Division of Geological Survey at the end of this Section. To date there have been no deaths and only a few minor injuries reported due to earthquakes in Ohio. Miami County has not been the epicenter of any earthquakes since recording began in 1776. However, neighboring Shelby County, to the north of Miami County, and some of the other counties surrounding Shelby County such as Auglaize County have been some of the most active earthquake areas in Ohio. Numerous earthquakes in this area have occurred since 1875. Earthquakes in 1930, 1931 and 1937 caused minor to moderate damage. The March 2 and March 9, 1937 (4.5 Richter magnitude) caused significant damage in the nearby community of Anna in Shelby County. Other recent earthquake epicenters have been in northern Mercer County in 2004, 2005, and two in Allen County in 2006. Miami County has experienced, since 1950, only a few periodic earthquake tremors that are of a magnitude to be felt.

### **Probability of Future Events**

Although a great deal is known about *where* earthquakes are likely to occur, there is currently no reliable way to predict the days or months *when* an event will occur in any specific location. Because at least 170 earthquake events have affected Ohio since 1776, it is anticipated one can expect future earthquake events to occur. The probability of a future event and the anticipated locations has been developed per the USGS Peak Acceleration Map shown in the Risk Assessment portion of this Section. The measurement used in this estimation is based on the chance of ground shaking over time. In this analysis the west central portions of Ohio have an increased chance of experiencing an earthquake than the eastern and southern portions of Ohio. According to the map Miami County has a 6-8% g peak acceleration rate with 2% probability of exceeding in 50 years.

### **Vulnerability Analysis & Loss Estimation**

As per the hazard profile information available, Miami County has a low to moderate risk of incurring damages from an earthquake. Miami County has not been the epicenter of any past earthquakes. Due to the infrequency of earthquakes occurring in Miami County and from nearby historical earthquake events it is possible an earthquake with a low to moderate magnitude on the Richter scale could be expected to cause minor to moderate damage to Miami County's infrastructure. Since most buildings constructed within Miami County are three stories or less, the damage experienced in such an event would most likely be damage to non-reinforced masonry, cracked plaster, broken window glass and falling objects that are not anchored. Most of the houses in Miami County are wood or wood frame and brick veneer. A few of the older houses are of solid brick masonry which would be more susceptible to damage.

Several of the older downtown districts such as found in Piqua, Troy and Tipp City and West Milton have non-reinforced brick structures that are 2 or 3 stories in height. These non-reinforced masonry structures would be more vulnerable to damage.

Other vulnerable infrastructure would include underground gas, water piping, and sewerage systems. Water wells may also be vulnerable.

Most of the modern industrial buildings in the county are of pre-engineered steel design with braced steel frames and would be less vulnerable to damage. Many of school districts in Miami County have newly constructed schools which should meet current earthquake design standards.

A moderate earthquake in the county could disrupt critical services to structures should a water main or gas main rupture. Disruption of such county services could have a moderate economic impact on the county should businesses be temporarily closed.

Loss estimations for Miami County's earthquake hazard are based on current property value assessments from the Miami County Auditors Office and from the historic data on west central Ohio earthquakes. It is anticipated that slight and moderate damage would occur to a limited number of buildings located within the county. Very minimal damage and losses are anticipated to affect critical facilities, utilities, or transportation systems.

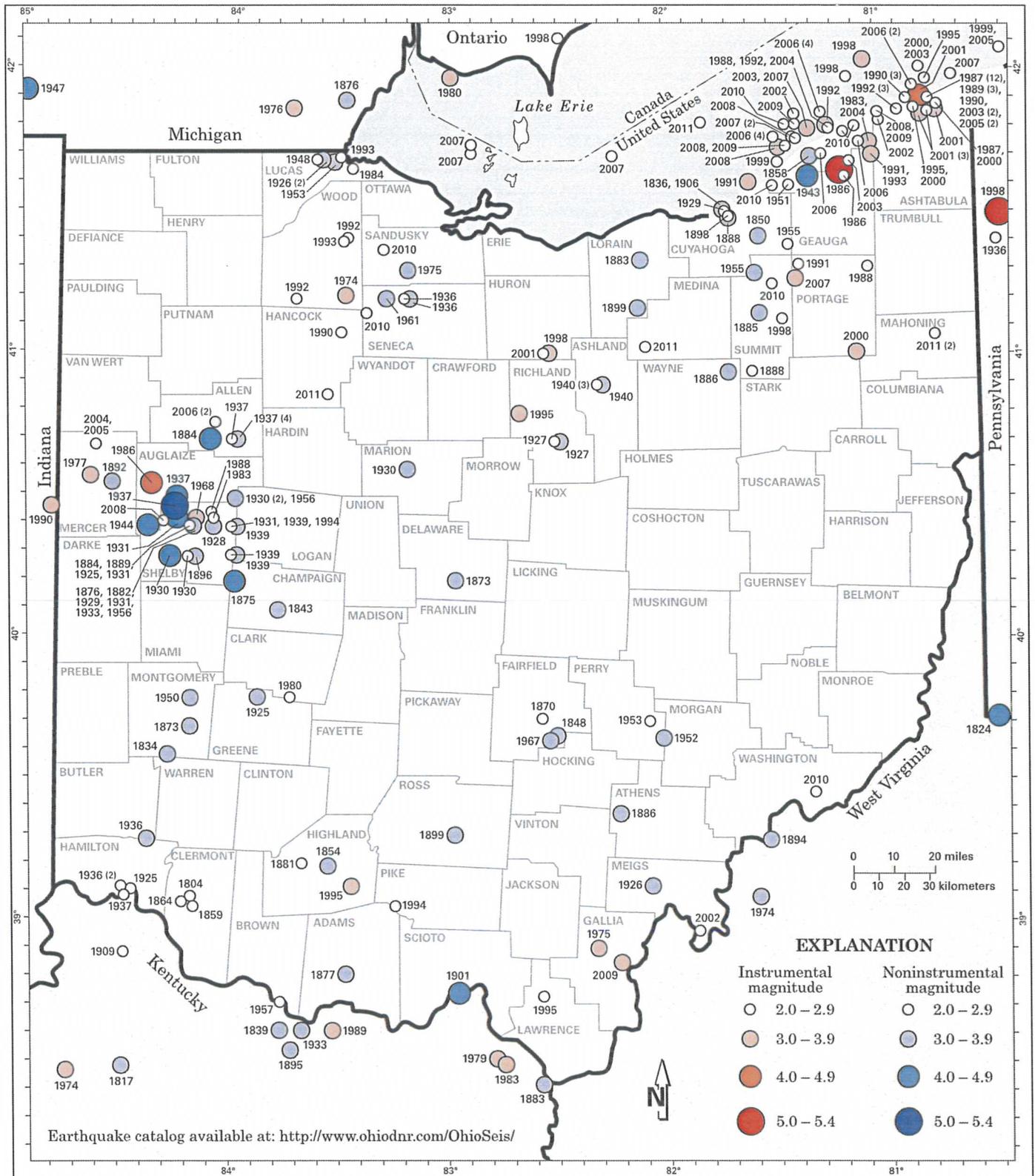
Estimate of Potential Losses to Earthquake Miami County Ohio*											
Total Number of Structures in County	Type of Structures	Total Value	Average Value**	# Affected Properties	Slight Damage - 1.5% of Properties @ 5% Damage	# Affected Properties	Moderate Damage - .05% of Properties @ 25% Damage	Content Loss	Extensive Damage - 0% @ 75% Damage	Content Loss	Total Content and Property Loss
35,393	Residential	\$3,414,386,710	\$96,470	531	\$2,561,279	177	\$4,268,798	\$2,134,399	0	0	\$8,964,476
2,484	Commercial	\$573,586,800	\$230,912	37	\$427,187	12	\$692,736	\$692,736	0	0	\$1,812,659
480	Industrial	\$266,389,800	\$554,979	7	\$194,242	2	\$346,862	\$520,293	0	0	\$1,061,397
1,609	Agricultural	\$181,063,700	\$112,531	24	\$135,037	8	\$225,062	\$225,062	0	0	\$585,161
632	Utility	\$153,908,270	\$243,525	9	\$109,586	3	\$182,644	\$273,966	0	0	\$700,135
										Total	\$13,123,828

\*"Understanding Your Risks" FEMA State & Local Mitigation Planning Guide 386-2 per Loss Estimation Table

\*\*Does not Include Land Value

Based on the above estimations a moderate earthquake would cause approximately \$13,123,828 in damages to County infrastructure including content losses. No amount has been included for loss of structure use.

# EARTHQUAKE EPICENTERS IN OHIO AND ADJACENT AREAS



Recommended citation: Ohio Division of Geological Survey, 2007, Earthquake epicenters in Ohio and adjacent areas—color version: Ohio Department of Natural Resources, Division of Geological Survey Map EG-2, generalized page-size version, 1 p., scale 1:2,000,000.



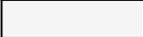
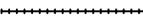
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  MODERATE HAZARD
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

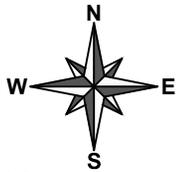
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000    FEET    0    16,000

# MIAMI COUNTY EARTHQUAKE



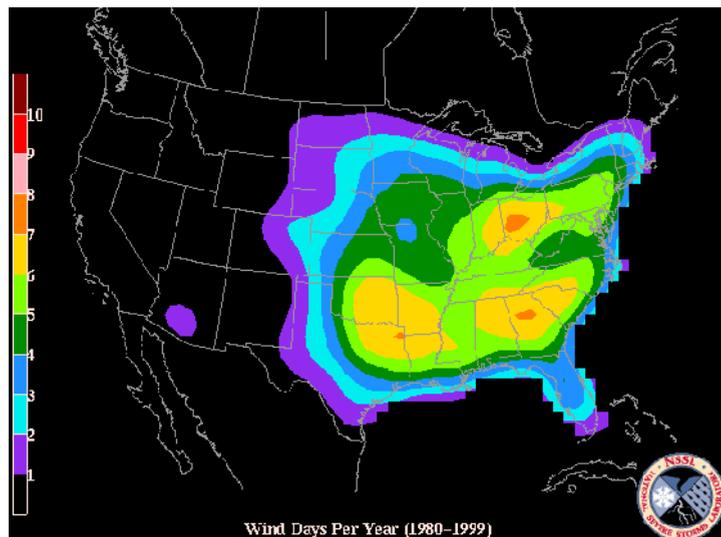
## 2.7 Severe Thunderstorm and Lightning/Hail

A severe thunderstorm is the result of a violent form of convection wherein cold, upper air falls and warm, moist air rises. As the warm air rises, cumulonimbus clouds can develop and turn into severe thunderstorms with strong winds, lightning, heavy rain, and hail.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a bolt. This flash of light usually occurs within the clouds or between the clouds and the ground.

Several methods of research identified severe thunderstorms and lightning as natural hazards in Miami County, including discussions with local representatives and officials. General severe thunderstorm information was gathered at [www.nfpa.org](http://www.nfpa.org) and [www.ohio.gov](http://www.ohio.gov) – The Ohio Committee for Severe Weather Awareness.

The National Weather Service defines a thunderstorm as “severe” when wind speeds reach 58 mph or stronger, and/or hail is produced that is  $\frac{3}{4}$  inch in diameter or larger, and/or a tornado is produced. High wind events are one of the most common types of hazards in Miami County. Figure 1.1 shows the number of high wind days that occur each year. To be classified as a “high wind event,” winds must be in excess of 52 mph. As can be seen, Ohio is one of the most prominent areas for high wind events, especially Miami County. Winds at these speeds are capable of doing great damage.



**Figure 1.1**

Thunderstorms are a seasonal hazard and can be expected to occur every year. According to the National Weather Service, the most active thunderstorm season in Ohio is late spring and early summer. The key ingredient that defines a thunderstorm is lightning. Because lightning creates thunder, a storm with lightning is termed a thunderstorm. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second. The rapid heating and cooling of air near the lightning causes thunder. Ohio averages four deaths and 15 injuries per year as a result of lightning. The United States has a ten-year average of 44 deaths annually due to lightning strikes. Ohio reported no deaths by lightning in 2009. Lightning Safety Week is promoted by the National

Weather Service the last full week in July to help educate the public and lower deaths and injuries due to lightning.

### Past Occurrences

An article taken from the Miami Valley Sunday News stated that on June 4, 1989, a thunderstorm passed over Miami County during the Troy Strawberry Festival. The thunderstorm brought high winds and heavy rain causing significant damage and one injury at the festival site, when a tent blew over onto a bystander.

According to a NOAA Storm Event Record, two clusters of thunderstorms caused significant damage on the 9th of August, 2000. Many trees and power lines were blown down across the county. In Piqua alone, at least 130 trees were knocked down, 12 homes damaged severely, and three vehicles were nearly destroyed. During the morning hours, a large bow echo cloud raced across the area causing widespread wind damage. During the afternoon and evening hours, a large cluster of storms formed causing widespread wind damage and hail along with some flooding.

According to NOAA Storm Event Records, there have been at least two reported occurrences of persons being struck by lightning in Miami County. The first occurred on June 3, 1996, when a Troy woman was struck while doing dishes near the kitchen sink during a thunderstorm. The second occurred on April 2, 2001 when a Piqua man was struck attempting to take cover near a tree at a city park.

According to NOAA Storm Event Records and local news articles a severe thunderstorm with lightning strikes occurred at the Troy Strawberry Festival injuring three persons on June 2, 2007. The following tables summarize the Severe Thunderstorm, Lightning, and Hail experienced in Miami County.

The following NOAA/NCDC Tables indicate thunderstorm, hail, and lightning events and locations that have occurred since 1994 throughout Miami County. Those listed are the ones that had injuries, deaths, property, or crop damages reported.

<b>Miami County Thunderstorm Events 1994-2010*</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Troy	4/27/1994	Tstm Wind	0 kts.	0	0	\$5,000	\$0
Troy Piqua	5/24/1994	Tstm Wind	0 kts.	0	0	\$50,000	\$0
Troy	7/2/1994	Tstm Wind	0 kts.	0	0	\$50,000	\$0
Piqua	6/21/1995	Tstm Wind	0 kts.	0	0	\$50,000	\$0
Fletcher	6/26/1995	Tstm Wind	0 kts.	0	0	\$4,000	\$0

Countywide	7/15/1995	Wind/Hail	1 kts.	0	0	\$6,000	\$0
Troy	7/26/1995	Tstm Wind	0 kts.	0	0	\$3,000	\$0
Tipp City	5/10/1996	Tstm Wind	50 kts.	0	0	\$4,000	\$0
Kessler	5/23/1996	Tstm Wind	50 kts.	0	0	\$10,000	\$0
Troy	6/14/1996	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Troy	7/7/1996	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Bradford	10/30/1996	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Pleasant Hill	11/7/1996	Tstm Wind	50 kts.	0	0	\$10,000	\$0
Fletcher	1/5/1997	Tstm Wind	50 kts.	0	0	\$15,000	\$0
Troy	7/27/1997	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Troy	5/29/1998	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Countywide	6/19/1998	Tstm Wind	50 kts.	0	0	\$10,000	\$0
Laura	6/29/1998	Tstm Wind	50 kts.	0	0	\$3,000	\$0
West Milton	6/29/1998	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Countywide	7/19/1998	Tstm Wind	60 kts.	0	0	\$20,000	\$0
Countywide	7/19/1998	Tstm Wind	60 kts.	0	0	\$10,000	\$0
Countywide	11/10/1998	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Countywide	2/11/1999	Tstm Wind	50 kts.	0	0	\$5,000	\$0
West Milton	7/9/1999	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Piqua	7/26/1999	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Countywide	4/20/2000	Tstm Wind	50 kts.	0	0	\$10,000	\$0
Tipp City	6/14/2000	Tstm Wind	52 kts.	0	0	\$5,000	\$0
Troy	7/28/2000	Tstm Wind	50 kts.	0	0	\$10,000	\$0
Piqua	8/9/2000	Tstm Wind	50 kts.	0	0	\$50,000	\$0
Countywide	9/20/2000	Tstm Wind	50 kts.	0	0	\$5,000	\$0
West Milton	11/9/2000	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Troy	5/17/2001	Tstm Wind	50 kts.	0	0	\$5,000	\$0

Piqua	6/11/2001	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Tipp City	6/12/2001	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Countywide	10/24/2001	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Troy	7/29/2002	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Covington	8/11/2002	Tstm Wind	50 kts.	0	0	\$3,000	\$0
West Milton	11/10/2002	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Tipp City	11/10/2002	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Troy	4/4/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Piqua	5/1/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Countywide	7/4/2003	Tstm Wind	50 kts.	0	0	\$7,000	\$0
Troy	7/5/2003	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Conover	7/6/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
West Milton	7/7/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Piqua	7/8/2003	Tstm Wind	55 kts.	0	0	\$5,000	\$0
Troy	7/21/2003	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Troy	7/27/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Covington	7/27/2003	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Tipp City	8/2/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Troy	8/27/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Brandt	9/1/2003	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Piqua	9/1/2003	Tstm Wind	50 kts.	0	0	\$8,000	\$0
Countywide	9/26/2003	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Countywide	5/23/2004	Tstm Wind	50 kts.	0	0	\$6,000	\$0
Troy	5/30/2004	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Piqua	5/11/2005	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Tipp City	6/30/2005	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Brandt	8/11/2005	Tstm Wind	50 kts.	0	0	\$3,000	\$0

Fletcher	8/20/2005	Tstm Wind	50 kts.	0	0	\$6,000	\$0
Tipp City	9/19/2005	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Covington	11/6/2005	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Pleasant Hill	11/6/2005	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Piqua	4/2/2006	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Piqua	5/25/2006	Tstm Wind	50 kts.	0	0	\$4,000	\$0
Countywide	6/28/2006	Tstm Wind	50 kts.	0	0	\$8,000	\$0
Troy	7/18/2006	Tstm Wind	50 kts.	0	0	\$15,000	\$0
Troy	8/3/2006	Tstm Wind	57 kts.	0	0	\$3,000	\$0
Troy	12/1/2006	Tstm Wind	50 kts.	0	0	\$4,000	\$0
Casstown	4/11/2007	Tstm Wind	50 kts.	0	0	\$5,000	\$0
Tipp City	5/15/2007	Tstm Wind	50 kts.	0	0	\$1,000	\$0
Covington	6/2/2007	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Pleasant Hill	8/16/2007	Tstm Wind	50 kts.	0	0	\$2,000	\$0
Fletcher	8/25/2007	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Troy	1/8/2008	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Troy	5/31/2008	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Troy	6/15/2008	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Ludlow Falls	6/28/2008	Tstm Wind	50 kts.	0	0	\$3,000	\$0
Pleasant Hill	5/7/2010	Tstm Wind	65 kts.	0	0	\$5,000	\$0
Piqua	6/2/2010	Tstm Wind	50 kts.	0	0	\$1,000	\$0
Brandt	4/27/2011	Tstm Wind	50 kts.	0	0	\$2,000	\$0
<b>TOTALS:</b>				<b>0</b>	<b>0</b>	<b>\$557,000</b>	<b>\$0</b>

Source: National Climatic Data Center (NCDC)

\* Through April 2011

<b>Miami County Lightning Events 1995-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Troy	8/7/1995	Lightning	N/A	0	0	\$5,000	\$0
Troy	6/3/1996	Lightning	N/A	0	1	\$0	\$0
Covington	6/14/1996	Lightning	N/A	0	0	\$20,000	\$0
Piqua	4/9/2001	Lightning	N/A	1	0	\$0	\$0
Troy	6/2/2007	Lightning	N/A	0	3	\$0	\$0
<b>TOTALS:</b>				<b>1</b>	<b>4</b>	<b>\$25,000</b>	<b>\$0</b>

Source: National Climatic Data Center (NCDC)

<b>Miami County Hail Events 1994-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Tipp City	6/6/1994	Hail	1.00 in.	0	0	\$0	\$50,000
Piqua	6/26/1995	Hail	0.75 in.	0	0	\$4,000	\$0
Countywide	7/15/1995	Wind /Hail	.75 in. 60 kts.	0	0	\$6,000	\$0
Pleasant Hill	4/7/2006	Hail	1.50 in.	0	0	\$6,000	\$0
Troy	8/3/2006	Hail	0.75 in.	0	0	\$2,000	\$0
Piqua	8/16/2007	Hail	1.00 in.	0	0	\$5,000	\$0
Troy	6/4/2008	Hail	1.00 in.	0	0	\$8,000	\$0
<b>TOTALS:</b>				<b>0</b>	<b>0</b>	<b>\$31,000</b>	<b>\$50,000</b>

Source: National Climatic Data Center (NCDC)

**Probability of a Future Event**

Severe thunderstorm, lightning, and hail events will continue to affect Miami County in the future. These hazard events can occur in all areas of the County. No one in the County is more susceptible to severe storms. The NOAA/NCDC reported 122 thunderstorm events, 50 hail events, and five lightning storms occurring in Miami County since 1994. On average, that is about 10 thunderstorm events per year.

**Vulnerability Analysis & Loss Estimation**

Many of the structural damages associated with severe thunderstorms include downed power lines, fallen trees and other debris that causes structural damage. Further, damage to contents is also potentially high, as in power surges due to lightning can cause damages to appliances and can cause structural fires. Other damage associated with severe thunderstorms includes hail storms which can cause moderate damage to roofs, windows, sky lights, and HVAC equipment.

A severe thunderstorm is issued by the National Weather Service (NWS) whenever conditions are favorable for the development of severe storms. At that time, citizens should be prepared and on the lookout for possible approaching storms and have a safe place in mind to take cover. Having a television or battery-operated radio on hand allows the public to listen and wait in safety until an “all clear” is given by authorities.

Other hazards such as tornadoes, high wind events, hail, and flooding can accompany severe storms. Citizens should be prepared for any of the above hazards when a severe thunderstorm warning is issued for their area. Mobile homes and older manufactured housing are generally more vulnerable to property damage; and therefore, moving to a safe room or other shelter is a good alternative prior to a severe thunderstorm event. Five lightning events have been recorded in Miami County since 1995. Lightning strikes have caused one death and four injuries so it is important to avoid outdoor exposure during a lightning event as it can cause varying degrees of disability with the most being with the central nervous system.

The three largest single reported thunderstorm event losses to affect Miami County were three separate thunderstorms occurring in Troy and Piqua in May, June, and July of 1994. All 177 severe storm events including lightning and hail have caused a total of \$663,000 in cumulative damages to Miami County or an average of about \$3,745 per thunderstorm, lightning, and hail event. Generally, there is more significant property damages in the more popular areas of the County during a storm event.

**Mapping**

See the Miami County Severe Thunderstorm and Lightning Map for a graphical representation of hazard areas with regard to severe thunderstorms and lightning.

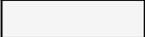
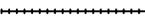
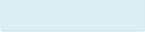
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  MODERATE HAZARD
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

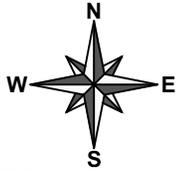
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000 FEET 0 16,000

# MIAMI COUNTY THUNDERSTORM, LIGHTNING, & HAIL



## 2.8 Temperature Extreme & Heat Wave

### Overview

Extreme heat is defined as three (3) or more consecutive days with daytime temperatures of 90 degrees F or higher and nighttime temperatures no lower than 85 degrees F, accompanied by high humidity and causing a significant amount of medically treated heat-related illnesses or deaths.

Several methods of research identified extreme heat as a minor hazard in Miami County, including searches of Internet sites such as:

- Extreme Heat Fact Sheet  
[www.fema.gov](http://www.fema.gov)
- General Heat Wave Information  
[www.nfpa.org](http://www.nfpa.org)
- The National Oceanic & Atmospheric Administration  
[www.noaa.gov](http://www.noaa.gov)

### Risk Assessment

Extreme heat is a hazard usually found in more desert regions than Miami County, Ohio. However, extreme heat can and has been a hazard in Ohio, causing heat strokes to occur to residents and proving detrimental to crops. The highest reported temperature in Ohio through the year 2011 was 113 degrees Fahrenheit, and was reported in Gallipolis on July 21, 1934. Estimates of deaths occurring in Ohio during the week of July 20 – 26, 1934 were about 160.

Health hazards related to extreme heat include sunburns, heat cramps, heat exhaustion, and heat stroke. In a normal year according to USCB 2004, approximately 358 Americans die from extreme heat and 680 Americans die from extreme cold. In August 2007, seven out of eight of the first eight days of August exceeded 90 degrees according to the archived climate data at the Wilmington, Ohio Branch of the National Weather Service. Young children, the elderly, and those who are sick or overweight are more likely to become victims. According to the 2010 Census, approximately 28% of the total population in Miami County is between the ages of 45 and 64. Because men sweat more than women, men are more susceptible to heat related illnesses because they become more quickly dehydrated.

### Location

No one geographical area of Miami County is more susceptible to temperature extreme and heat wave. However, the affects can vary greatly depending on climate control availability.

### Past Occurrences

The summer of 1934 ranks as the hottest in Ohio since temperature records began in 1883. The average summer temperature of 75.7 degrees for June, July, and August broke

the old record set in 1901 and was 5% above normal. In 2003, which was a hotter than normal year, the average summer temperature was 73.18 degrees.

According to an article taken from the Troy Daily News dated July 5, 1999, temperatures soared into the upper 90's during the county's Independence Day celebration. No heat related illnesses were reported.

According to a NOAA/NCDC Event Record, the last part of July 1999 was very hot and humid across the state with temperatures reaching into the 90s most days and above 100 for a few days. The dew points and overnight lows were in the 70s through much of the period. The excessive heat contributed to 10 deaths in the Cincinnati metro area. The following tables summarize Temperature Extremes and Heat Waves experienced in Miami County.

<b>Miami County Extreme Weather Events 1995-2010</b>							
<b>Location or County</b>	<b>Date</b>	<b>Type</b>	<b>Magnitude</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>	<b>Crop Damage</b>
Countywide	2/11/1995	Extreme Cold	N/A	4	0	\$100,000	\$0
Statewide	12/9/1995	Extreme Cold	N/A	0	1	\$2,000	\$0
Countywide	2/1/1996	Extreme Cold	N/A	0	0	\$1,300,000	\$0
Countywide	7/20/1999	Excessive Heat	N/A	13	0	\$0	\$0
Countywide	4/6/2007	Frost/Freeze	N/A	0	0	\$0	\$540,000
<b>TOTALS:</b>				<b>17</b>	<b>1</b>	<b>\$1,402,000</b>	<b>\$540,000</b>

Source: National Climatic Data Center (NCDC)

### **Probability of Future Events**

From 1995 through 2010 NOAA/NCDC has recorded five extreme weather events. There were three extreme cold weather events, one extreme heat event, and one frost/freeze event recorded. The probability of such an event occurring is about one temperature extreme event every three years.

### **Vulnerability Analysis & Loss Estimation**

Based on historical available data, the most costly extreme weather event to occur in Miami County was the February 1, 1996 extreme cold spell. Almost \$1,300,000 in damages occurred as a result of that hazard event. Power outages, burst water mains, and excessive use of space heaters caused house fires. Drivers were stranded because of the affect the extreme cold had on automobiles.

Extreme heat wave can also cause damages and buckling to pavement, affect proper operation of vehicles and is particularly hard on the elderly and to workers that labor in an outside atmosphere.

The average cost of property/crop damages occurring from this type of hazard event is approximately \$260,420. There have been a total of 57 deaths and one injury associated with these five events. Potential losses would only include structure use and function loss, which is estimated to be \$543,600.

**Mapping**

See the Miami County Temperature Extreme and Heat Wave Map for a graphical representation of hazard areas with regard to temperature extremes. Typically the high density areas of the cities will be at moderate risk due to the larger elderly population and due to the heat island effect. The rural areas are generally at a slight risk due to the lower population numbers.

### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

- MODERATE HAZARD
- LOW HAZARD

- MAJOR ROADWAY
- MINOR ROADWAY
- ACTIVE RAILROAD
- CITY / VILLAGE
- COUNTY

**Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

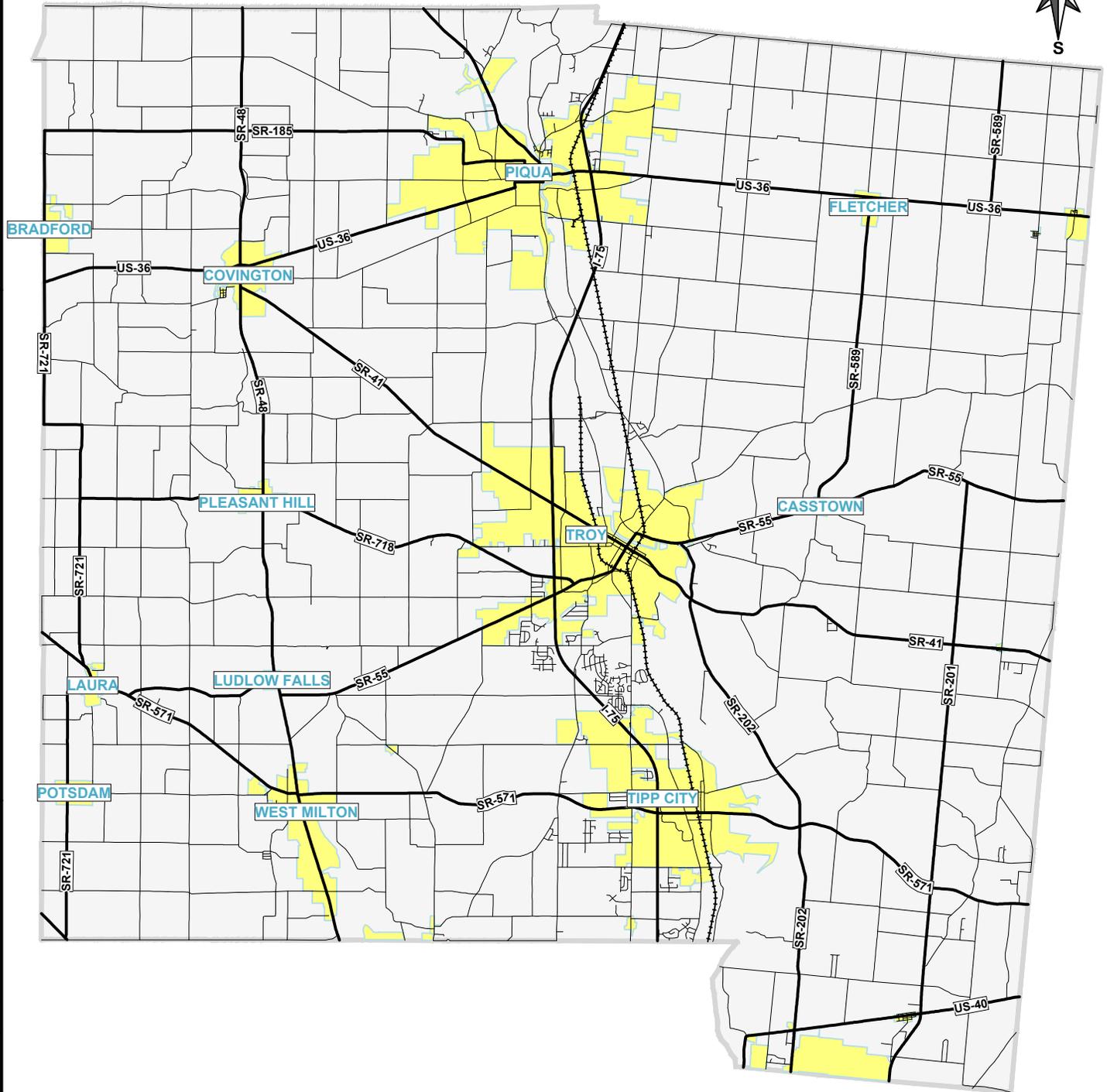
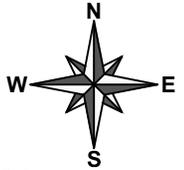
DRAWN BY: SMK    DATE: 8/9/11

SCALE: 1" = 16,000'



16,000 FEET 0 16,000

# MIAMI COUNTY TEMPERATURE EXTREME & HEAT WAVE



## 2.9 Epidemic/Disease Impact

### Overview

An epidemic is a disease, usually contagious, that recurs in a community and attacks a large number of people at the same time. The potential impacts of an epidemic are illness or fatalities, disruption or closing of schools, or the forced closure of businesses and industrial operations.

### Epidemic versus Pandemic

An **epidemic** is a classification of a disease that appears as new cases in a given human population, during a given period, at a rate that substantially exceeds what is “expected”, based on recent experience (the number of new cases in the population during a specified period of time is called the “incident rate”).

A **pandemic** is an epidemic that spreads across a large region (for example a continent) or even worldwide.

Simple put, when an epidemic gets out of hand, it is called a pandemic. This has two fine distinctions:

Geographical spread – An epidemic that is not localized to a city or a small region but spans a larger geographical area can be called a pandemic.

Incident rate – An epidemic may be localized to a small region but the number of people affected may be very, very large compared to what is “expected”. In this case, it can be called a pandemic even if its geographical spread is not very large. For example, let us say that a disease has an “expected” rate of infection of 15%. When 40% of the population of a state is infected, we have an epidemic on our hands. When 75% of the population is infected, it has reached pandemic proportions.

Several methods of research identified epidemics as a hazard in Miami County including discussions with the local Health Department and Ohio Department of Health. Epidemic is a natural hazard risk in Miami County. The probability of an epidemic striking Miami County is relatively low. However, the risk associated with this hazard is very high.

### Risk Assessment

#### Location

An epidemic has the potential to affect the entire county, but is more probable to occur in densely populated areas, such as the Cities of Piqua, Tipp City, and Troy, especially at facilities containing large numbers of occupants. Many commercial and industrial sites throughout the county contain many facilities at which a large work force is employed. A potential epidemic is of particular concern at these facilities. For example, Upper Valley Medical Center is a large facility at which approximately 1,600 people work. Because these individuals may be exposed to viruses at any time, an epidemic may begin at this

facility. To compound the problem, this facility is located between Troy and Piqua, the two largest concentrations of population in Miami County.

Epidemics can develop with little or no warning and quickly erode the capacity of local medical care providers. A fast developing epidemic can last several days and extend into several weeks. In some extreme cases, they can last for several months.

An epidemic can occur at any time of the year, but the warm summer months, when bacteria and microorganism growth are at their highest, present the greatest risk. The West Nile Virus (WNV) caused growing concern in Ohio in 2003 when 10,000 reported cases of the WNV encephal were reported from 46 states resulting in 264 fatalities. The most recent epidemic was the 2009 H1N1 pandemic which expired on June 23, 2010.

### **Past Occurrences**

The history of epidemics in Miami County is as follows:

- 1830's – Chlorea outbreak due to contaminated food and water.
- 1914 – Quarantine imposed due to outbreak of Scarlet Fever.
- 1918 – Influenza outbreak closed schools and restricted public gatherings.
- 1949 – Poliomyelitis outbreak.
- 2003 – West Nile Virus outbreak.
- 2009 – H1N1 Influenza clinics were held.

### **Probability of Future Events**

Locally recorded epidemics have affected Miami County as early as the 1830's. There is clear precedence set that Miami County will continue to experience epidemic hazard events in the future. While they may not occur frequently, based on past history an epidemic has occurred once in about every 20-25 years.

### **Vulnerability Analysis & Loss Estimation**

Losses to structural assets are relatively low when considering epidemic. This hazard primarily affects the human population. However, a large-scale epidemic could affect enough of the population to request a quarantine or cancel of an event, school, or business which could in turn cause a significant economic loss.

There would not be a property damage loss as a result of an epidemic event in Miami County; however, there could be a loss of revenue from a closed facility or event.

### **Mapping**

See the Miami County Epidemic Map for a graphical representation of the areas with regards to epidemic. The areas with greater population such as with in the cities would carry a greater risk of an epidemic hazard event than in the rural areas. Therefore the Hazard Epidemic Map indicates a low risk for rural areas and a moderate risk for the city and village areas.

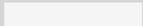
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  EPIDEMIC HAZARD
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

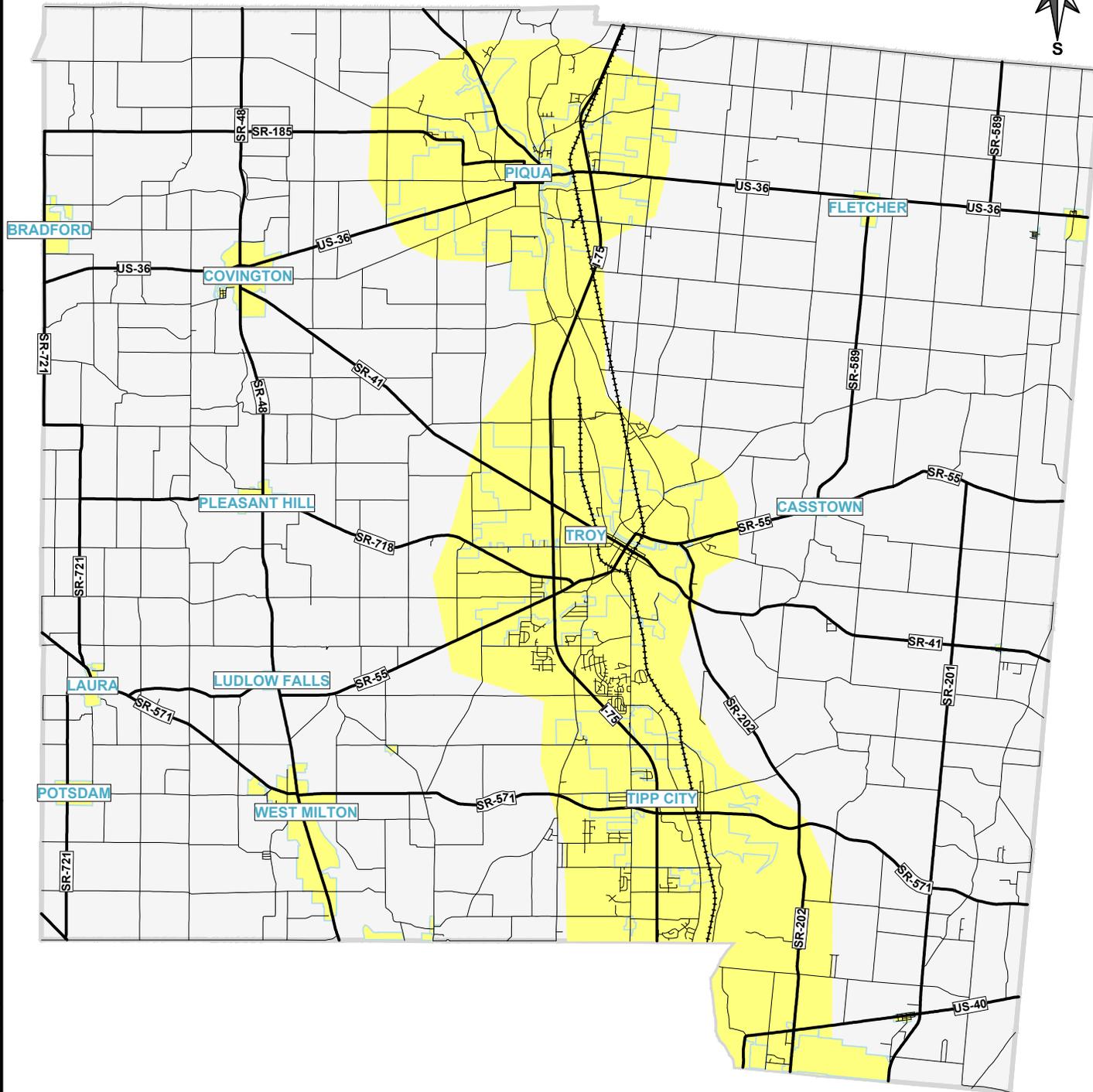
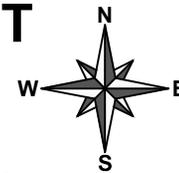
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000 FEET 0 16,000

# MIAMI COUNTY EPIDEMIC/DISEASE IMPACT



## 2.10 Drought

A drought is a period of abnormally dry weather, which persists long enough to produce a serious hydrologic imbalance.

Several methods of research identified drought as a hazard in Miami County, including discussions with local representatives. Drought information was obtained from the following Internet sites.

- United States Department of Agriculture  
[www.usda.gov](http://www.usda.gov)
- United States Geological Survey  
[www.usgs.gov](http://www.usgs.gov)
- National Oceanic Atmospheric Administration (NOAA)  
[www.noaa.gov](http://www.noaa.gov)
- Ohio Department of Natural Resources

Drought is a relative term and is used in relation to who or what is being affected by the lack of moisture. Droughts can be categorized into four types – each one affecting the other.

**Agricultural Drought** – Moisture deficiency seriously injurious to crops, livestock, or other agricultural commodities. Parched crops may wither and die. Pastures may become insufficient to support livestock. Effects of agricultural droughts are difficult to measure because there are many other variables that may impact production during the same growing season.

**Hydrological Drought** – Reduction in stream flow, lake and reservoir levels, depletion of soil moisture, and a lowering of the ground water table. Consequently, there is a decrease in groundwater discharge to streams and lakes. A prolonged hydrological drought will affect the water supply.

**Mathematical Drought** – Computation in which rainfall deficiencies are expressed.

Extended, widespread droughts are fairly infrequent; however, brief local droughts are common and can be severe. The drought of 1930-36 was the most severe that has been recorded in Ohio. Precipitation totals for 1930 and 1934 were the smallest since the earliest statewide records began in 1883.

Miami County is susceptible to drought conditions during the summer and autumn months due to significant lack of rainfall and/or other precipitation. These drought conditions often affect local farmers (both commercial farmers and personal farmers) and the local water supply (wells often run dry, rivers run low forcing public water supplies to decrease).

**Socioeconomic Drought** – Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depends on weather. Due to variability of climate, water supply is sufficient in some years but not satisfactory to meet human and environmental needs in other years. The demand for

economic goods is increasing as a result of increasing population. Supply may also increase because of improved production efficiency and technology.

Miami County's large agricultural sector is extremely susceptible to drought, and could potentially suffer significant economic losses. According to the Palmer Drought Severity Index for a period between 1985 and 1995, Ohio counties spend 0-5% of the summer and autumn months under drought conditions. According to a NOAA Event Record drought conditions continued from July 1, 1999 through August of 1999 with most areas receiving well below normal rainfall for these months. In some areas around 50% of crops were considered total losses. Most counties in southwest Ohio were declared federal disaster areas by the US Department of Agriculture. According to a July 15, 1999 article taken from the Troy Daily News, some farmers started feeding hay to livestock that could cause a shortage in the fall due to severe dry weather. Some livestock deaths were blamed on temperatures in the upper 90s combined with a lack of moisture. Moderate drought conditions have been experienced countywide in the fall of 2007 and 2010.

### Measuring Drought

The Standardized Precipitation Index (SPI) is a way of measuring drought that is different from the Palmer drought index (PDI). Like the PDI, this index is negative for drought, and positive for wet conditions. But the SPI is a probability index that considers only precipitation, while Palmer's indices are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff).

The Palmer Drought Severity index (PDSI) is a soil moisture algorithm. The PDSI was developed by W.C. Palmer in 1965. It is a highly recognized method to measure drought. Many U.S. government agencies and states rely on the PDSI to trigger drought relief programs and responses. (See following chart)

Palmer Drought Severity Index Classifications	
4.0 or greater	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

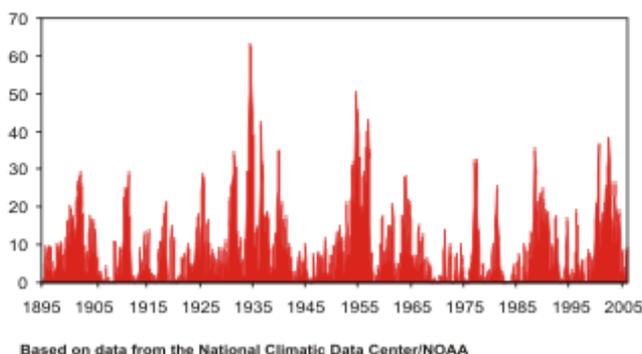
The Palmer Index is typically calculated on a monthly basis, and a long-term archive of the monthly PDSI values for every climate division in the United States exists with the National Climatic Data Center from 1895 through the present. Weekly Palmer Index values are calculated for climate divisions. The State of Ohio currently has 10 climate divisions.

**Risk Assessment**

Using Palmer Drought Severity Index data, the National Drought Mitigation Center indicated the most extreme drought in the recent past in the United States occurred in July 1988 when 36% of the country experienced severe drought conditions. The worst ever drought recorded was during July 1935 with 65% of the United States experiencing extreme drought conditions.

**Percent Area of the United States in Severe and Extreme Drought**

January 1895–January 2006



**Past Occurrences**

According to the National Climatic Data Center, the number of years Ohio experienced severe or extreme drought between 1896 and 1995 were as follows:

Number of Years with Severe or Extreme Drought between 1896 to 1995									
% area of basin/region	>0 %	>10 %	>25 %	>33 %	>50 %	>66 %	>75 %	>90 %	>100 %
Ohio	67	51	34	28	16	12	9	4	3

**Miami County, Ohio Drought Event History/Loss Estimates (1995 – May 2011)**

Summer 1999 Drought

- As much as 50% of crops considered a total loss in some areas

**Summer 2002**

- Severe crop loss
- County received Federal Agricultural funds for losses

**September 23, 2010 Drought Conditions & High Winds**

- Set fields on fire
- One house and barn destroyed in nearby adjacent eastern Miami County

**Probability of Future Events**

Based on historical drought in West Central Ohio, the probability of a future drought occurrence is likely with an event probable in the next three to four years and a major drought every 20 to 25 years.

It is possible that changes in the climate can directly impact water resources, and flooding could become more severe. More frequent extreme events such as droughts and floods may be noticeable with climate change.

**Vulnerability Analysis & Loss Estimates**

Miami County is a rural agricultural County with large gross receipts for grain and livestock. A drought can have a considerable impact on the agricultural economic stability of the County. The 1999 summer drought indicates the County is very much affected in several ways. In addition to economic loss of reduced crop yields, droughts lead to problems with irrigation and increase the potential for field and grass fires. The significantly less rainfall also can leave reservoirs, water tables and farm ponds significantly lower. Some farmers use their ponds for livestock.

Damages are not immediately noticed, such as the damages to trees, shrubbery and wildlife. Diminished water may affect the rural water wells which are heavily relied upon to provide water for domestic and livestock uses. Some damage may also occur to building foundations as a result of the loss of moisture in areas where highly expansive clay soils may be found in Miami County.

Drought impacts large areas and crosses jurisdictional boundaries. All existing and future buildings, facilities and populations are exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages and crop/livestock losses on agricultural lands and typically have no impact on buildings.

**Estimated Potential Losses**

In 2007, the market value of agricultural products sold from Miami County farms in 2007 was:

Crop Sales:	\$74,703,000
Livestock Sales:	<u>\$15,079,000</u>
Total Value of Products Sold:	\$89,782,000*

\*Source: Census of Agriculture USDA [www.agcensus.usda.gov](http://www.agcensus.usda.gov)

Drought can have a devastating effect on the Miami County economy. During the 1999 drought, crop yields were cut 50% in comparison to the yields of 2000 and 2001. Based on this recent historic data, a loss of one half the crop yields due to drought in Miami County could result in 50% less farm revenue or county crop sales value loss of \$37,351,500.

**Mapping**

See the Miami County Drought Map for a graphical representation of the hazard areas with regard to drought conditions. No one area of the County is more susceptible to drought than another. Therefore, the county is shown as a moderate risk to drought conditions.



## 2.11 Infestation/Invasive Species

### Overview

According to a review of information provided by ODNR Wildlife Division, Miami County is subject to both insect and plant evasive species. Although there are over 3,000 species of plants known to occur in Ohio, about 75% are native or have occurred in Ohio before the time of Europeans (1750).

Some of those that have invaded Ohio displace native plants and disrupt woodlands, prairies, wetlands, and natural areas.

Those plants that typically have been the most invasive for Miami County residents include:

- Bush Honeysuckle
- Garlic Mustard
- Multiflora Rose

These nuisance plants spread quickly and force out native spring wildflowers. Other non-native plants impact the County's wetlands. The wildlife depends on native plants for food and cover, so invasive species are problematic.

According to the ODNR Division of Forestry, one of the most prevalent invasive insect species is the Emerald Ash Borer. It is an Asian wood-boring beetle and affects all species of native ash trees found in Ohio. In 2003, it was first found in northwest Ohio feeding on ash trees. The Emerald Ash larvae were active just below the bark and feeding on the living part of the tree, preventing the tree's ability to move water and nutrients through its system.

Other invasive species to affect Miami County include:

- The Asian Longhorned Beetle
- Emerald Ash Borer
- Gypsy Moth Caterpillars
- Spider Mites

Most recently found in southwest Ohio is the Asian Longhorned Beetle (AJB) which attacks broadleaf trees, particularly maples.

An infestation is to spread or swarm in or over in a troublesome manner. Also, to live in or on as a parasite.

According to reviews of online information provided by the Ohio Division of Forestry, Miami County is subject to an infestation primarily of gypsy moths. The impact of gypsy moths includes economic losses through timber mortality, loss of recreational opportunities in severely defoliated areas, and nuisances from gypsy moth



Figure 1.1

caterpillars. Other infestations that could possibly occur in Miami County include Asian long horned beetles (pictured in Figure 1.1), mosquitoes known to be infected with the West Nile Virus, and spider mites, as was the case in 1999.

An entomologist at the Agricultural Research and Development Center in Wooster stated that two spotted spider mites were detected in Miami County, and were devastating soybean crops.

The probability of an infestation hazard event actually occurring in Miami County is relatively low, with only moderate risk associated with it. Infestation is most likely to occur in the 20,930.60 acres of forested or the 211,000 acres of farmland and will likely cause no damage to structural assets. Infestation is considered as a hazard in Miami County due to the high percentage of agricultural and forestland in the county.

The Asian Long-Horned Beetle (ALB) has been discovered in Southwest Ohio east of Cincinnati by the U.S. Department of Agriculture. Ohio is the 5th state to detect ALB. These beetles attack a wide variety of broadleaf trees particularly Maples.

Invasive species are defined as:

1. Non-native (or alien) to the ecosystem under consideration, and
2. Whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Invasive species can be plants, animals, and other organisms (e.g., microbes). Human actions are the primary means of invasive species introductions.

There are about 60 species of invasive plants identified in Ohio. Invasive species can cause economic and environmental damages in communities. Miami County adjoins Clark and Champaign County to the east. Clark and Champaign Counties are currently participating in a 22 county Woodland Invasive Species Program launched to promote healthier forests. Invasive Bush Honeysuckle is one of the most prevalent invasive species in Miami County. Invasive species plants are usually characterized by fast growing, rapid vegetation spread, and efficient speed dispersal and germination. Since these plants are not native to Ohio, they lack the natural predators and disease which would naturally control them in their native habitats.

### **Past Occurrences**

Invasive species have been around since the settlers of the 1750's. Movement of people and transportation has made the spread of invasive species more prevalent. The Emerald Ash Borer was introduced in the U.S. in the 1990's from wood packing material from China, first being discovered in Lower Michigan, spreading to Ohio, Maryland, Pennsylvania, northern Indiana, and Chicago.

**Probability of Future Events**

Invasive species will continue to affect Ohio. With the increase in worldwide trade and the fast modes of transportation, the invasive species will continue to occur.

Just as the Asian Longhorned Beetle has recently been discovered in southwest Ohio, new species of unwanted pests will come. The importance of controlling the natural environment native to our county will require local, State, nationwide, and international cooperation to avoid unwanted infestations of invasive species.

**Vulnerability Analysis & Loss Estimation**

The Emerald Ash Borer has already cost large amounts of dollars in attempts to identify and isolate infected trees. It is estimated in Ohio alone there are five billion ash trees that could become infected with the Emerald Ash Borer. Removal and proper handling of the trees will be costly in itself. Pesticides which have to be applied yearly are labor intensive and costly. It is estimated the treatments alone will be substantial for County residents. Labor costs and pesticide costs to remove honeysuckle will also be ongoing as it an ongoing labor intensive procedure to remove such a species.

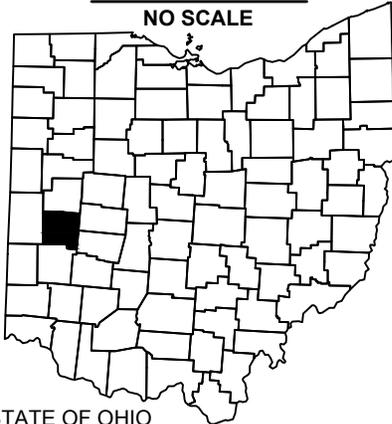
Some areas of Ohio are participating in a Woodland Invasive Species Program to promote healthier forests. Miami County is not currently participating in this program.

**Mapping**

See the Miami County Infestation Map for a graphical representation of hazard risk areas with regard to infestations/invasive species. Typically the rural areas of the county are more at risk for the plant invasive species and the remainder of the county is at an equal risk for tree borers. Therefore, the map indicates Miami County rural areas are at a moderate risk and the municipal areas are at a low risk for infestations/invasive species.

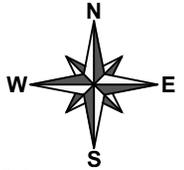
### VICINITY MAP

NO SCALE

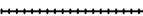
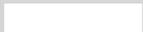


STATE OF OHIO

# MIAMI COUNTY INFESTATION & INVASIVE SPECIES



### MAP LEGEND

-  MODERATE HAZARD
-  LOW HAZARD
  
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

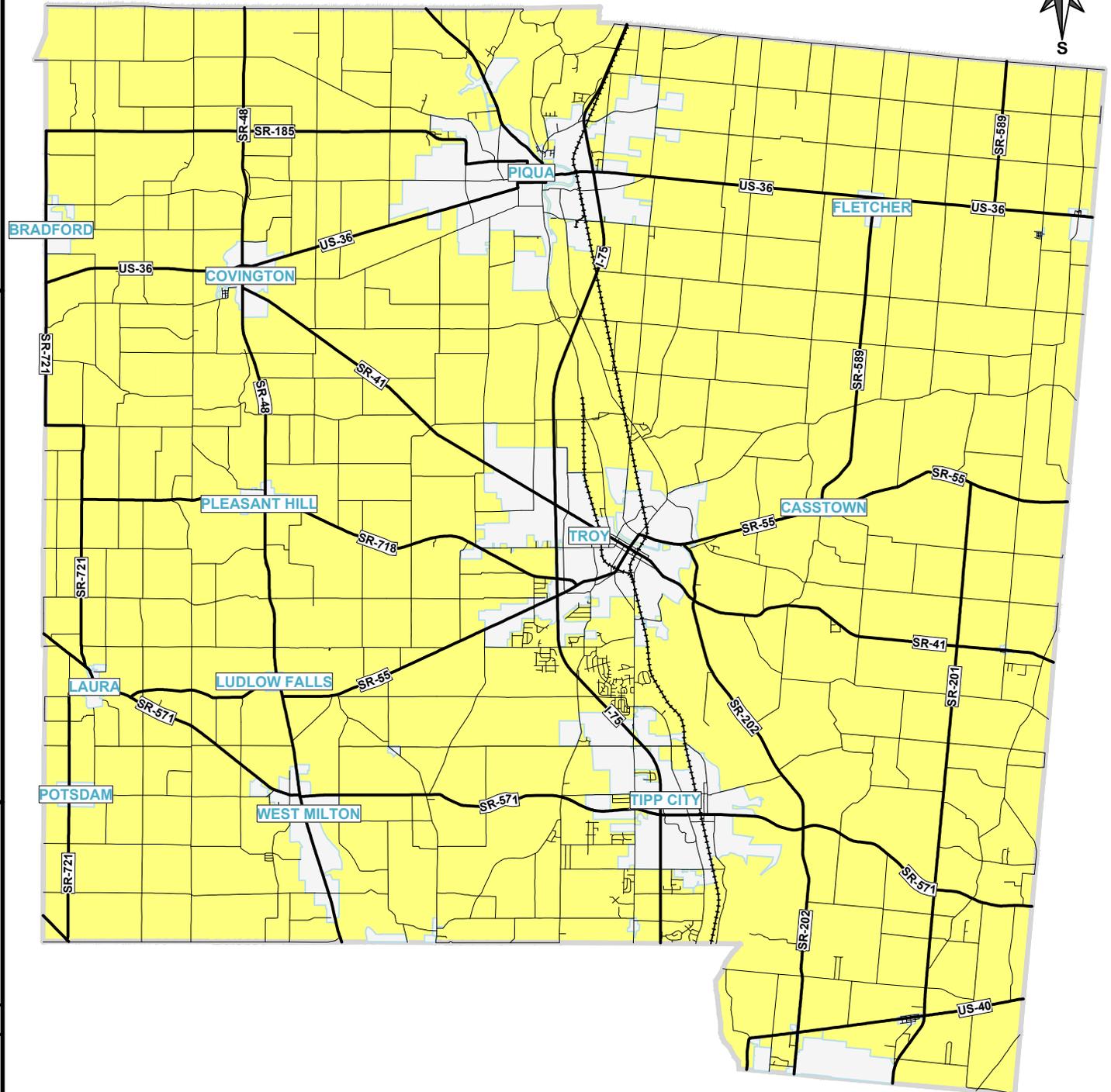
Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000    FEET    0    16,000



## 2.12 Wildfire

### Overview

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke that fills the area for miles around. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires.

Although typically Ohio wildfires are more prevalent within the Ohio forests and grasslands in southern and eastern Ohio, under certain dry and windy conditions, they can occur on a smaller scale in Miami County. The conditions that set the stage for wildfires are dry, warm, windy conditions with low humidity. Typically fall and early spring are considered the prime seasons. When you combine these weather conditions with the fall season of dry crops, and vegetation such as dry leaves and a wooded terrain, there is an unpredictable danger for wildfire.

Several methods of research identified wildfires (on a very small scale) as a hazard in Miami County, including discussions with local representatives. The following Internet sites were searched with regard to wildfires.

- Firewise  
[www.firewise.org](http://www.firewise.org)
- General Wildfires Information  
[www.nfpa.org](http://www.nfpa.org)
- Local Wildfire Observations and Trend Forecasts for Fire Weather Forecast Zones  
[www.fs.fed.us/land/wfas/fd\\_class.png](http://www.fs.fed.us/land/wfas/fd_class.png)
- NOAA Fire Event Satellite Photos  
[www.osei.noaa.gov](http://www.osei.noaa.gov)
- Resolution Fire Danger Rating Fuel Model Map  
[www.fs.fed.us](http://www.fs.fed.us)
- US Forest Service (USDA)  
[www.fs.fed.us](http://www.fs.fed.us)
- USGS Topographic Maps  
[topomaps.usgs.gov](http://topomaps.usgs.gov)
- Wildland Fire Assessment System  
[www.wfas.net](http://www.wfas.net)
- Wildland Fire Updates  
[www.wfas.net](http://www.wfas.net)

## Risk Assessment

Wildfire Urban Interface (WUI) conditions refer to the zone between unoccupied land and human development. Occasionally, homes and structures are built within or near these woodlands and grasslands.

There are no known building codes in Ohio that specifically address consideration for construction methods regarding wildfire. In Ohio, the ODNR Division of Forestry has in place “Firewise Ohio”, a statewide WUI safety initiative, in response to the growing WUI situation in Ohio. Local fire departments & Firewise Ohio collaborate to effectively implement wildfire prevention and safety programs at the community level. To date, the program has been a successful partnership.

According to the Ohio Division of Forestry, there are several factors that can contribute to the start of wildfires in Miami County, including arson, equipment fires, campfires, and lightning. Approximately 10,000 forest fires are started each year by lightning. Miami County contains limited forestland, with several recreational campsites and other attractions in designated areas such as the Brukner Nature Center, Charleston Falls Preserve, and the Stillwater Prairie Preserve. Campfires, coupled with large numbers of visitors and a large proportion of trees, make wildfires a potential hazard for Miami County.

Members of the volunteer fire departments confirm that small brush fires are a common occurrence during the dry summer months, in what is typically known as the “burning season.” These small brush fires are usually handled by local fire departments and often do not cause damage to structures. However, the threat is present that these bush fires could burn out of control and consume many structures, as well as a portion of the nearly 21,000 acres of forestland that exists in Miami County. Dry croplands also are subject to fuel wildfires.

As shown below, Ohio is marked as having a “low” fire class rating. However, this can change with climatic conditions. A large period of drought and high heat may dry up many areas of the County and add them to the amount of fuel for a potentially destructive wildfire.

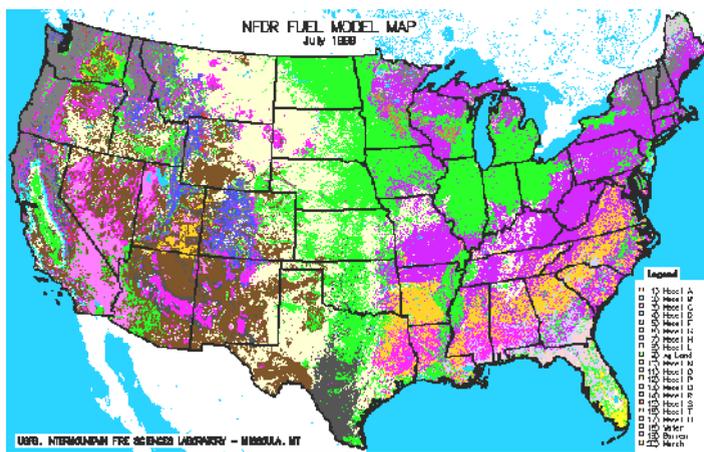


Figure 1.1



### **Probability of Future Events**

The number of occurrences, size of wildfires, and severity of burn fluctuate annually in response to a variety of factors including:

- Weather – daily, monthly, seasonal, and long-term trends in:
  - Precipitation
  - Relative humidity
  - Temperature
  - Wind
- Fuels – condition of 1, 10, 100, 1000 hour fuels in terms of:
  - Moisture content
  - Arrangement
  - Accumulation level
  - Availability
- Ignitions – presence or absence of wildfire starts:
  - Human caused
    - ❖ Debris burning – compliance of ORC 1503.18, and safe debris burning techniques
    - ❖ Incendiary – arsonists at large
    - ❖ Wildfire prevention and awareness efforts
- Suppression Response – Capability and timeliness of initial attack
  - Quickness of response to the incident
  - Local / Volunteer fire department capability
  - Availability of state and local resources
    - ❖ Number of concurrent wildfires

### **Vulnerability Analysis & Loss Estimation**

18.5% of Miami County is covered with wooded areas and 63.7% is covered with crops. Many of the structural assets in the County are within close proximity of those wooded areas and cropland. If a wildfire were to occur during dry and windy conditions, a moderate portion of structural assets could possibly be destroyed.

Potential structural losses of farm buildings due to wildfires is estimated to be \$112, 521 which is the average assessed value of a farm structure in Miami County. This does not include any potential crop losses.

### **Mapping**

See the Miami County Wildfire Map for a graphical representation of the hazard areas with respect to wildfires. The areas with no shading represent “low hazard areas,” the yellow areas represent “moderate hazard areas,” and the red areas represent “high hazard areas.”

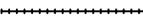
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  MODERATE HAZARD
-  LOW HAZARD
  
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

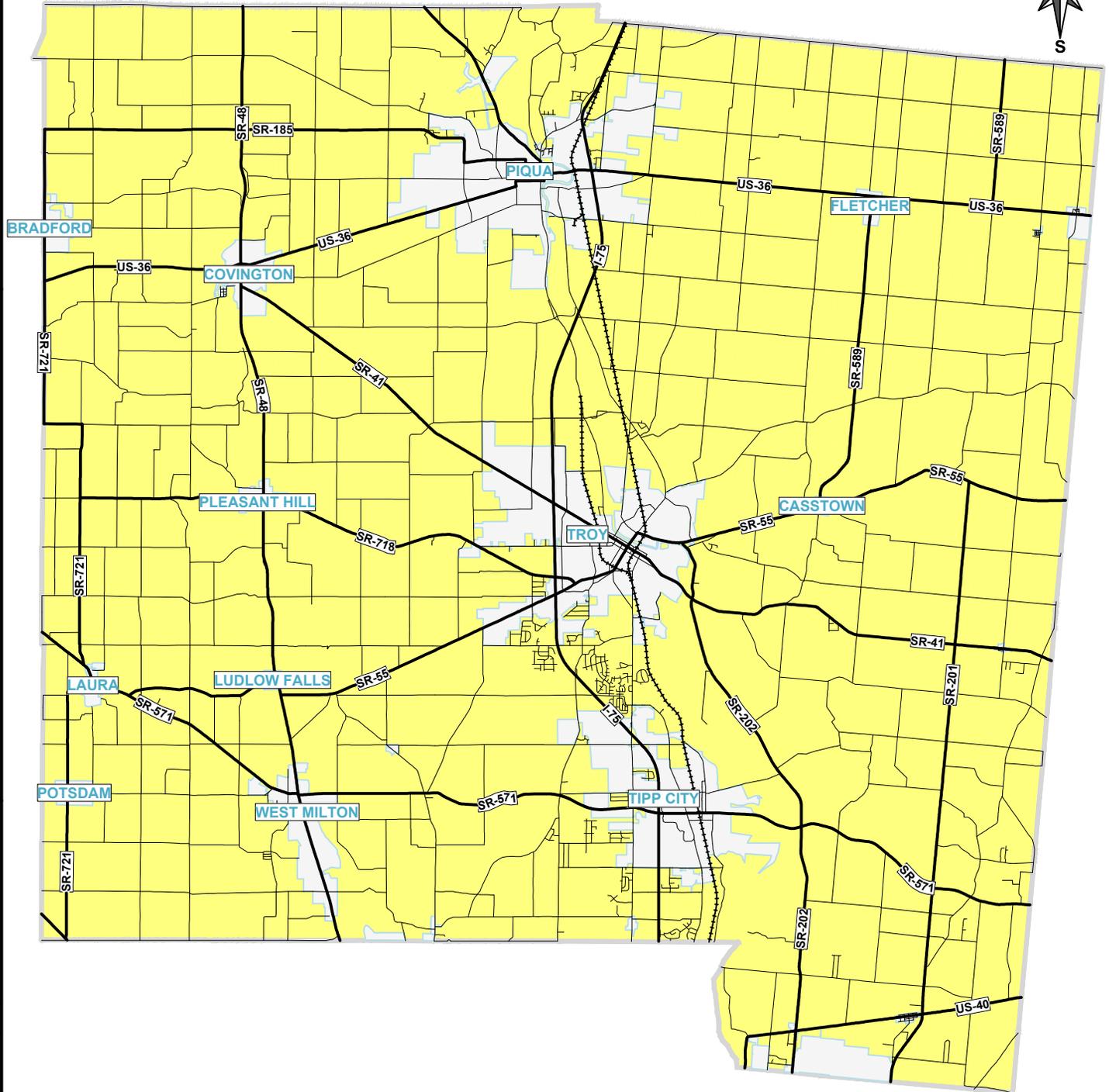
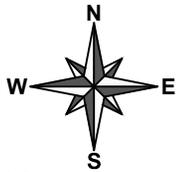
**DRAWN BY:** SMK    **DATE:** 8/9/11

**SCALE:** 1" = 16,000'



16,000    FEET    0    16,000

# MIAMI COUNTY WILDFIRE



## 2.13 Terrorism

### Overview

Terrorism is a form of violence aimed at a public audience. The Federal Bureau of Investigation defines terrorism as “the unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof in furtherance of political or social objections.”

### Risk Assessment

Terrorist incidents continue to be mindful following the events of September 11, 2001. We, as a society, have realized how vulnerable we are to such actions. Miami County is not immune from any type of terrorist activity. Terrorist attacks can be focused on government or the civilian population. Organized criminal groups do operate within Ohio according to the Buckeye Sheriff’s Association and the President’s Commission on Crime. Without a doubt, such criminal organizations intimidate and threaten the freedom of many Ohio residents, including those in Miami County. Anti-abortion and militia groups are known to operate in and near Miami County.

Biological terrorist incidents have a somewhat low probability of occurring in Miami County. These incidents include the release of diseases such as smallpox into the general population for destructive purposes. Biological events have an extremely high risk associated with them, as the affects of such an event can exceed the capabilities of the limited healthcare facilities located in Miami County, and the loss of human life can be disastrous. Miami County is not equipped on the local level to cope with a large-scale terrorist incident. Therefore, as a mitigative action, mutual aid agreements should be made with agencies/departments at the state and federal level if that have not already been made.

Chemical terrorist incidents are comparable to biological incidents in that they have a relatively low probability of occurring, yet are associated with extremely high risks. Chemical incidents include the use of weapons that subject the general population to toxic chemicals similar to those that could potentially be released during an accidental HAZMAT incident. Chemical incidents are capable of subsequent losses to large percentages of the population. Miami County does contain public water systems, which makes the threat of a biological and chemical attack more plausible. According to the Miami County Sheriffs Department, local officials responded to a “white powder” incident in late 2001.

Events involving weapons of mass destruction also have a relatively low probability of occurring in Miami County. However, in the event that a nuclear or other weapon of mass destruction was to discharge in or near the county, the inherent loss of life would be catastrophic. A WMD threat is ever present and the reduction of such threat is dependent upon the actions of other country’s that are unpredictable. As long as there are weapons and the capability of delivery of those weapons, the threat will remain.

**Location**

Terrorist actions often occur in areas of densely concentrated population to increase the loss of human life. As such, all population centers in the county are at an elevated risk, especially the Cities of Tipp City, Troy, and Piqua as the largest and most diverse municipalities in the county. Dams, water, and sewer treatment facilities are likewise highly susceptible to terrorist activities. Facilities in neighboring counties such as the Wright-Patterson Air Force Base may also be susceptible to WMD-type attacks and may affect Miami County indirectly. According to the 2009 Ohio Department of Public Safety website, 48 violent crimes and 1,872 property crimes were reported in Miami County during the year.

**Past Occurrences**

Several Ohio events in which authorities checked out possible terrorist events include:

- 2007 shopping mall terrorist plot in Columbus.
- August 17, 2011 – South Broomfield, Ohio, suspicious traffic stop.
- August 18, 2011 – Call to Green County to check out suspicious trailer.
- September 2, 2011 – Call to Sharonville, Ohio, to check out suspicious trailer.

**Vulnerability Analysis & Loss Estimation**

Terrorism, while extremely low in probability, could cause a significant amount of damage. Weapons of mass destruction will cause significant damage to structures, while chemical and biological events can have significant effects on the general population.

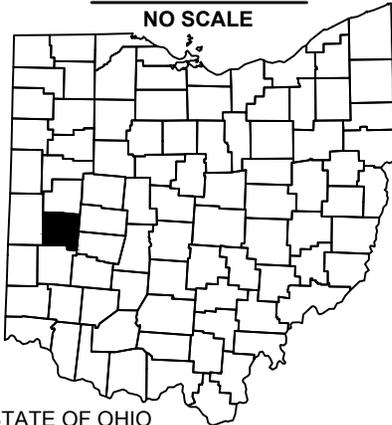
A total loss estimate to structures as a result of terrorist events has not been determined at this time.

**Mapping**

See the Miami County Terrorism Map for a graphical representation of hazard risk areas with relation to terrorist incidents. The city municipal areas of Miami County have been shown as a moderate risk. The rural areas of Miami County have been shown as a low risk.

### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

- MODERATE HAZARD
- LOW HAZARD

- MAJOR ROADWAY
- MINOR ROADWAY
- ACTIVE RAILROAD
- CITY / VILLAGE
- COUNTY

**Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

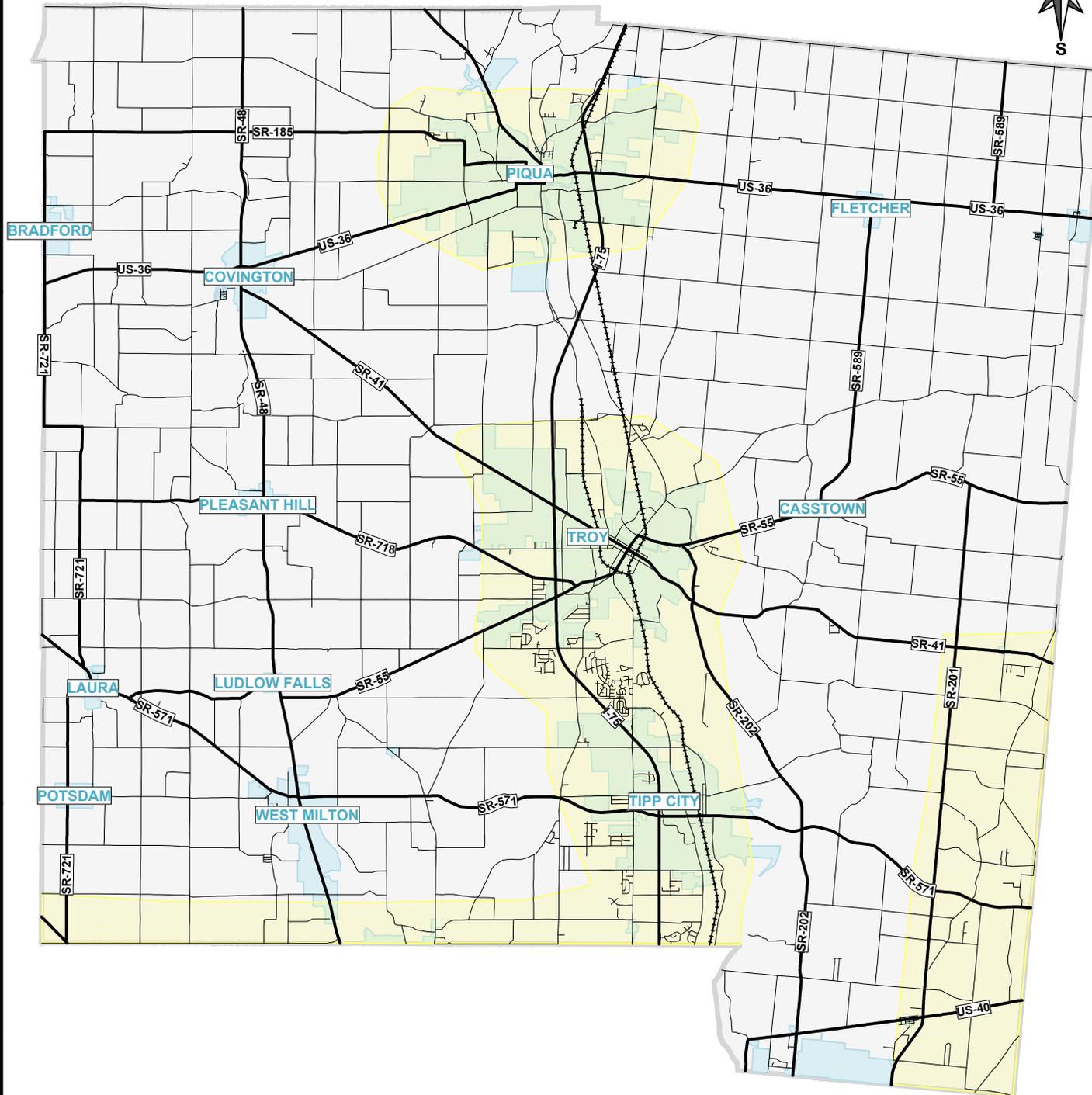
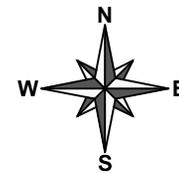
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000 FEET 0 16,000

# MIAMI COUNTY TERRORISM HAZARD



## 2.14 Utility/Communication Failures

### Overview

With technology dependence, many residents, industries, and businesses rely on uninterrupted utilities and communications.

A utility or communication system failure can result from numerous causes including severe weather such as flooding, wind, lightning, ice, and heavy snow. Outages can also be caused by large demands on systems during extreme hot and cold weather events. Falling limbs or trees, poorly maintained poles and infrastructure, and even small animals climbing the lines can cause a shorting out of power supply. Outages also can occur due to technological failures, loss of power poles, accidents, and excavation errors as well as others.

### Risk Assessment

The public has become more and more dependent on technology, communications, and power and are more demanding of uninterrupted communication and services. The loss of utilities or communications can be widespread or affect only limited areas. Long periods of outages have an economic and social impact to residents, businesses, and industry. Loss of utility services can include water, sanitary sewer, gas, electric, cable television, telephone, communication devices, and alarm systems.

Many of the utility providers have become more centralized and are more dependent on technology. The centralization of services tends to create longer response time for repair crews. Extended loss of utilities and communications can cause considerable losses to Miami County residents as well as county businesses and industries. A loss of heat source or air conditioning can be an issue with the elderly or those with special needs. This is of particular concern during prolonged outages. With the technological advances of equipment, residents with special needs can be more independent and reside in their homes. Therefore, loss of power can adversely affect residents that utilize power for the use of their medical equipment. Loss of power can cause critical situations with water and sanitary services for villages that do not have emergency back-up power for pumping stations and well operations.

Smaller scale and shorter periods of utility and communication failure generally occur several times annually. The severe windstorm that occurred with Tropical Storm Ike on September 14, 2008, allowed many Miami County residents to experience power outages for up to five days. The problems experienced with this prolonged outage have increased awareness and needs to plan for such events. With the recent prolonged high wind event, the probability of such events has been changed from low to moderate. Efficient and effective communication systems and operable utilities are vital resources for First Responders and for critical facilities. The increasing need and use of back-up power generators can help mitigate these impacts. Further research and documentation is needed regarding the countywide effects of this secondary hazard.

Until further research information is available, it is assumed all areas of Miami County would be equally vulnerable to this hazard.

**Location**

Utility/Communication outages can occur anywhere within the County. Although no one area of the County appears to be more susceptible than another there are numerous factors that can influence loss of power. Power and communication lines that are near trees can be downed by falling limbs; older poles and power lines are more susceptible for failure; and the type of power failure such as technological or weather related failure all have an impact on the location and length of the outage.

**Vulnerability Analysis & Loss Estimation**

Many of the damages associated with utility and communication failures are associated with long term outages. Extended periods of loss of power or communications can adversely affect businesses and industries as well as the residents of the county. Productivity losses or changes to delivery schedules can amount to large financial losses. Health and safety needs are also compromised particularly for those that do not have emergency backup power or alternate methods of communication. Further study is needed to more accurately evaluate the anticipated financial estimated losses from Utility/Communication Failure events. Loss for such an event and potential structural loss are anticipated to be low; content loss moderate, but structure function use loss high.

**Mapping**

See the Utility/Communication Failures Map for a graphical representation of the hazard risk for Miami County.

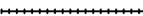
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  MODERATE HAZARD
-  LOW HAZARD
  
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

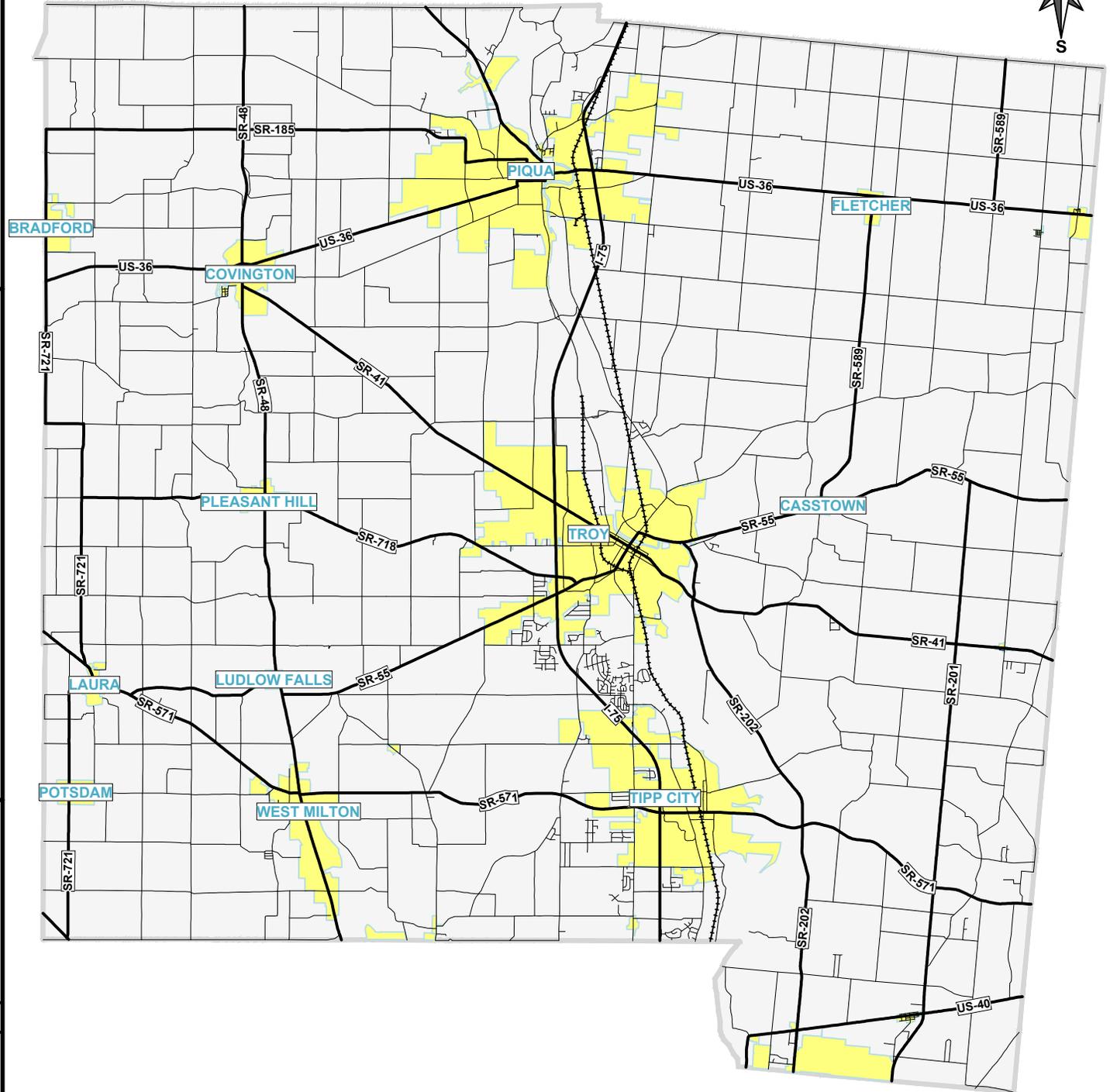
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000    FEET    0    16,000

# MIAMI COUNTY UTILITY / COMMUNICATIONS FAILURES



## 2.15 Hazardous Materials Incident

### Overview

Hazardous Materials (HAZMAT) – These are defined as explosive, flammable, combustible, corrosive, oxidizing, toxic, infectious, or radioactive materials that, when involved in an accident, and released in sufficient quantities, will place a segment of the general public in immediate danger from exposure, contact, inhalation, or ingestion.

Hazardous Materials Incident – These are incidents involving either the release or potential release of a hazardous material as the result of accidental spills, leaks, or released airborne hazardous materials at transportation or fixed facilities.

Hazardous substances fall under two definitions:

Health Hazard – Means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur if exposed. Hazardous materials can enter the body in one of four ways. The four routes of entry include inhalation, ingestion, injection, and skin absorption.

Physical Hazard – Means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed liquid, a compressed gas, explosive, flammable, an organic oxide, an oxidizer, pyrophoric (ignites spontaneously), unstable (reactive), or water reactive.

### Risk Assessment

Hazardous materials incidents are a significant man-made hazard in Miami County. Hazardous materials in various forms have the potential to result in death, serious injury, long lasting health effects, and damage to buildings, homes, and other property. However, the hauling, storage, and use of hazardous materials play a vital role in the economy of the nation. These materials are stored and handled at fixed facilities and are transported over highways, railways, and water transportation systems.

According to the Local Emergency Planning Committee (LEPC), there are numerous hazardous materials sites within the County. There are also large quantities of hazardous materials transported annually by trucks on the country's highways each day. Almost half of all freight trains carry hazardous materials. Ohio is a crossroads state into which, through which, or out of which travels virtually every one of the 50,000 chemicals known to be manufactured in the United States. There are many hazardous materials shipments per day on the highways across the state. According to the Miami County LEPC the most probable site for a hazardous materials incident in Miami County would be the villages and cities where industries that use hazardous materials and areas where transportation routes cross. Hazardous materials incidents do not follow any seasonal pattern and could occur at any time of the year. An incident causing the accidental release of a hazardous material is spontaneous, with little time for warning. For this reason, evacuation procedures at large industrial/commercial sites and evacuation routes should be identified

and made known to the employees and the public as a mitigation action. Further, the recovery and clean-up activities involved in a hazardous materials incident may require several hours, days, or even weeks to complete.

Because the vulnerability for a hazardous materials incident to occur in Miami County can happen, the Miami County LEPC completed a countywide hazardous materials railroad and truck survey during the months of March and April 2009. The most dramatic illustrated hazardous material area incident, which occurred in adjacent Montgomery County, Ohio, was the 1986 train derailment in Miamisburg. Approximately 5,000 gallons of phosphorus were spilled which prompted the evacuation of 30,000 people.

The Miami County survey allowed LEPC officials the opportunity to gather data and identify the seven most common carried chemicals by railcars or trucks. The data was broken down per location and time of day. This survey has helped the County planning efforts in better understanding the types of chemicals and the frequency of hazardous chemicals being shipped through Miami County by rail and roadway. The major transportation corridors of the CSX Railroad, I-75, US Route 36, State Route 41, and 571 were observed and surveyed.

### **Location**

Hazardous materials incidents are most likely to occur along the CSX Railroad route throughout the County along I-75 and US Route 36 or at one of the industry sites where hazardous materials are stored and used.

### **Vulnerability Analysis & Loss Estimation**

Miami County is susceptible to hazardous material incidents because of the arterial routes and railway system in the County, as well as the commercial truck traffic on US Route 36, Interstate 75, and Interstate 70. Because of the complexity and limited information on a hazardous materials incident no loss estimates have been prepared at this time.

### **Mapping**

See the Miami County Hazardous Materials Incident Map for a graphical representation of high-risk areas with regard to hazardous materials incidents.

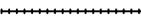
### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  MODERATE HAZARD
-  LOW HAZARD
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: [info@moteassociates.com](mailto:info@moteassociates.com)  
Website: [www.moteassociates.com](http://www.moteassociates.com)

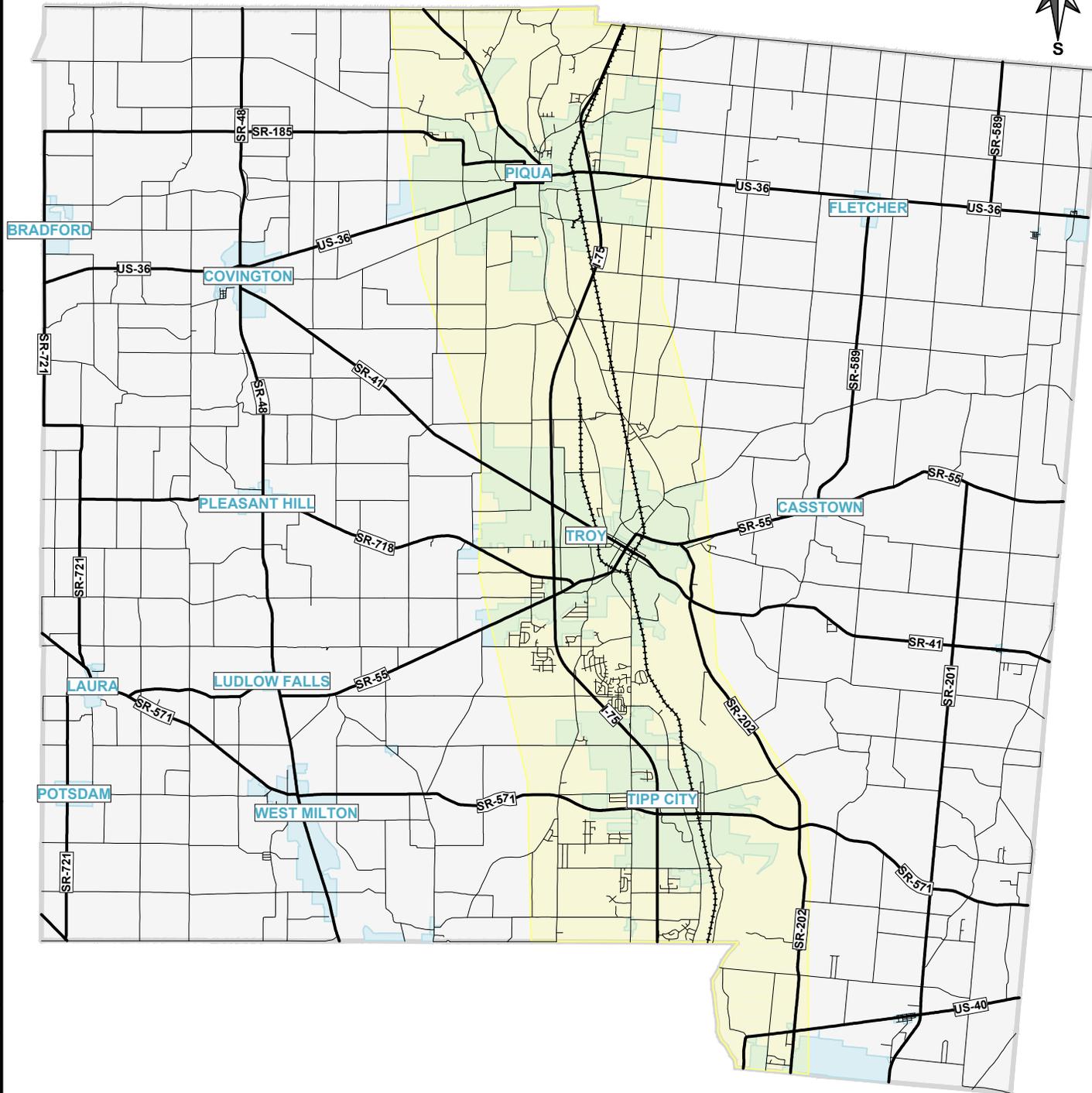
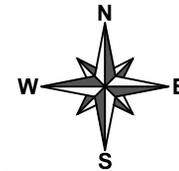
DRAWN BY: SMK      DATE: 8/9/11

SCALE: 1" = 16,000'



16,000 FEET 0 16,000

# MIAMI COUNTY HAZARDOUS MATERIALS INCIDENT



## **2.16 Transportation Accident**

### **Overview**

Transportation accidents occur frequently in the United States and are caused by several factors. These accidents involve all types of vehicles including cars, trucks, trains, boats, and airplanes. Transportation accidents interrupt commercial and industrial operations and pose a very high risk for human injury or death.

Transportation accidents are reoccurring hazards in Miami County. Transportation accidents involving cars and trucks are frequent occurrences on our nation's highways, including Miami County's 154 miles of state highway and large segment of Interstate I-75. These types of accidents, commonly known as "car wrecks" or "car crashes" occur almost exclusively on roadways.

Other transportation accidents such as train derailments or airplane accidents are much less frequent. The risk associated with these accidents is just as eminent as roadway accidents. Miami County is particularly susceptible to these less-frequent hazards as the County does contain railroads which run through the center of the County. In addition to the miles of roadways and railways, Miami County is near to the Wright Patterson Air Force Base and two commercial airports.

### **Risk Assessment**

Transportation accidents often interrupt commercial and industrial operations delaying deliveries, damaging freight, etc. These accidents pose a substantial threat of causing human injury or death as well. These accidents occur quickly and without warning. The recovery or clean-up period following a transportation accident may take as little as a few minutes or as long as several days.

According to the 2010 Ohio Department of Development – County Profiles, there are 122,265 registered motor vehicles in Miami County. There are approximately 50,000 people that commute daily to work in the County, 38% of those (19,000) spend 15 to 30 minutes one way on the road per day, with another 7,546 people traveling 30 to 44 minutes one way. The high number of vehicles on the road combined with the amount of time spent on the road, especially during adverse driving conditions, increases the probability for traffic accidents.

### **Past Occurrences**

According to an article taken from a February 20, 2003, issue of the Dayton Daily News, an accident which occurred in 1990 was said to be one of the worst traffic accidents in Ohio. When the blowing snow subsided, the visibility improved, and the smoke cleared, 9 people were dead and 56 persons were injured. The collision included 38 vehicles which had been damaged or destroyed. The accident occurred at 4:05 P.M. on Saturday, February 24, 1990, on Interstate I-75 about a half mile south of Ohio State Route 571 at Tipp City in Miami County.

On October 9, 2010, a 16-year old Amish boy was seriously injured in a horse and buggy-automobile accident in Miami County. Miami County had a total of 2,711 reported accidents in 2008. Seven of these accidents were fatal.

**Location**

See Miami County Fatalities Location Map on the following page for locations of the 2008-2010 reported fatalities within Miami County.

**Vulnerability Analysis & Loss Estimation**

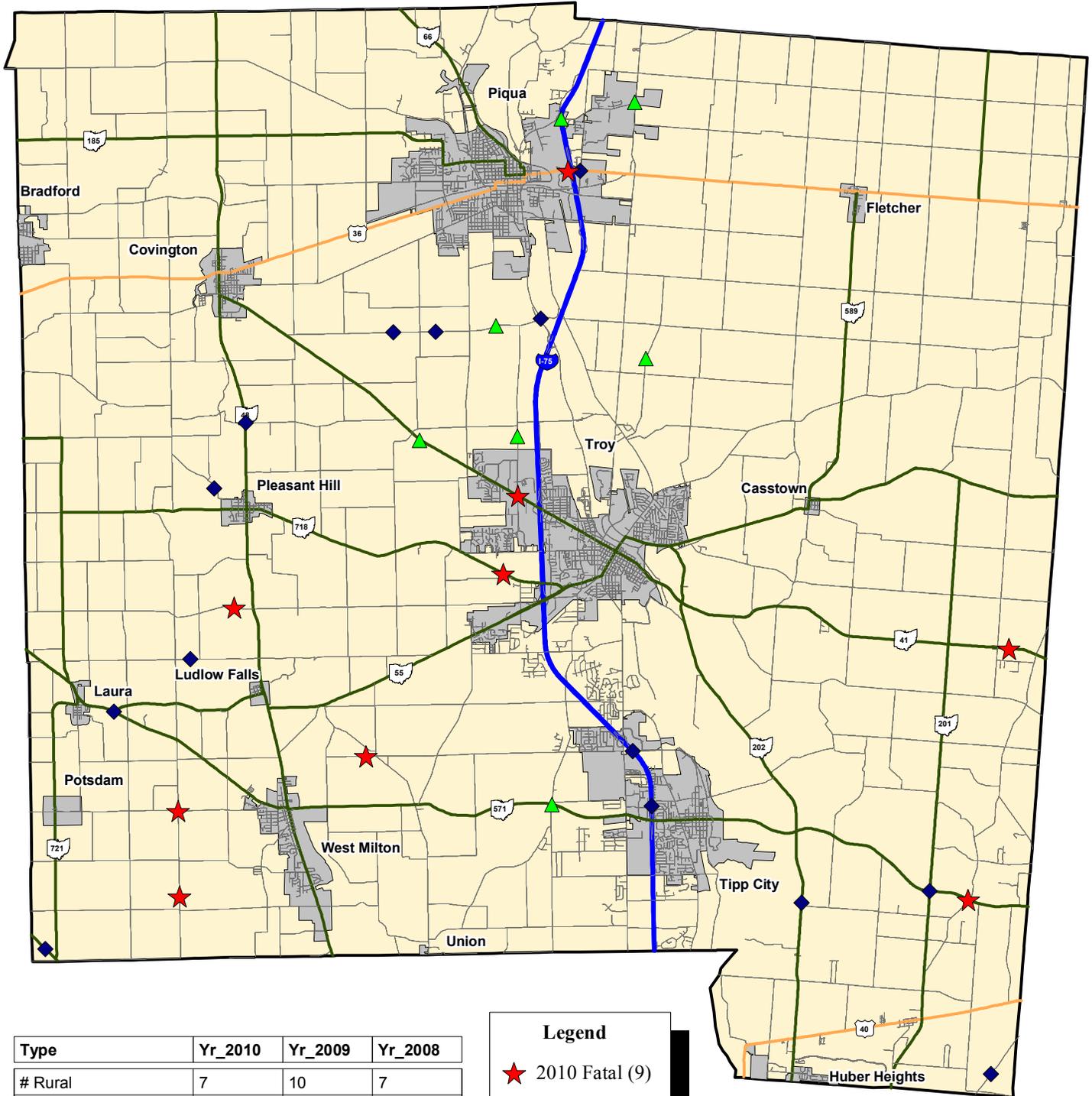
Miami County contains 19.95 miles of US Interstate 75, as well as approximately 154 miles of state highway, 1,010 miles of County roadway, two commercial airports, and railways. According to the 2010 Ohio Department of Development, Miami County Profile, there are 122,265 registered motor vehicles in the county, which does not include the commercial trucks and non-resident traffic that is on the County's highways daily, which increases the probability of an accident occurring.

According to the Ohio Department of Public Safety, in 2010 Miami County had 2,810 enforcement stops, 196 vehicle crash investigations, and nine reported fatal crashes. Of the fatalities, seven occurred on rural roads and two on urban roads; of these, two were OVI related and there was one motorcyclist fatality reported.

**Mapping**

See the Miami County Transportation Accident Map for a graphical representation of the hazard risk areas based on vehicle traffic count of highways when considering transportation accidents.

# Miami County Fatal Traffic Crashes 2008 to 2010 YTD



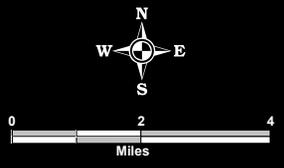
Type	Yr_2010	Yr_2009	Yr_2008
# Rural	7	10	7
# Urban	2	4	0
# OVI Related	1	3	4
# Commercial Related	2	2	0
# Motorcycle Related	1	2	1

**Legend**

- ★ 2010 Fatal (9)
- ◆ 2009 Fatal (14)
- ▲ 2008 Fatal (7)



Data Source: OSHP LINC Database  
 Map Design and Layout: OSHP Statistical Analysis Unit  
 Ohio State Highway Patrol  
 December 6, 2010





## 2.17 Dam/Levee Failure

### Overview

Dam failures are often referred to as disasters. A dam is a barrier built across a waterway to control the flow or raise the level of water. A dam failure occurs when the barrier constructed across the waterway fails or otherwise does not obstruct or restrain the flow of water, which can rapidly result in a large area of completely inundated land.

### Risk Assessment

Several methods of research identified dam failure as a hazard in Miami County. There are about 80,000 dams in the United States, the majority of which are privately owned. Others are owned by state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous; they provide water for drinking, navigation, and agricultural irrigation, and save lives by preventing or reducing floods. General information on dam failures was obtained from the following sources, and Internet sites.

- Ohio Department of Natural Resources Division of Water  
[www.dnr.state.oh.us/water](http://www.dnr.state.oh.us/water)
- HAZUS Instruction and Technical Information  
[www.fema.gov/hazus](http://www.fema.gov/hazus)

Because many dams exist in Miami County, the MCHMC chose to profile this hazard in the Miami County Hazard Mitigation Plan.

Dams are man-made structures designed to obstruct or restrain waters that may cause downstream flooding. These structures are generally made with concrete or earthen materials. The failure of these dams, although a man-made structure, would result in a natural event of flooding. There are currently 13 total dams in Miami County. Of those dams, three are Class I, six are Class II, and four are Class III. There is no record of any Class IV dams in Miami County. Dams are classified under two conditions, height and storage, as illustrated in the charts at right. The height of a dam is defined as the vertical dimension (as measured from the natural streambed at the downstream toe of a dam to the low point along the top of the dam). The storage volume of a dam is defined as the total volume impounded when the pool level is at the top of the dam immediately before it is overtopped. According to the Ohio Department of Natural

Height of Dam	
Class I	Greater than 60 feet
Class II	Greater than 40 feet
Class III	Greater than 25 feet
Class IV	Less than or equal to 25 feet

Storage Volume	
Class I	Greater than 5000 acre-feet
Class II	Greater than 500 acre-feet
Class III	Greater than 50 acre-feet
Class IV	Less than/equal to 50 acre-feet

Resources, the damage predicted by a dam failure coincides with the class of the dam. The potential downstream hazards are defined as the resultant downstream damage should the dam fail, including probable future development.

The potential downstream hazards are broken into four (4) classes.

<b>POTENTIAL DOWNSTREAM HAZARDS</b>	
<b>Class I</b>	<b>Probable loss of life, structural damage to high value property (i.e. homes, industries, major public utilities).</b>
<b>Class II</b>	<b>Flood water damage to structures (no loss of life envisioned), damage to state and interstate highways, railroads, only access to residential areas.</b>
<b>Class III</b>	<b>Damage to low value non-residential structures, blocked roads, crops, and livestock.</b>
<b>Class IV</b>	<b>Losses restricted mainly to the dam.</b>

Uncontrolled floodwaters are one of the most powerful and destructive forces in nature. Dams that are not designed to withstand major storms may be destroyed, increasing flood damage downstream.

The potential for damage due to dam failures increases along with the increased number of residential and commercial development downstream of dams. In many cases, existing dams will need to be modified to keep downstream areas safe from disasters resulting from catastrophic flooding.

### **Location**

Miami County contains several dams which could present the possibility of significant flood damage to the residents and businesses located near or downstream from the dams. In many cases, the dams are less than five miles away from the nearest community. There are three Class I dams in the county, all of which are located near the City of Piqua; two are public recreation dams and the other serves as a water supply dam. These dams are located on Swift Run Creek or tributaries of Swift Run.

There are also three dams located near Tipp City. Two are Class II dams and one is a Class III. All are privately owned and are of earth-fill construction.

There are three types of failures of earthen dams: overtopping, seepage, and structural failure. Overtopping failures result from the erosive action of water on the embankment. Erosion is due to uncontrolled flow of water over, around, and adjacent to the dam. Earth embankments are not designed to be overtopped and therefore are particularly susceptible to erosion. Once erosion has begun during overtopping, it is almost impossible to stop.

All earth dams have seepage resulting from water percolating slowly through the dam and its foundation. Seepage must, however, be controlled in both velocity and quantity. If uncontrolled, it can progressively erode soil from the embankment or its foundation, resulting in rapid failure of the dam. Erosion of the soil begins at the downstream side of the embankment; (either in the dam proper or the foundation) progressively works toward the reservoir, and eventually develops a "pipe" or direct conduit to the reservoir. Seepage

can cause slope failure by creating high pressures in the soil pores or by saturating the slope.

Structural failures can occur in either the embankment or the appurtenances. Structural failure of a spillway, lake drain, or other appurtenance may lead to failure of the embankment. Cracking, settlement, and slides are the more common signs of structural failure of embankments. Large cracks in an appurtenance or the embankment, major settlement, and major slides will require emergency measures to ensure safety, especially if these problems occur suddenly.

The three types of failures previously described are often interrelated in a complex manner. For example uncontrolled seepage may weaken the soil and lead to a structural failure. A structural failure may shorten the seepage path and lead to a piping failure. Surface erosion may result in structural failure and so on.

Minor defects such as cracks in the embankment may be the first visual sign of a major problem which could lead to failure of the structure. Officials experienced in dam design and construction should evaluate the seriousness of all deficiencies.

The Lockington Dam, upstream from the City of Piqua in Shelby County, in the spring of 2010 underwent a \$3,700,000 Dam Safety Initiative (DSI) as a part of the Miami Conservancy Districts (MCD) to address vulnerabilities such as under seepage. Under seepage has already been addressed with relief wells, toe berms, and drainage systems for Germantown, Taylorsville & Huffman Dams south of Miami County.

The following table lists the dams in Miami County along with names, classifications, and owners.

Name of Dam	Classification of Dam	Owner of Dam
Piqua Dam	Class I	City of Piqua
Piqua Dam	Class I	City of Piqua
Lake Dam	Class I	City of Piqua
Low Head	Class II	Milton
Head Dam	Class II	City of Troy
Wildlife Dam	Class II	State of Ohio
Bradford Sewage Dam	Class II	Bradford
Bradford Sewage Dam	Class II	Bradford
Golf Course Dam	Class II	Private Golf Course
Matsushita Dam	Class III	Association Inc.
Head Dam	Class III	City of Piqua
Lee R. Healey Dam	Class III	Lee R. Healey
William Brewer Dam	Class III	William Brewer

**Probability of Future Occurrence**

Miami County does not have a history of any dam failure. The State of Ohio Dam Safety Program is in place to monitor and provide dam owners in Miami County pertinent information to support their dam's maintenance requirements. The Dam Safety Program regulates the construction, operation, and maintenance of Ohio's dams, dikes, and levees to protect life and property from damages due to failure. Periodic inspections, new dam construction permits, and regulation of improvements, maintenance and operation of existing dams are provided through the Dam Safety Program. The probability of future dam failure occurrences is low, however, the likelihood of severe damage if a Class I or potentially a Class II Dam were to fail is determined on a case by case basis.

**Vulnerability Analysis & Loss Estimation**

There are three Class I Dams in Miami County, all of which are located near the City of Piqua. The City has been requested to perform a dam inundation study for all three of the Class I Dams to determine the vulnerability and loss estimation should a dam failure occur. Based on current information, the chances of a dam failure within the County are anticipated to be low to moderate.

**Mapping**

See the Miami County Dam Failure Map for a graphical representation of the hazard areas with regard to dam locations and failure.

### VICINITY MAP

NO SCALE



STATE OF OHIO

### MAP LEGEND

-  LEVEE
-  DAM
-  RIVER / STREAM
-  LAKE / POND
-  MAJOR ROADWAY
-  MINOR ROADWAY
-  ACTIVE RAILROAD
-  CITY / VILLAGE
-  COUNTY

 **Mote & Associates, Inc.**  
ENGINEERING, LAND SURVEYING

Address: 214 West Fourth Street  
Greenville, OH 45331  
Phone: (937)-548-7511  
Fax: (937)-548-7484  
Email: info@moteassociates.com  
Website: www.moteassociates.com

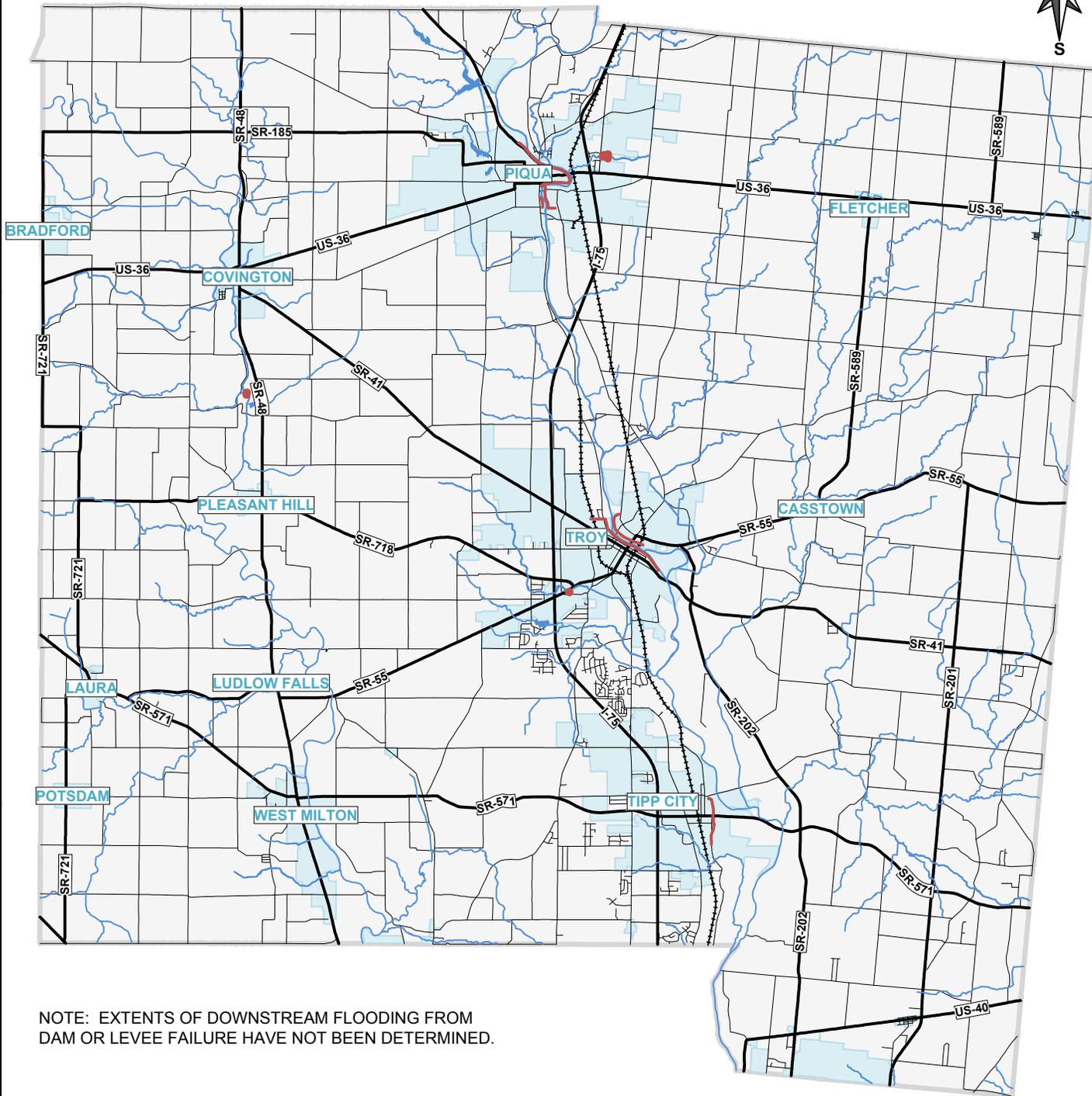
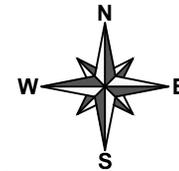
**DRAWN BY:** SMK    **DATE:** 8/9/11

**SCALE:** 1" = 16,000'



16,000 FEET 0 16,000

# MIAMI COUNTY DAM & LEVEE FAILURE



NOTE: EXTENTS OF DOWNSTREAM FLOODING FROM DAM OR LEVEE FAILURE HAVE NOT BEEN DETERMINED.

## **2.18 Addressing Repetitive Loss Structures**

The Miami County cities of Piqua, Tipp City and Troy and the villages of Covington, Fletcher, Laura and West Milton are listed as participating in the Natural Flood Insurance Program (NFIP).

Under the NFIP Repetitive Loss Structures are those for which two or more losses of at least \$1,000 each have been paid under the NFIP within any ten-year program since 1978. In Miami County there are seven properties that are known to be repetitive loss structures. Three are located in the unincorporated areas and have had a total of nine losses. Total building payments have been \$164,342.23. Total content payments have been \$58,053.30 for a total payment amount of \$222,395.53. Four are located with the incorporated area of the City of Troy and have had a total of nine losses. Total building payments have been \$150,426.64. Total content losses have been \$25,500.05 for a total payment of \$175,926.69. The total of all repetitive loss structures in Miami County is \$398,322.22. This information is based on information found in the January 2011 State of Ohio Enhanced Mitigation Plan. There are no severe repetitive loss structures located within the County.

Miami County, including the City of Troy and Concord Township, has been very proactive in preserving the areas within and along the floodplains as natural corridors. From 2000 to 2010 numerous buildings have been purchased and razed within the floodplain along the Miami River at the north end of Troy and within Concord Township. This area is being developed as a "Recreational Trail" Bike Path corridor which includes the new Barbee Park and plans for a future canoe launch area. Future development in these areas include protecting and preserving the natural and beneficial floodplain functions which yield mitigation benefits while helping to integrate floodplain management efforts with other community goals and objectives.

## **2.19 Asset Inventory**

### **Overview**

The Hazard Mitigation Committee secured the help of the County Fire Department Districts to help update the inventory of critical facilities, transportation systems, lifeline utility systems, communication systems, and historic cultural and natural resource areas located in their fire District of Miami County. The fire district personnel were also asked to obtain building data and property values. This Hazard Mitigation Committee was then able to use this data to:

- Determine which critical facilities and structures are susceptible to property damage.
- Determine potential dollars lost based on various levels of damage on different categories and structures
- Evaluate the impact on infrastructure and the municipal or county population.
- Evaluate the amount of property loss, loss of life and the economic impact.

The list of each community's assets and critical facilities are included within this section.

### **Asset Inventory Methodology**

#### **Critical Facilities**

Members of each district fire department were asked to compile a list of critical facilities for their community (including schools, government buildings, hospitals, water and wastewater treatment plants, airports, energy services, nursing and assisted living facilities, churches, day care facilities, large assembly facilities and large outdoor event facilities. Also requested were community assets such as libraries, museums, historical sites.

#### **Potential Dollars Lost**

The second step of the vulnerability assessment process was to calculate the impact for each of the hazards in terms of property damage and loss of property use. Averages of these costs were estimated based on various categories of facilities. This type of analysis did not predict which facilities were likely to be struck by which hazard, but instead provided a general estimate of the level of damage that would be expected based on available data. The process was as follows:

1. Value of property being damaged was determined based on market value as determined by the County Auditor's data and contents value was calculated as a percentage of the structure's value.

**Table “A”**  
**Contents Value as a Percentage of Structure Value**

<b>Occupancy Class</b>	<b>Value (%)</b>
Residential	50%
Commercial	100%
Industrial/Utility	150%
Medical Facilities	150%
Emergency Services	150%
General Government	100%
Schools/Libraries	100%
Colleges/Universities	150%
Religion/Non-profit	100%
Shelters	100%
Agricultural	100%

The above values are as recommended by FEMA guidance documents.

- Levels of damage were evaluated for each category of structure. These levels were assigned a percentage of damage associated with each hazard. There could be additional lost revenue from “down time” for a facility which was not estimated.

#### Slight Damage

A value of 5% of the structure’s market value was used. (No contents losses were assessed with light damage).

#### Moderate Damage

More serious damage which was calculated at 25% of the structure’s market value contents damage used were as per Table “A”

#### Extensive Damage

The building is heavily damaged and the average dollar figure for this category was calculated at 75% of the structure’s market value. Contents were as per Table “A”.

Table “B” below shows the calculated dollar losses for each level of damage per the type of facilities. The market value determination was determined by taking the total market value of each category and dividing them by the number of parcels for that property category type (i.e. residential, commercial, industrial, and agricultural). It was not possible to determine vacant parcels at this time.

**Table “B”****Potential Dollar Losses Per Property Type**

<b>Property Type</b>	<b>Average* Market Value</b>	<b>Slight Damage 5%</b>	<b>Moderate Damage 25%</b>	<b>Extensive Damage 75%</b>
Residential	96,470	4,824	24,118	72,353
Commercial	230,912	11,546	57,728	173,184
Industrial	554,979	27,749	138,745	416,234
Agricultural	112,531	5,627	28,132	84,398
Utility	243,525	12,176	60,881	182,644

\*Does not include land value

**Vulnerability: Collection of Data**

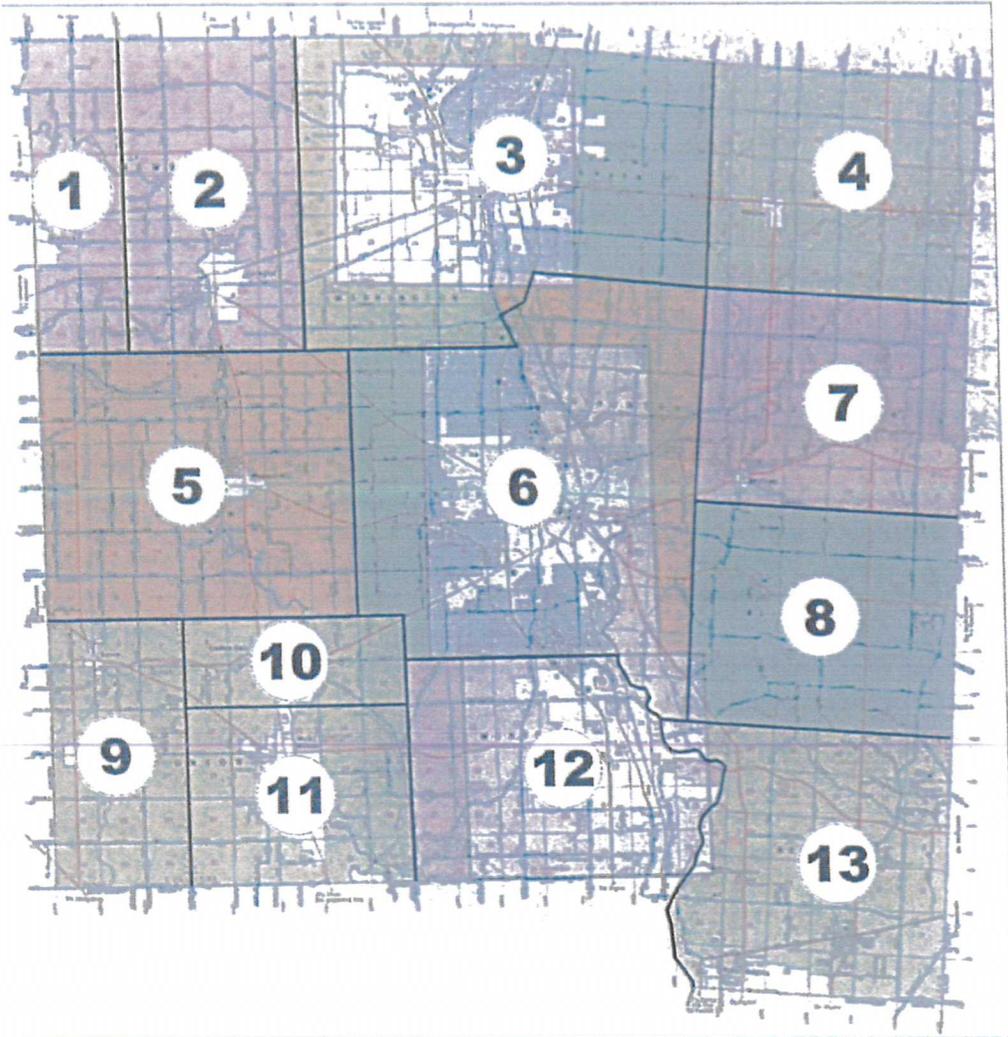
The National Climate Data Center NCDC was used to help assess existing hazards that have affected Miami County. In addition existing local information sources were also used when accessible. For earthquakes, the Ohio Seismic Network data was utilized. In some instances the Miami County Hazard Mitigation Committee used their experience to collect needed information regarding local events in order to help prioritize the hazard information.

**Vulnerability Assessment Process**

The Vulnerability Assessment Process is addressed under each specific identified hazard listed within this section. A summary of the critical facilities within Miami County have been provided by the Miami County Fire Department Districts and are shown in the following table:

<b>Critical Facilities in Planning Area</b>	
<b>Property</b>	<b>Count</b>
Airports	2
Police/EMS/Fire	23
Schools/Churches	59
Water/Wastewater	33
Government	20
Extended Care Facilities	6
Hospitals	1
Red Cross Facility	1
Utilities	15
<b>Total Critical Facilities</b>	<b>160</b>

# Miami County Fire Department Districts



## Map Legend

- 1.) Bradford Fire Department
- 2.) Covington Fire Department
- 3.) Piqua Fire Department
- 4.) Fletcher Fire Department
- 5.) Pleasant Hill Fire Department
- 6.) Troy Fire Department
- 7.) Casstown Fire Department
- 8.) Elizabeth Twp Fire Department
- 9.) Laura Fire Department
- 10.) Ludlow Falls Fire Department
- 11.) West Milton Fire Department
- 12.) Tipp City Fire Department
- 13.) Bethel Twp Fire Department

## **2.19 Updating Asset Inventory**

### **ASSET INVENTORY – VILLAGE OF BRADFORD**

#### **Methodology**

The methodology for the asset inventory of the Village of Bradford is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Bradford.

#### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Bradford and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Bradford and the Bradford Fire Department Jurisdiction.

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Bradford Fire Department  
Updated 2010  
Village of Bradford**

Name of Facility	Risk Assessment Category	Size of Facility	Estimated Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Bradford Fire & Rescue Services, Inc.	I	8,000 S.F. 1.88 Acres	36	\$800,000	X		200 South Miami Avenue Bradford, OH 45308	937-448-2054
Bradford Maintenance Garage	I	2,000 S.F.	1	\$190,000		X	115 North Miami Avenue Bradford, OH 45308	937-448-2718
Bradford Municipal Building	I	3,200 S.F.	20	\$366,000		X	115 North Miami Avenue Bradford, OH 45308	937-448-2718
Bradford Park Shelter	III	400 S.F.	50	\$90,000		X	Bradford, OH 45308	937-448-2718
Bradford Public Library	VI	6,300 S.F.	8	\$892,000			138 East Main Street Bradford, OH 45308	937-448-2612
Wastewater Plant/Government Bldg.	I	1,300 S.F.	1	\$468,000			11750 Klinger Road Bradford, OH 45308	937-448-2718
Water Treatment Facilities	I	2,500 S.F.	1	\$1,000,000	X		11755 Klinger Road Bradford, OH 45308	937-448-2718
Wise Street Sewer Lift Station	I	500 S.F.	—	\$218,000	X		Wise Street Bradford, OH 45308	937-448-7218
Bradford Exempted Village School District	II	107,000 S.F.	650	\$12,300,000			7500 State Route 721 Bradford, OH 45308	937-448-2770
Bridges	IV							
Roads	IV							
Railroads	IV							
<b>Risk Assessment Categories</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>		<b>VI</b>	
	Critical Facilities	Facilities with Substantial Hazards to Human Life	High Risk Event Locations	Transportation Considerations and Infrastructure	Special Needs		High Profile Community Locations/Assets	



## **ASSET INVENTORY – VILLAGE OF CASSTOWN**

### **Methodology**

The methodology for the asset inventory of the Village of Casstown is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Casstown.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Casstown and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Casstown and the Casstown Fire Department Jurisdiction.



## 7.) Casstown Fire Department



## **ASSET INVENTORY – VILLAGE OF COVINGTON**

### **Methodology**

The methodology for the asset inventory of the Village of Covington is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Covington.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Covington and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Covington and the Covington Fire Department District.

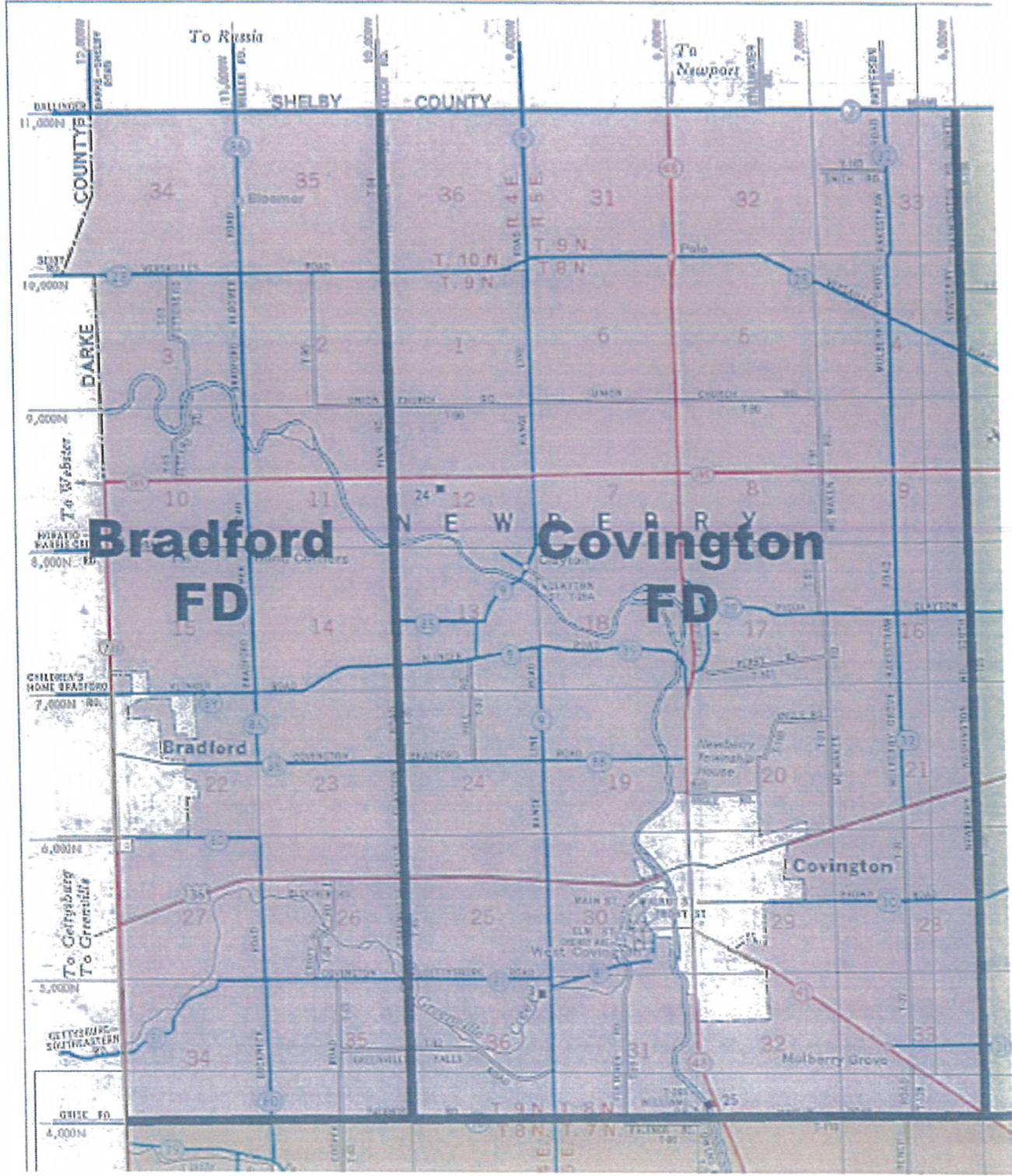
**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Covington Fire Department  
Updated 2010  
Village of Covington**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Covington Care Center	I	33,000 S.F.	130	\$6,700,000	X		75 Mote Drive Covington, OH 45318	937-473-2075
Covington Fire Department	I	16,600 S.F.		\$3,000,000	X		801 East Broadway Covington, OH 45318	937-418-8433
Covington Government Center and Police Department	I	10,800 S.F.	25	\$1,500,000	X		1 South High Street Covington, OH 45318	937-473-2102
Covington Elementary School	I	37,997 S.F.		\$7,466,968		X	707 Chestnut Street Covington, OH 45318	937-473-2249
Covington High School	I	52,675 S.F.		\$8,473,604		X	807 Chestnut Street Covington, OH 45318	937-473-2249
Covington Middle School	I	37,997 S.F.		\$8,429,506		X	25 North Grant Street Covington, OH 45318	937-473-2249
Covington Rescue Squad	I	10,000 S.F.		\$1,400,000	X		1000 Dick Minnich Drive Covington, OH 45318	
Covington Water Tower (East)	I	500,000 gallons	serves 2,600	\$1,400,000		X	938 East Walnut Street Covington, OH 45318	937-473-2103
Covington Water Tower (West)	I	100,000 gallons	serves 2,600	\$1,000,000		X	Maple Street Covington, OH 45318	937-473-2103
Covington Water Treatment Plant	I	6,350 S.F.	serves 2,600	\$4,500,000	X		123 West Wright Street Covington, OH 45318	937-473-2103
Covington Waste Water Plant	I	3 Acres	serves 2,600	\$5,000,000	X		200 West Bridge Street Covington, OH 45318	937-473-2103
DP&L Covington Sub Station	I	66,500 S.F.	0				Rangeline Rd. @ Greenville Falls, Covington, OH 45318	
Newberry Twp. Garage & Clerk's Office	I	5,580 S.F.		\$495,000		X	7835 Ingle Road Covington, OH 45318	937-473-2469
Pathway School, Inc.	I	9,710 S.F. on 3.025 Acres				X	6225 Farrington Road Covington, OH 45318	937-473-5436 937-473-5654 (h)
Vectren Energy Delivery	IV	900 S.F.	0				St. Rt. 41 & Wenrick St. Covington, OH 45318	800-920-9422
Mid-Valley Oil Pipeline Inc.	IV	16" diameter pipe	0				western Miami County	800-753-5531

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Covington Fire Department  
Updated 2010  
Village of Covington**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Fort Rowdy Museum	VI	2,200 S.F.				X	101 E. Spring Street Covington, OH 45318	937-473-2934
J. R. Clarke Public Library	VI	8,900 S.F.		\$2,500,000		X	102 E. Spring Street Covington, OH 45318	937-473-3543
<b>Risk Assessment Categories</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>		<b>VI</b>	
	Critical Facilities	Facilities with Substantial Hazards to Human Life	High Risk Event Locations	Transportation Considerations and Infrastructure	Special Needs		High Profile Community Locations/Assets	

- 1.) Bradford Fire Department
- 2.) Covington Fire Department



## **ASSET INVENTORY – VILLAGE OF FLETCHER**

### **Methodology**

The methodology for the asset inventory of the Village of Fletcher is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Fletcher.

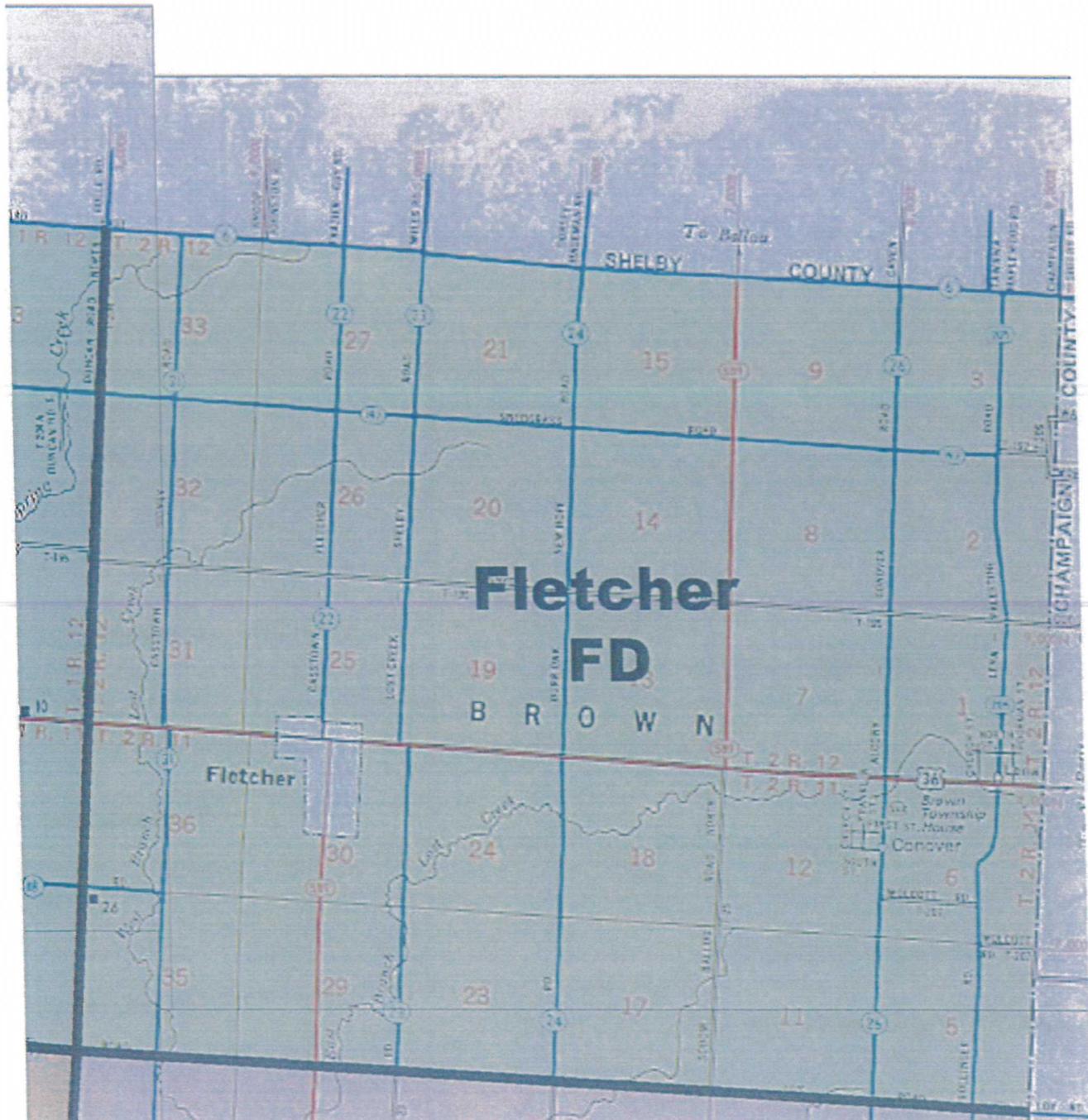
### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Fletcher and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Fletcher and the Fletcher Fire Department District.



#### 4.) Fletcher Fire Department



## **ASSET INVENTORY – VILLAGE OF LAURA**

### **Methodology**

The methodology for the asset inventory of the Village of Laura is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Laura.

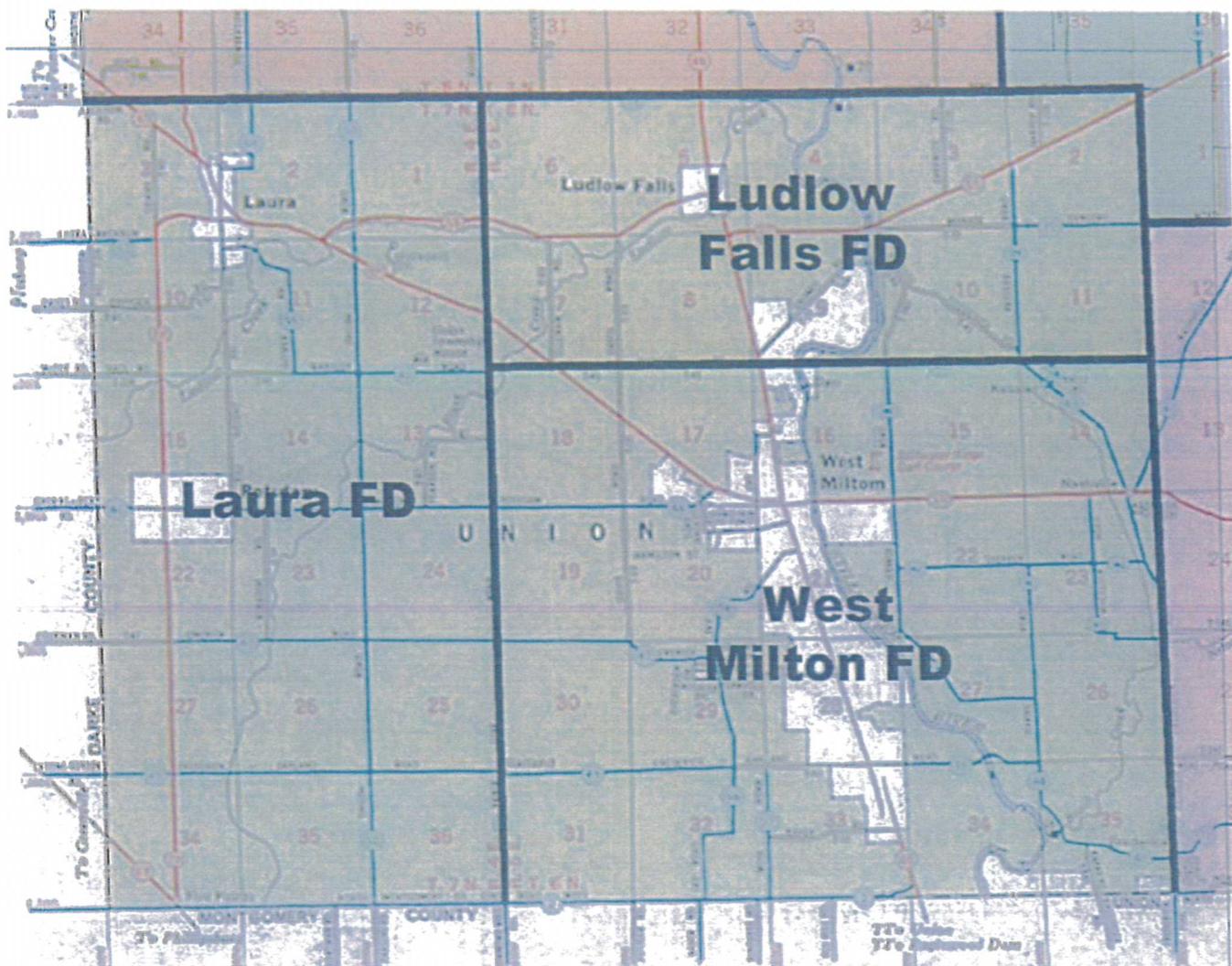
### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Laura and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Laura and the Laura Fire Department District.



- 9.) Laura Fire Department
- 10.) Ludlow Falls Fire Department
- 11.) West Milton Fire Department



## **ASSET INVENTORY – VILLAGE OF LUDLOW FALLS**

### **Methodology**

The methodology for the asset inventory of the Village of Ludlow Falls is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Ludlow Falls.

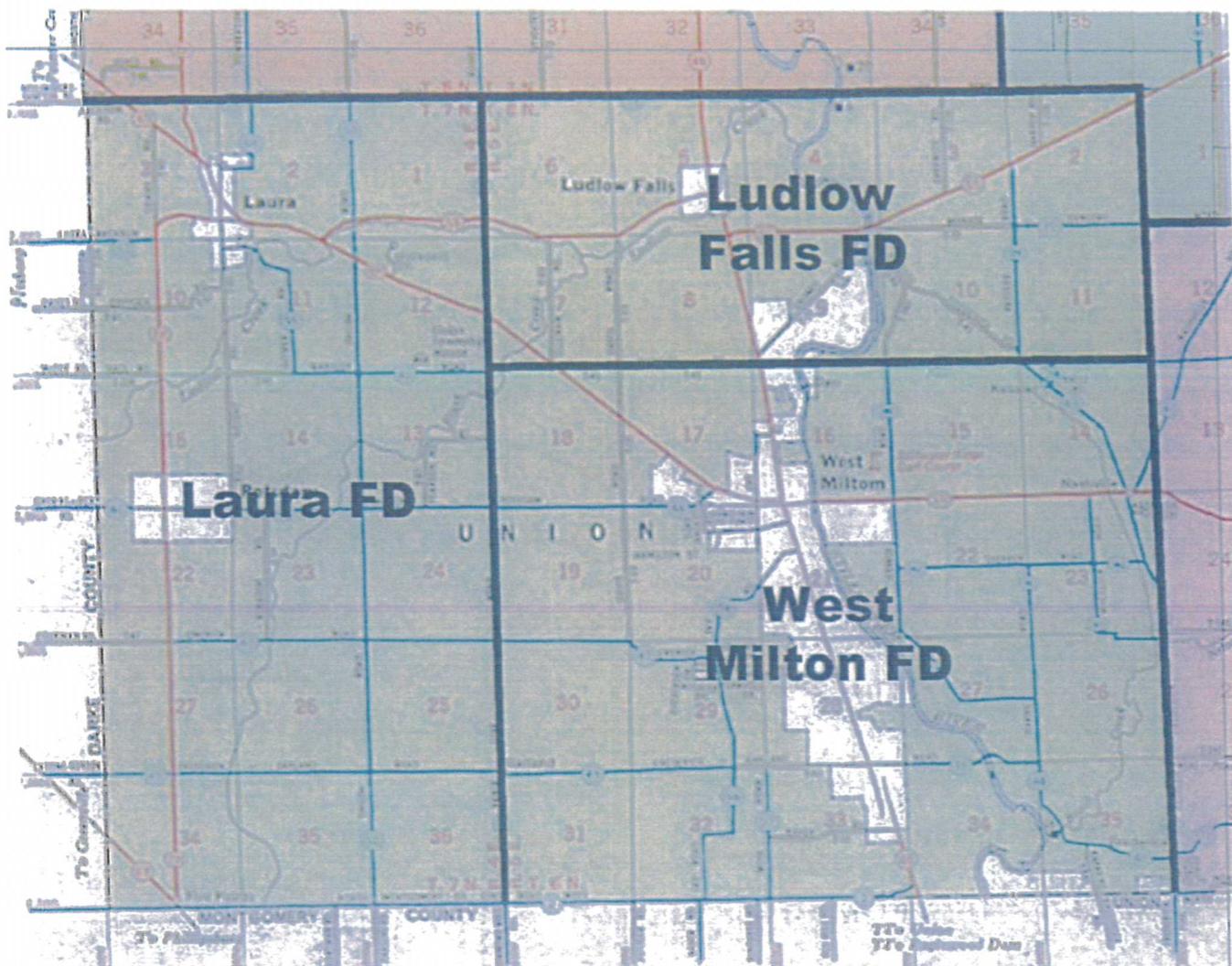
### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Ludlow Falls and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Ludlow Falls and the Ludlow Falls Fire Department District.



- 9.) Laura Fire Department
- 10.) Ludlow Falls Fire Department
- 11.) West Milton Fire Department



## ASSET INVENTORY – CITY OF PIQUA

### **Methodology**

The methodology for the asset inventory of the City of Piqua is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the City of Piqua.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the City of Piqua and the hazards to which these facilities are susceptible.

The following are assets located within the City of Piqua and the City of Piqua Fire Department District.

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
AT&T The Ohio Bell Telephone Co.	I	20,576 S.F.	2		X		630 W. High Street Piqua, OH 45356	937-227-7911
Echo (Cellular Tower)	I				X		441 S. College Street Piqua, OH 45356	800-852-2671
Heavy Equipment Storage	I	16,200 S.F.	17	\$914,085		X	859 S. Main Street Piqua, OH 45356	937-778-2095 937-606-0754 (c)
Hetzler Clean Water Pump	I	768 S.F.	0	\$30,000		X	8605 N. Hetzler Road Piqua, OH 45356	937-778-2090 937-606-0758 (c)
Municipal Government Complex	I	51,600 S.F.	100	\$10,698,000	X		201 W. Water Street Piqua, OH 45356	937-778-2072 937-606-0356 (c)
Piqua Decommissioned Reactor	I	143,168 S.F.	22	\$4,943,337		X	123 Bridge Street Piqua, OH 45356	937-474-8289
Piqua Fire Station	I	15,000 S.F.	15	\$5,199,039	X		229 W. Water Street Piqua, OH 45356	937-778-2015 937-606-0714 (c)
Piqua Race Street Pump Station	I	3-18" vertical pumps 11,000 gpm each				X	Water St. at Race St. Piqua, OH 45356	937-414-7012
Sewage Lift Stations	I		0	\$106,000		X	Candlewood Drive Piqua, OH 45356	937-773-2088 937-606-0604
Sewage Lift Stations	I		0	\$106,000		X	Eagles Lake Drive Piqua, OH 45356	937-773-2088 937-606-0604
Sewage Lift Stations	I		0	\$106,000		X	Maplewood Drive Piqua, OH 45356	937-773-2088 937-606-0604
Sewage Lift Stations	I		0	\$106,000		X	Orchard Drive Piqua, OH 45356	937-773-2088 937-606-0604
Sewage Lift Stations	I		0	\$106,000		X	Stratford Drive Piqua, OH 45356	937-773-2088 937-606-0604
Shawnee Pump Station	I	200 S.F. underground	0	\$557,000	X		100 First Street Piqua, OH 45356	937-778-2095 937-606-0754 (c)
Substation 1	I	2.3 Acres	4	\$11,184,100	X		919 S. Main Street Piqua, OH 45356	937-778-5140 937-606-0734 (c)
Substation 2	I	5,600 S.F.	0	\$172,000		X	135 S. Main Street Piqua, OH 45356	937-778-5140 937-606-0734 (c)
Substation 3	I	30,000 S.F.	0	\$575,000		X	N. Sunset Drive Piqua, OH 45356	937-778-5140 937-606-0734 (c)
Substation 4	I	1,000 S.F.	0	\$1,388,300		X	1005 S. Main Street Piqua, OH 45356	937-778-5140 937-606-0734 (c)

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Substation 5	I	1,188 S.F.	0	\$2,166,500	X		N. County Road 25A Piqua, OH 45356	937-778-5140 937-606-0734 (c)
Substation 6	I	10,000 S.F.	0	\$80,000		X	N. College Street Piqua, OH 45356	937-778-5140 937-606-0734 (c)
Swift Run Dam and Spillway	I	527 Acres	5,000			X	Piqua, OH 45356	973-778-2072 937-606-0356 (c)
The Dome/Associated Admin. Office	I	2.5 Acres	0	\$225,000		X	123 Bridge Street Piqua, OH 45356	937-778-5140 937-606-0734 (c)
Vectren Natural Gas Transmission Regulator Stations - Piqua #1	I	50' x 100'					East of Gordon, South of Hemm Road, Piqua	800-345-0962
Vectren Natural Gas Transmission Regulator Stations - Piqua #2	I	60' x 120'					West of Sunset Drive, North of St. Rt. 36, Piqua	800-345-0962
Waste Water Plant	I	2 Acres	20	\$2,871,403	X		121 Bridge Street Piqua, OH 45356	937-773-2088 937-606-0604
Water Tower (East)	I		0	\$1,312,810		X	1241 E. Ash Street Piqua, OH 45356	937-778-2090 937-606-0758 (c)
Water Tower (North)	I		0	\$540,000		X	615 N. Spring Street Piqua, OH 45356	937-778-2090 937-606-0758 (c)
Water Tower (South)	I		0	\$540,000		X	925 S. Main Street Piqua, OH 45356	937-778-2090 937-606-0758 (c)
Water Tower (West)	I		0	\$1,597,000		X	Robert M. Davis Parkway Piqua, OH 45356	937-778-2090 937-606-0758 (c)
Water Treatment Plant	I	2 Acres	8	\$4,436,000	X		9360 N. State Route 36 Piqua, OH 45356	937-778-2090 937-606-0758 (c)
Ziegler Clean Water Pump	I	768 S.F.	0	\$30,000		X	3050 Ziegler Road Piqua, OH 45356	937-778-2090 937-606-0758 (c)
A Learning Place	II	32,000 S.F.	540 - hall 120 - offices	\$6,000,000		X	201 RM Davis Parkway Piqua, OH 45356	937-778-5220
A.M. Leonard, Inc.	II	113,852 S.F. 10.252 Acres	125	\$9,100,000		X	241 Fox Drive Piqua, OH 45356	937-773-2694
Bent Tree Apartments	II		108 units	\$5,255,002		X	1240 E. Garbry Road Piqua, OH 45356	937-778-9155 937-396-9181 (c)
Buckeye Insurance Group	II		70	\$3,000,000	X		256 Looney Road Piqua, OH 45356	937-778-5000
Cinemark Miami Valley Center Movie Theatre	II, III	25,480 S.F.	1,271	\$4,700,000		X	1020 Garbry Road Piqua, OH 45356	330-933-0296

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Crayex Corporation	II	126,000 S.F.	35	\$21,550,000		X	1747 Commerce Drive Piqua, OH 45356	937-773-7000
Fort Piqua Plaza	II	60,000 S.F.	575	\$35,000,000		X	110-120 W. High Street Piqua, OH 45356	937-773-6753 937-773-7098 (h)
Fraternal Order of Eagles Aerie 614	II		499	\$1,500,000		X	301 Kienle Drive Piqua, OH 45356	937-570-7830
French Oil Mill Machinery Co. (The)	II	150,841 S.F. 8.23 Acres	56	\$18,000,000		X	1035 W. Greene Street Piqua, OH 45356	937-773-3420 ext. 286
Garbry Ridge Assisted Living	II	35,000 S.F.	60	\$4,950,000	X		1567 Garbry Road Piqua, OH 45356	937-778-9385
Hampshire Co. (The)	II	32,000 S.F.	34	\$1,500,000		X	9225 N. State Route 66 Piqua, OH 45356	937-773-3493 937-773-8579 (h)
Harmony Systems and Service	II	100,000 S.F. 10 Acres	95	\$2,800,000		X	1711 Commerce Drive Piqua, OH 45356	937-778-1082 937-367-8859 (c)
Hartzell Industries, Inc.	II	13,097 S.F.	18	\$2,564,000		X	1025 S. Roosevelt Avenue Piqua, OH 45356	937-418-7190 (c) 937-773-6034 (h)
Hartzell Industries, Inc.	II	58,968 S.F.	1	\$2,637,000		X	Corner Clark & Roosevelt Piqua, OH 45356	937-418-7190 (c) 937-773-6034 (h)
Hartzell Industries, Inc.	II	55,615 S.F.	2	\$2,218,500		X	710 S. Roosevelt Avenue Piqua, OH 45356	937-418-7190 (c) 937-773-6034 (h)
Heartland of Piqua	II, V	31,347 S.F.	100 bed	\$4,165,000	X		275 Kienle Drive Piqua, OH 45356	937-773-9346
Home Depot Store #3862 (The)	II	118,000 S.F.	150	\$22,624,961	X		1200 E. Ash Street Piqua, OH 45356	937-615-9606
Jackson Tube Service	II	400,000 S.F.	161	\$50,000,000		X	8210 Industry Park Drive Piqua, OH 45356	937-773-8550
Market Place Shopping Center	II	180,000 S.F.	22 tenants	\$25,000,000		X	1510-1598 Covington Ave. Piqua, OH 45356	513-315-7958
McDonald's Restaurant	II	4,000 S.F.	65	\$2,300,000		X	1546 Covington Avenue Piqua, OH 45356	937-778-8400
Miami County YMCA	II	66,000 S.F.		\$8,666,667		X	223 W. High Street Piqua, OH 45356	937-773-9622
Miami County YMCA - Richard E. Hunt Youth Center	II	5,000 S.F.		\$681,600		X	307 W. High Street Piqua, OH 45356	937-773-9622
Miami Valley Steel Service	II	309,000 S.F.	135	\$88,000,000	X		201 Fox Drive Piqua, OH 45356	937-773-7127

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Nicklin	II	14,050 S.F.	30	\$4,500,000		X	821 Nicklin Avenue Piqua, OH 45356	937-440-4515
Nitto Denko Automotive, Ohio, Inc.	II	105,103 S.F. 8.14 Acres	172	\$14,611,185		X	1620 S. Main Street Piqua, OH 45356	937-773-4820 ext. 201
OCCN	II	23,000 S.F.	75	\$6,000,000	X		280 Looney Road Piqua, OH 45356	937-440-4515
Orr Felt Company (The)	II	300,000 S.F.	50	\$73,912,000		X	750 S. Main Street Piqua, OH 45356	937-773-0551
Perfecto Industries, Inc.	II	50,000 S.F.	35	\$1,630,000		X	1729 W. High Street Piqua, OH 45356	937-778-1900 ext. 222
Piqua Battery	II	5,000 S.F.		\$517,000		X	115 Wood Street Piqua, OH 45356	937-773-3652
Piqua Emery Foundry	II	65,000 S.F.	35	\$4,970,000		X	821 S. Downing Street Piqua, OH 45356	937-773-4134 937-418-1480 (c)
Piqua Manor	II, V	37,000 S.F.	130	\$6,100,000	X		1840 W. High Street Piqua, OH 45356	419-704-6741
Piqua Senior Housing	II, V	82,074 S.F. 2.26 Acres	80 residents	\$4,000,000		X	316 N. College Street Piqua, OH 45356	863-453-8444
R K Hydro-Vac	II	16,400 S.F.	13	\$1,400,000		X	322 Wyndham Way Piqua, OH 45356	937-773-8600 937-305-4222 (c)
Rack Processing Company	II	36,000 S.F.	17	\$2,390,000		X	170 Fox Drive Piqua, OH 45356	937-773-0725
Red Carpet Inn	II	50 rooms	125	\$800,000		X	9060 Country Club Road Piqua, OH 45356	937-773-6275
Red Lobster Restaurant #706	II	4,935 S.F.	194	\$2,800,000		X	991 E. Ash Street Piqua, OH 45356	937-308-0300
Rehabilitation Center for Neurological Development	II	22,740 S.F.	60	\$2,100,000		X	1306 Garbry Road Piqua, OH 45356	937-773-7630 ext. 114
SafeHaven, Inc.	II	7,670 S.F.	255	\$1,098,050		X	633 N. Wayne Street Piqua, OH 45356	937-615-0126 ext. 202
<b>SCHOOLS:</b>								
Alexander Stadium	II		8,200	\$1,318,467		X	Indian Trail Piqua, OH 45356	937-773-4321
Alexander Stadium East Storage	II			\$61,080		X	Indian Trail Piqua, OH 45356	937-773-4321

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Alexander Stadium, Unattached Building - East Side	II		20	\$359,707		X	Indian Trail Piqua, OH 45356	937-773-4321
Alexander Stadium, Unattached Building - West Side	II		20	\$369,998		X	Indian Trail Piqua, OH 45356	937-773-4321
Bennett Intermediate	II	56,802 S.F. 1.27 Acres	302	\$7,360,333		X	625 S. Main Street Piqua, OH 45356	937-773-0386
Edison State Community College - Main Campus	II	240,000 S.F. 108 Acres	3,000	\$50,000,000		X	1973 Edison Drive Piqua, OH 45356	937-778-7878
Favorite Hill Primary	II	39,960 S.F. 7.6 Acres	298	\$5,848,421		X	950 South Street Piqua, OH 45356	937-773-4678
Greene Street United Methodist Church & Greene Street Daycare/Preschool	II		225	\$2,500,000		X	415 W. Greene Street Piqua, OH 45356	937-773-5313
High Street Primary	II	30,220 S.F. 6 Acres	270	\$4,066,251		X	1249 W. High Street Piqua, OH 45356	937-773-3567
Miami County YMCA - Alexander-Davis Childcare Center	II	8,000 S.F.		\$1,150,000		X	300 W. High Street Piqua, OH 45356	937-773-9622
Nicklin Learning Center	II	22,940 S.F. .86 Acre	305	\$3,241,495		X	818 Nicklin Street Piqua, OH 45356	937-773-4742
Piqua High School	II	118,224 S.F. 24 Acres	974	\$27,845,762	X		1 Indian Trail Piqua, OH 45356	937.773.6314
Piqua Junior High School	II	113,159 S.F. 24 acres	577	\$15,294,141	X		1 Tomahawk Trail Piqua, OH 45356	937-778-2997
Piqua Kids Learning Place	II	15,500 S.F.	125	\$2,000,000		X	285 RM Davis Parkway Piqua, OH 45356	937-778-5220
Springcreek Primary	II	39,949 S.F. 10.41 Acres	247	\$10,246,563		X	145 E. State Route 36 Piqua, OH 45356	937.773-6540
Staunton	II	16,428 S.F. 3.64 Acres	24	\$2,273,803		X	430 Staunton Street Piqua, OH 45356	937-778-4522
Upper Valley JVS	II	210,000 S.F.	1,500	\$22,000,000		X	8811 Career Drive Piqua, OH 45356	937-381-1479
Washington Intermediate	II	34,944 S.F. 6.82 Acres	280	\$4,909,094		X	800 N. Sunset Piqua, OH 45356	937-773-8472
Wertz Stadium	II		5,500	\$3,012,626		X	402 E. Ash Street Piqua, OH 45356	937-773-4321
Wertz Stadium (Maintenance Building)	II			\$149,931		X	402 E. Ash Street Piqua, OH 45356	937-773-4321

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Wilder Intermediate	II	53,958 S.F. 1.5 Acres	298	\$6,889,374		X	1120 Nicklin Piqua, OH 45356	937-773-2017
Speedway #5243	II	2.6 Acres	24	\$1,800,000		X	900 Scott Drive Piqua, OH 45356	419-618-2638
Speedway #5401	II	0.4 Acres	24	\$1,800,000		X	1551 Covington Avenue Piqua, OH 45356	419-618-2638
Sterling House of Piqua	II	148,433 S.F.	38 residents	\$2,500,000		X	1744 W. High Street Piqua, OH 45356	937-773-0500
United Parcel Service-Package Center	II	26,500 S.F. 7.4 Acres	150	\$3,200,000		X	8460 Industry Park Piqua, OH 45356	614-497-6063
Urban Elsass & Son, Inc.	II	8 Acres	18	\$3,000,000		X	600 E. Statler Road Piqua, OH 45356	937-214-0060
YWCA Piqua	II, III, IV	17,000 S.F.	600	\$1,750,000		X	418 N. Wayne Street Piqua, OH 45356	937-773-6626
4th of July Celebration	III						Foundation Park Piqua, OH 45356	
Aesthetic Finishers	III							
Christmas on the Green	III							
Corpus Christi Procession	III							
Dancing in the Moonlight	III							
Downtown Holiday Parade	III							
Farmers Market	III							
Heritage Festival	III							
Mainstreet Piqua Events	III							
Mainstreet Stride and Ride	III							
Memorial Day Parade	III							

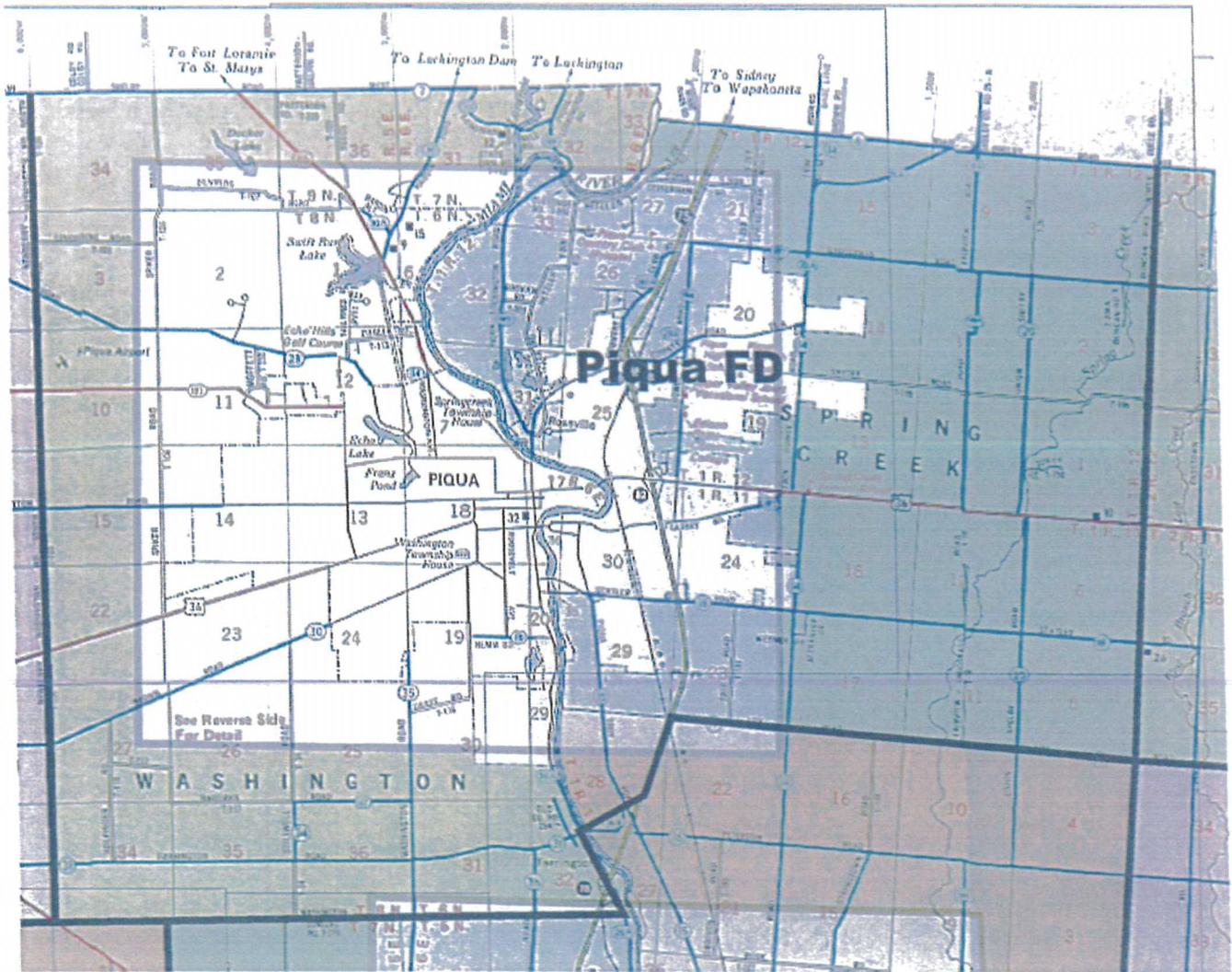
**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Miami Valley Centre Mall - Cruise-In	III							
Miami Valley Safety Council - Safety Fair	III						Learning Center	
National Day of Prayer	III							
Piqua Kiwanis Halloween	III							
Piqua - Pep Rally	III							
PYBSA Parade	III							
Readmore's Hallmark	III							
RIP Run Parade	III							
St. Boniface Church Festival	III							
St. Mary's Church Festival	III							
Strawberry Festival Soccer Tournament	III						Pitsenbarger Park	
Taste of the Arts	III							
Various Events	III							
Piqua Airport - Hartzell Field	IV	150 Acres	500			X	5465 W. State Route 185 Piqua, OH 45356	937-778-4207 937-418-2624 (c)
Sunset Box Culvert	IV	10" high, 96" long; 14" wide	0	\$200,000		X	100 block N. Sunset Ave. Piqua, OH 45356	937-778-2095 937-606-0754 (c)
Traffic Management Infrastructure	IV		0	\$5,154,900		X	throughout Piqua, OH	937-778-2095 937-606-0754 (c)
Bike Path	VI	11 Miles	350	\$500,000		X	throughout Piqua, OH	937-778-2085 937-606-0692 (c)
Fountain Park	VI	35 Acres	1,000	\$1,200,000		X	1300-1514 Forest Avenue Piqua, OH 45356	937-778-2085 937-606-0692 (c)

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Piqua Fire Department  
Updated 2010  
City of Piqua**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
French Park	VI	2 Acres	150	\$60,000		X	503 E. Ash Street Piqua, OH 45356	937-778-2085 937-606-0692 (c)
Hollow Park	VI	35 Acres	250	\$105,000		X	820 Scott Drive Piqua, OH 45356	937-778-2085 937-606-0692 (c)
Johnston Farm & Indian Agency	VI	250 Acres	9			X	9845 Hardin Road Piqua, OH 45356	937-773-2522
Lockington Dam	VI					X	Kaser Road, Lockington Shelby County	937-414-7012
Mote Park	VI	32 Acres	500	\$570,000		X	635 Gordon Street Piqua, OH 45356	937-778-2085 937-606-0692 (c)
Piqua Golf Course	VI	145 Acres	125	\$1,929,405		X	2,000, 2030 & 2100 Echo Lake Drive, Piqua, OH	937-778-2086
Piqua Local Flood Protection Feature	VI	15.214 linear feet total length				X	Along the Great Miami River, Piqua	937-414-7012
Piqua Pool	VI	.41 Acre	300	\$891,000		X	1400 South Street Piqua, OH 45356	937-778-2085 937-606-0692 (c)
Pitsenbarger Park	VI	67 Acres	1,500	\$338,000		X	McKinley & South Streets Piqua, OH 45356	937-778-2085 937-606-0692 (c)
Roadside Park	VI	7 Acres	500	\$3,500		X	St. Rt. 66 - near Hardin Rd. Piqua, OH 45356	937-778-2085 937-606-0692 (c)
Veteran's Memorial Park	VI	2 Acres	300	\$100,000		X	1701 Washington Avenue Piqua, OH 45356	937-778-2085 937-606-0692 (c)
<b>Risk Assessment Categories</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>		<b>VI</b>	
	Critical Facilities	Facilities with Substantial Hazards to Human Life	High Risk Event Locations	Transportation Considerations and Infrastructure	Special Needs		High Profile Community Locations/Assets	

### 3.) Piqua Fire Department



## **ASSET INVENTORY – VILLAGE OF PLEASANT HILL**

### **Methodology**

The methodology for the asset inventory of the Village of Pleasant Hill is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Pleasant Hill.

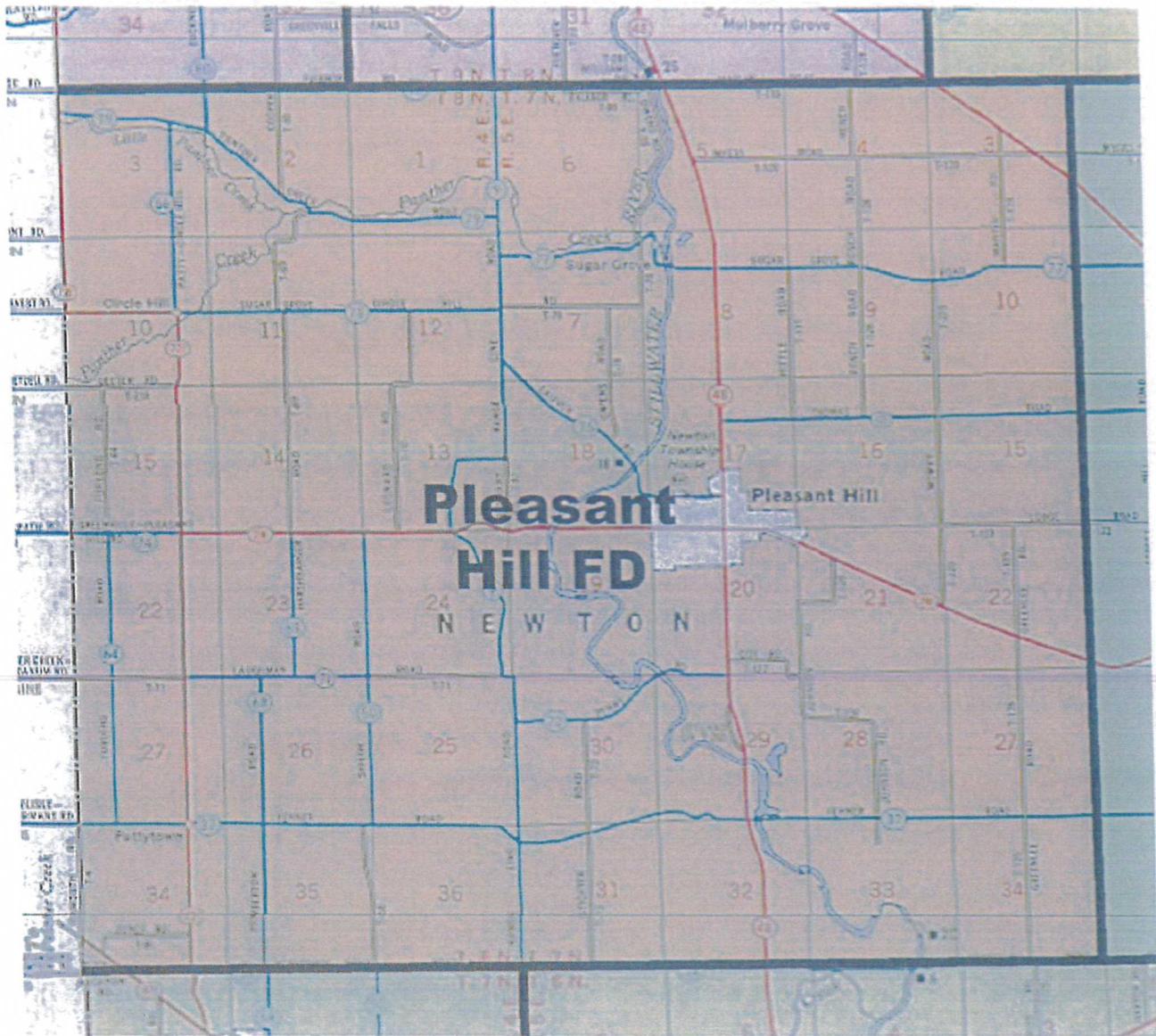
### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Pleasant Hill and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Pleasant Hill and the Pleasant Hill/Newton Township Fire Department District.



## 5.) Pleasant Hill Fire Department



## ASSET INVENTORY – VILLAGE OF POTSDAM

### Methodology

The methodology for the asset inventory of the Village of Potsdam is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of Potsdam.

### Assets

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of Potsdam and the hazards to which these facilities are susceptible.

The following are assets located within the Village of Potsdam and the Laura Fire Department District.

- Potsdam Municipal Building
- Bridges – Critical Facility (Transportation Infrastructure)
- Roads – Critical Facility (Transportation Infrastructure)
- Railroads – Critical Facility (Transportation Infrastructure)

## **ASSET INVENTORY – CITY OF TIPP CITY**

### **Methodology**

The methodology for the asset inventory of the City of Tipp City is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the City of Tipp City.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the City of Tipp City and the hazards to which these facilities are susceptible.

The following are assets located within the City of Tipp City and the Tipp City Fire Department District.

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Tipp City Fire Department  
Updated 2010  
City of Tipp City**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Electrical Substation #1	I	15,000 S.F.	12	\$4,200,000		X	N. 1st Street Tipp City, OH 45371	937-667-0519
Electrical Substation #2	I	10,000 S.F.	0	\$3,000,000		X	Behind A.O. Smith Tipp City, OH 45371	937-667-0519
Electrical Substation #3	I	100 x 100	0	\$5,000,000		X	Harmony Water Tower Tipp City, OH 45371	937-667-0519
Fire House II	I		20	\$3,000,000	X		520 W. Main Street Tipp City, OH 45371	937-669-8477
Government Center/Police Dept.	I	10,000 S.F.	40	\$4,000,000	X		260 S. Garber Drive Tipp City, OH 45371	937-506-3182
Hyatt Center	I	30,000 S.F.	100	\$3,000,000	X		450 N. Hyatt Street Tipp City, OH 45371	937-440-4000
Lift Station	I	2,500 S.F.	0	\$2,000,000	X		E. Main Street Tipp City, OH 45371	937-667-7298
Lift Station	I	2,500 S.F.	0	\$1,000,000	X		Rosewood Tipp City, OH 45371	937-667-7298
NAWA Water Plant	I		3	\$7,000,000	X		525 S. First Street Tipp City, OH 45371	937-313-9361
Tipp City Fire Department - West Side	I	9,800 S.F.	25	\$1,200,000	X		520 W. Main Street Tipp City, OH 45371	937-667-3112
Tipp City Police Department	I	19,400 S.F.	10	\$1,000,000	X		260 S. Garber Drive Tipp City, OH 45371	937-667-3112
Tipp City Post Office	I	1,400 S.F.	30	\$1,300,000		X	520 N. Hyatt Street Tipp City, OH 45371	937-667-3012
Tipp City Public Library	I	10,000 S.F.	20	\$1,500,000		X	11 E. Main Street Tipp City, OH 45371	937-667-3826
Water Tower	I			\$750,000				
Water Tower	I			\$4,000,000		X	Bowman & Walnut Tipp City, OH 45371	937-667-7298
Water Tower	I	1 million gallon	0	\$2,500,000		X	Harmony Tipp City, OH 45371	937-667-7298

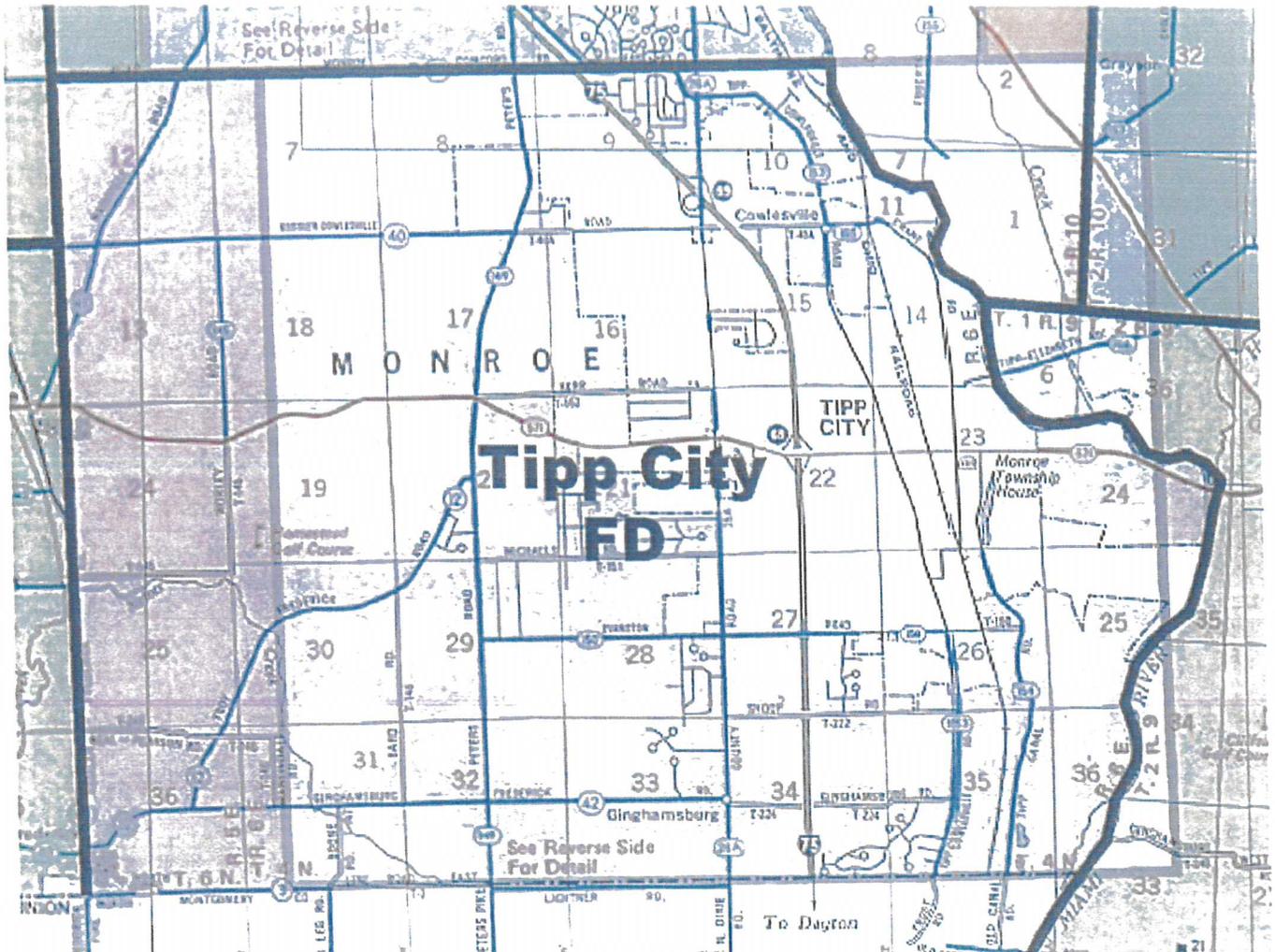
**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Tipp City Fire Department  
Updated 2010  
City of Tipp City**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Well Fields	I			\$500,000		X	E. Main Street Tipp City, OH 45371	937-667-7298
A.O. Smith Corporation	II	200,000 S.F.	300	\$4,000,000		X	531 N. Fourth Tipp City, OH 45371	937-667-2431
BASF Construction Chemicals LLC	II	40,000 S.F.	30	\$1,500,000		X	310 Park Avenue Tipp City, OH 45371	937-547-6798
BP Gas Line	II							800-842-6561
CSX Railroad	II, IV					X		800-232-0144
DAP, Inc.	II	80,000 S.F.	50	\$20,000,000	X		875 N. Third Street Tipp City, OH 45371	937-335-3826
Ginghamsburg Church	II	121,000 S.F.		\$14,000,000			6759 S. Co. Rd. 25A Tipp City, OH 45371	937-667-1069
Meijer's	II		830	\$3,700,000	X		4200 S. Co. Rd. 25A Tipp City, OH 45371	937-667-9628
<b>SCHOOLS:</b>								
Broadway Elementary	II	88,806 S.F.	459	\$7,003,245		X	223 W. Broadway Tipp City, Ohio 45371	937-667-6216
L.T. Ball Intermediate	II	88,806 S.F.	428	\$5,521,057		X	575 N. Hyatt Tipp City, Ohio 45371	937-667-8444
Little Light House Day Care/ Community Bible Church	II	10,000 S.F.	30	\$2,000,000		X	1427 West Main Tipp City, Ohio 45371	937-667-2710
Main S. Day Care/ Tipp City United Methodist Church	II	50,000 S.F.	40	\$5,000,000		X	8 West Main Street Tipp City, Ohio 45371	937-667-4924 ext. 206
Nazarene Church Day Care	II	50,000 S.F.	50	\$4,000,000		X	1221 W. Main Street Tipp City, Ohio 45371	937-667-6586
Nevin Coppock Elementary	II	40,000 S.F.	250	\$4,000,000		X	525 N. Hyatt Street Tipp City, Ohio 45371	937-667-8444
St. John's Preschool	II	50,000 S.F.	50	\$5,500,000		X	753 S. Hyatt Tipp City, Ohio 45371	937-667-4983 937-623-0447 (c)
Tipp City Christian School	II	7,000 S.F.	20	\$1,700,000		X	445 Evanston Road Tipp City, Ohio 45371	937-667-9167

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Tipp City Fire Department  
Updated 2010  
City of Tipp City**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Tippecanoe High School	II	100,666 S.F.	952	\$7,468,128			615 E. Kessler-Cowlesville Tipp City, OH 45371	
Tippecanoe Middle School	II	45,000 S.F.	675	\$7,003,245		X	555 N. Hyatt Tipp City, Ohio 45371	
Liberty Commons	II, V	206,000 S.F. 4.75 Acres	160	\$2,200,000		X	101 Rohrer Drive Tipp City, Ohio 45371	937-667-3650
Springmeade Health Center	II, V	41,000 S.F.	300	\$5,000,000	X		4385 S. County Road 25A Tipp City, OH 45371	937-667-7500
Tippecanoe Aquatic Center	II	5,542 S.F.	1,000	\$7,000,000		X	N. Third Street-City Park Tipp City, OH 45371	
Bridges Over Interstate	IV			\$299,977,500		X	25A-571 - Evanston-Shoop- Gingham, Tipp City	
Mum Festival	VI	10 Acres	3,000	\$200,000		X	25 Parkwood Drive Tipp City, OH 45371	937-667-5816
Tippecanoe Football Stadium/Track	VI	2 Acres	3,000	\$2,000,000		X	225 Park Avenue Tipp City, OH 45371	937-667-8444
YMCA - Robinson Branch	VI	52,000 S.F.	200	\$7,000,000		X	3060 S. County Rd. 25A Troy, OH 45373	
<b>Risk Assessment Categories</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>		
	Critical Facilities	Facilities with Substantial Hazards to Human Life	High Risk Event Locations	Transportation Considerations and Infrastructure	Special Needs	High Profile Community Locations/Assets		

## 12.) Tipp City Fire Department



## **ASSET INVENTORY – CITY OF TROY**

### **Methodology**

The methodology for the asset inventory of the City of Troy is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the City of Troy.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the City of Troy and the hazards to which these facilities are susceptible.

The following are assets located within the City of Troy and the City of Troy Fire Department District.

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Troy Fire Department  
Updated 2010  
City of Troy**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
911 Building	I, III, V	12,520 S.F.		\$4,350,742	X		210 Marybill Drive Troy, OH 45373	937-339-6400
American Red Cross	I	7,344 S.F.	100	\$750,000		X	1314 Barnhart Road Troy, OH 45373	937-332-1414 937-232-1064 (c)
Miami County Animal Shelter	I	1.81 Acres		\$686,743		X	1110 N. County Road 25A Troy, OH 45373	937-332-6919
Miami County Dispatch Center	I	11,730 S.F.	100	\$10,000,000	X		210 Marybill Drive Troy, OH 45373	937-232-1819
Miami County Sanitary Engineering Office Building	I	15,404 S.F.		\$1,492,339		X	2200 N. County Road 25A Troy, OH 45373	937-440-5653
Miami County Transfer Station - Waste Management	I	23,728 S.F.		\$4,015,039			2200 N. County Road 25A Troy, OH 45373	937-440-5653
Troy Fire Department - Station 1	I	11,000 S.F.	7	\$2,000,000	X		19 E. Race Troy, OH 45373	937-335-5678
Troy Fire Department - Station 2	I	10,622 S.F.	5	\$3,500,000	X		1528 N. Market Street Troy, OH 45373	937-339-3140
Troy Fire Department - Station 3	I	8,920 S.F.	5	\$2,000,000	X		40 S. Stanfield Troy, OH 45373	937-335-2227
Troy Maintenance Facility	I	44,500 S.F.	65	\$6,000,000		X	1400 Experiment Road Troy, OH 45373	937-875-2571
Troy Police Department	I	22,731 S.F.	30	\$5,580,000	X		124 E. Main Street Troy, OH 45373	937-875-0209
Troy Wastewater Treatment Plant	I	12,000 S.F.	8	\$20,000,000	X		1400 Dye Mill Road Troy, OH 45373	937-875-2497
Troy Water Treatment Plant	I	1,200 S.F.	6	\$30,000,000	X		300 E. Staunton Road Troy, OH 45373	937-875-0107
Upper Valley Hospital	I	270,468 S.F.	875	\$107,000,000	X		3130 N. County Road 25A Troy, OH 45373	937-440-4515
Alterra Sterling House	II					X	81 Stanfield Road Troy, OH 45373	937-339-5900
Caldwell House	II	8,000 S.F.	50	\$2,000,000		X	2900 Corporate Drive Troy, OH 45373	937-339-5199 937-573-6812 (c)

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Troy Fire Department  
Updated 2010  
City of Troy**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
F & P	II	325,000 S.F.	650	\$200,000,000		X	2101 Corporate Drive Troy, OH 45373	937-414-7142
Incarceration Center	II	30,000 S.F.		\$4,382,165			2042 N. County Road 25A Troy, OH 45373	937-440-5650
Miami County Jail	II	49,496 S.F.		\$10,138,651		X	2042 N. County Road 25A Troy, OH 45373	937-440-6085
<b>SCHOOLS:</b>								
Concord Elementary	II	67,598 S.F.	650	\$10,925,000		X	3145 State Route 718 Troy, OH 45373	937-332-6730
Cookson Elementary	II	41,877 S.F.	350	\$6,850,000		X	921 Mystic Lane Troy, OH 45373	937-332-6700
Forrest Elementary	II	41,481 S.F.	320	\$5,800,000		X	413 E. Canal Street Troy, OH 45373	937-332-6700
Heywood Elementary	II	37,231 S.F.	380	\$6,250,000		X	260 S. Ridge Avenue Troy, OH 45373	937-332-6700
Hook Elementary	II	31,257 S.F.		\$5,375,000		X	729 Trade Square West Troy, OH 45373	937-332-6760
Kyle Elementary	II	33,620 S.F.	270	\$5,425,000		X	501 S. Plum Street Troy, OH 45373	937-332-6770
Miami Jacobs Career College	II	60,000 S.F.	700	\$13,000,000		X	865 W. Market Street Troy, OH 45373	937-308-1118
Troy Christian Elementary School	II	43,550 S.F.	552	\$4,400,000		X	700 S. Dorset Road Troy, OH 45373	937-308-3861
Troy Christian High School	II	62,000 S.F.	368	\$6,200,000		X	700 S. Dorset Road Troy, OH 45373	937-339-5692 937-308-3861 (c)
Troy High School	II	221,011 S.F.	1,560	\$37,300,000		X	151 W. Staunton Road Troy, OH 45373	937-332-6710
Troy Junior High School	II	104,689 S.F.	775	\$19,000,000		X	556 N. Adams Street Troy, OH 45373	937-332-6720
Van Cleve Elementary	II	82,253 S.F.	370	\$13,500,000		X	617 E. Main Street Troy, OH 45373	937-332-6780

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Troy Fire Department  
Updated 2010  
City of Troy**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Troy Care & Rehabilitation Center	II	20,000 S.F.	220	\$4,000,000	X		512 Crescent Drive Troy, OH 45373	937-509-5824 (c)
West Central Juvenile Facility	II	49,272 S.F.		\$12,195,224		X	201 W. Main Street Troy, OH 45373	937-440-5651
Hobart Arena	III	43,004 S.F. 0.99 Acre	5,332	\$8,297,000	X		255 Adams Street Troy, OH 45373	937-339-2911
Miami County Fairgrounds	III	100 Acres		\$8,240,000		X	650 N. County Road 25A Troy, OH 45373	937-335-7492
Miami County Safety Building	III, V, VI, II	104,048 S.F.		\$24,174,768			201 W, Main Street Troy, OH 45373	937-418-8335
Strawberry Festival	III, VI	13.4 Acres	80,000			X	Levee by Troy Memorial Stadium, Troy, OH 45373	937-339-7714
Troy Memorial Stadium	III	8.95 Acres	10,000	\$3,890,000		X	150 W. Staunton Road Troy, OH 45373	937-332-6700
Adams Street Bridge (over river)	IV					X	Adams Street Troy, OH 45373	937-440-5656
Adams Street Bridge (over CSX RR)	IV					X	Adams Street Troy, OH 45373	937-339-2641
Broadford Bridge (over river)	IV					X	S. R. 41 (E. Main Street) Troy, OH 45373	937-492-1141
N. Market Street Bridge (over river)	IV					X	N. Market Street Troy, OH 45373	937-492-1141
CSX Railroad Bridge (over river)	IV						East of N. Market St. Bridge Troy, OH 45373	800-232-0144
Interstate 75	IV					X	City of Troy Troy, OH 45373	937-492-1141
Miami County Engineering Building	IV	4,104 S.F.	10	\$721,544		X	2100 N. County Road 25A Troy, OH 45373	937-440-5656
Miami County Garage	IV	49,816 S.F.		\$5,926,568		X	2100 N. County Road 25A Troy, OH 45373	937-440-5656
Miami County Storage Building	IV	14,400 S.F.		\$371,280		X	2100 N. County Road 25A Troy, OH 45373	937-440-5656

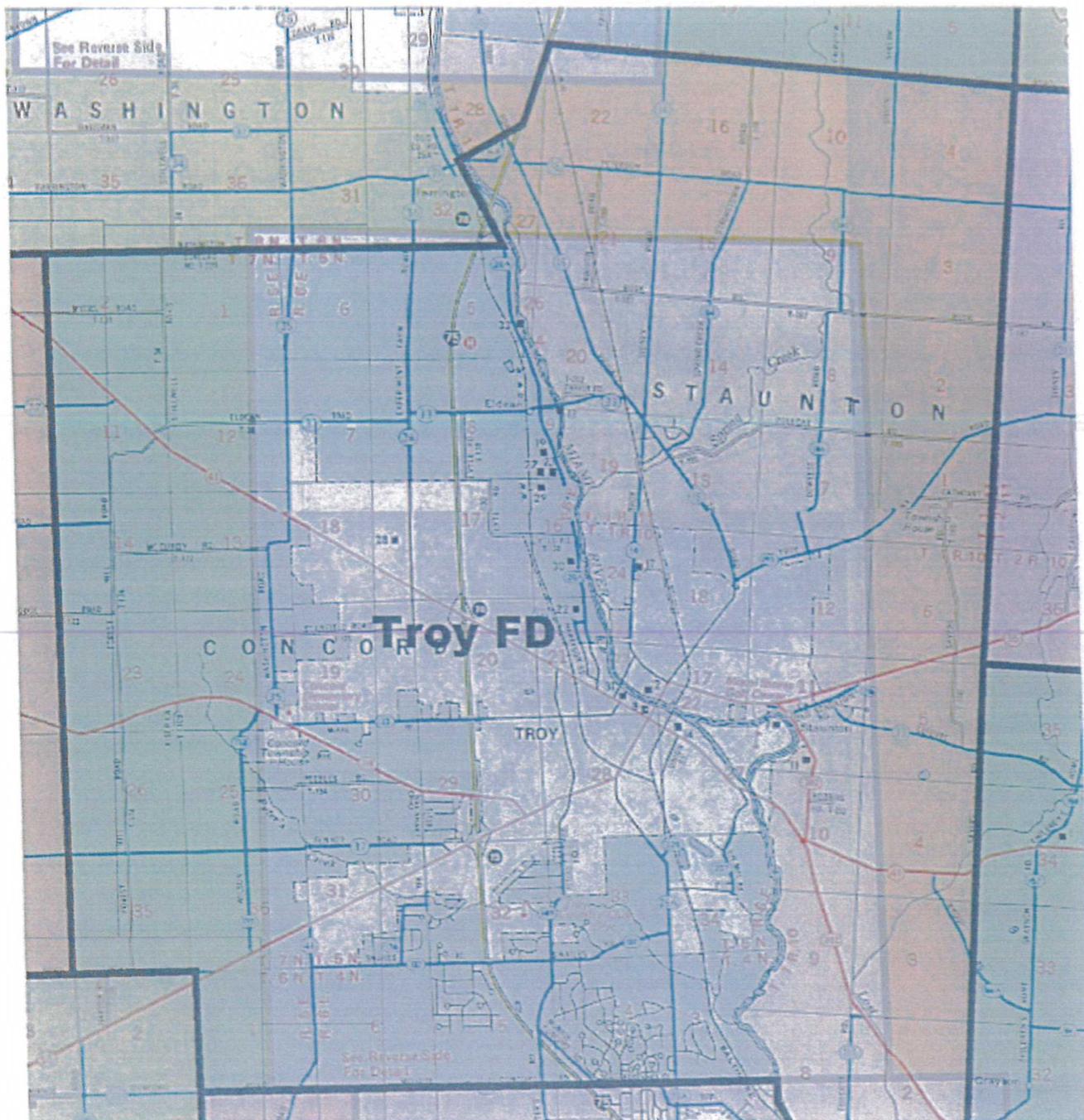
**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by Troy Fire Department  
Updated 2010  
City of Troy**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Boyer House	V	4,059 S.F.				X	109 S. Walnut Street Troy, OH 45373	937-653-1320
Cell Tower/Old Grain Elevator/Silo	V					X	229 South Mulberry Street Troy, OH 45373	937-603-3456
Community Park	V	5,979 S.F.		\$528,187		X	200 Adams Street Troy, OH 45373	937-335-4612
Dam (Great Miami River)	V					X	Behind Water Treatment Plant (Staunton Rd.)-Troy	937-339-2641
Duke Park	V						1670 Troy-Sidney Road Troy, OH 45373	937-335-4612
Hobart Building (County Government)	V, VI	68,582 S.F.		\$10,221,388		X	510 W. Water Street Troy, OH 45373	937-440-5656
Job & Family Services Building	V, VI	16,246 S.F.		\$5,305,418		X	2040 N. County Road 25A Troy, OH 45373	937-440-3471
Mennel Milling Company	V	13.96 Acres	12	\$10,000,000		X	2600 County Road 25A Troy, OH 45373	937-335-8334
Miami County Abuse Shelter	V	0.17 Acre	25			X	16 E. Franklin Street Troy, OH 45373	937-339-6761
Morris House	V, II	0.18 Acre				X	1 W. Franklin Street Troy, OH 45373	937-335-7921
Overfield Tavern Museum	V					X	201 E. Water Street Troy, OH 45373	937-335-4019
Waco Field Air Museum	V, VI	72.38 Acres					1865 S. County Road 25A Troy, OH 45373	937-335-9226
Eldean Bridge (over river)	VI	3,990 S.F.		\$2,207,414		X	Eldean Road Troy, OH 45373	937-440-5656
Hayner Cultural Center	VI	8,337 S.F. .71 Acre	200			X	301 W. Main Street Troy, OH 45373	937-339-0457
Hobart Arena	VI	25,000 S.F.	4,000	\$12,500,000	X		255 Adams Street Troy, OH 45373	937-339-2911 937-875-0243 (c)

**Miami County Hazard Mitigation  
 Risk Assessment Asset Inventory as Compiled by Troy Fire Department  
 Updated 2010  
 City of Troy**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
Miami County Courthouse	VI, III	38,985 S.F.		\$23,092,510		X	201 West Main Street Troy, OH 45373	937-440-6050
Miami County YMCA	VI	50,000 S.F.	250	\$10,000,000		X	3060 S. County Road 25A Troy, OH 45373	937-440-9622
Troy Public Library	VI	20,930 S.F. 1.32 Acres	900	\$400,000		X	419 W. Main Street Troy, OH 45373	937-339-0502
<b>Risk Assessment Categories</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>		<b>VI</b>	
	Critical Facilities	Facilities with Substantial Hazards to Human Life	High Risk Event Locations	Transportation Considerations and Infrastructure	Special Needs	High Profile Community Locations/Assets		

## 6.) Troy Fire Department



## **ASSET INVENTORY – VILLAGE OF WEST MILTON**

### **Methodology**

The methodology for the asset inventory of the Village of West Milton is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the corporate limits of the Village of West Milton.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the Village of West Milton and the hazards to which these facilities are susceptible.

The following are assets located within the Village of West Milton and the West Milton Fire Department District.

**Miami County Hazard Mitigation  
Risk Assessment Asset Inventory as Compiled by West Milton Fire Department  
Updated 2010  
Village of West Milton**

Name of Facility	Risk Assessment Category	Size of Facility	Population of Facility	Replacement Value (\$)	Generator System		Address of Facility	Phone Number
					yes	no		
West Milton City Hall, Fire Department and Police Department Station	I	22,500 S.F.		\$1,500,000		X	701 S. Miami Street West Milton, OH 45383	937-698-1500
McKinley Commons	I	12,300 S.F.	33 units			X	240 S. Main Street West Milton, OH 45383	937-698-3456
Church of the Transfiguration	II		500			X	972 S. Miami Street West Milton, OH 45383	
Milton-Union High School	II	106,000 S.F.		\$17,000,000		X	221 S. Jefferson Street West Milton, OH 45383	937-884-7910
Milton-Union Middle & Elementary School	II	100,000 S.F.	1,200	\$15,000,000		X	112 East Spring Street West Milton, OH 45383	937-884-7910
Princeton Village Apartments	II	40 units	40			X	68 Bevonne Court West Milton, OH 45383	937-698-4104
Rudy's, Inc.	II		15			X	149 West Hayes West Milton, OH 45383	937-621-4094 937-698-4501
4th of July Festival	III, VI		500			X	East Tipp Pike West Milton, OH 45383	937-947-1012
Lowry Sports Complex	III, VI	129 Acres	1,500			X	7600 Milton-Potsdam West Milton, OH 45383	937-901-7370
Frederick-Garland Bridge	IV					X		
Community Church	VI, II		500	\$6,000,000		X	2261 S. Miami Street West Milton, OH 45383	937-416-5831
<b>Risk Assessment Categories</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>		
	Critical Facilities	Facilities with Substantial Hazards to Human Life	High Risk Event Locations	Transportation Considerations and Infrastructure	Special Needs	High Profile Community Locations/Assets		



## **ASSET INVENTORY – BETHEL TOWNSHIP FIRE DEPARTMENT DISTRICT**

### **Methodology**

The methodology for the asset inventory of the Bethel Township Fire Department District is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the limits of the Bethel Township Fire Department District.

### **Assets**

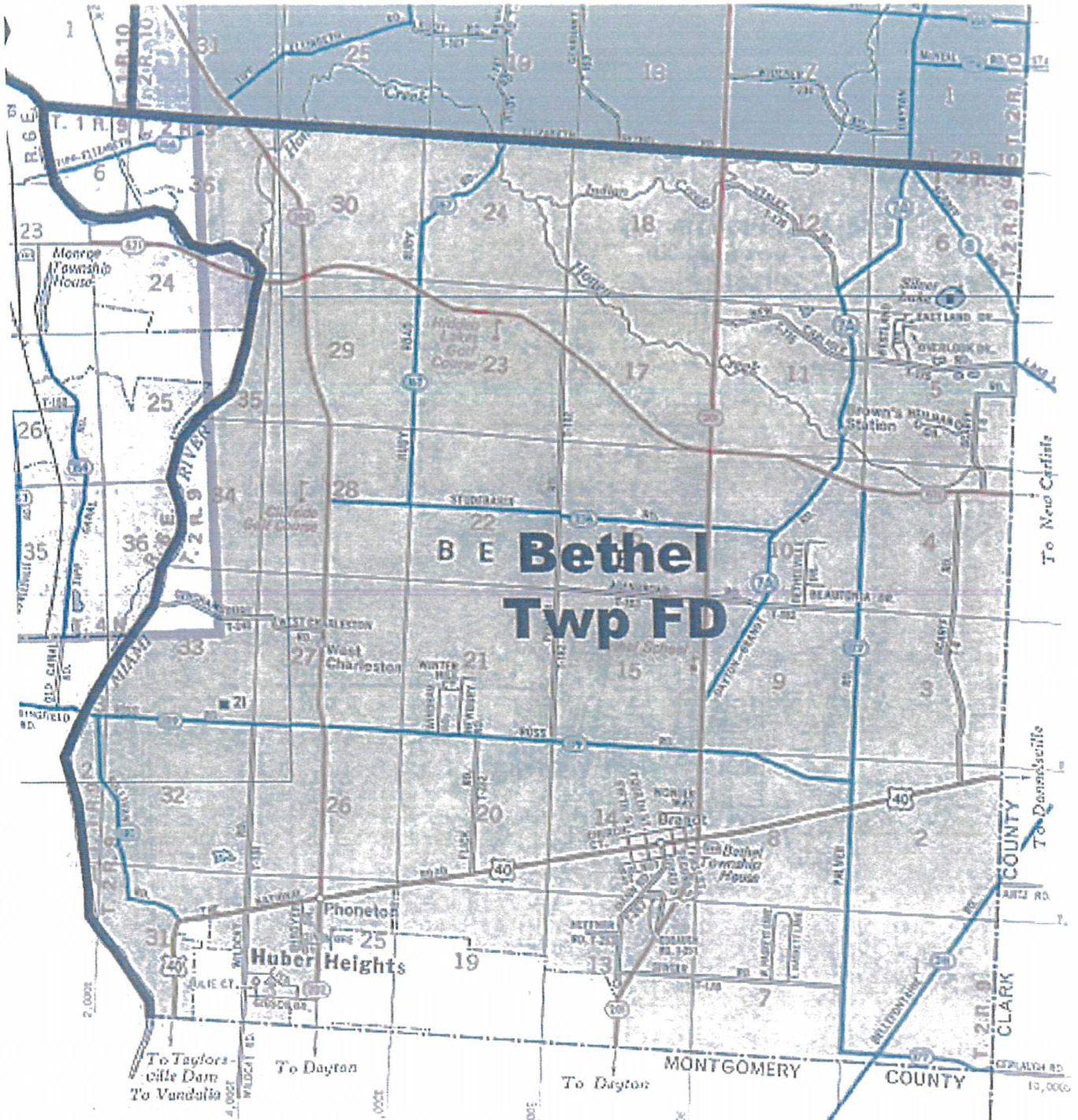
Miami County's Hazard Risk Assessment identifies specific assets located throughout Bethel Township Fire Department District and the hazards to which these facilities are susceptible.

The following are assets located within Bethel Township Fire Department District

- There are no incorporated municipalities within Bethel Township except for a small portion of the City of Huber Heights. The City of Huber Heights is not addressed within this Plan
- Bridges – Critical Facility (Transportation Infrastructure)
- Roads – Critical Facility (Transportation Infrastructure)



### 13.) Bethel Twp Fire Department



## **ASSET INVENTORY – ELIZABETH TOWNSHIP FIRE DEPARTMENT DISTRICT**

### **Methodology**

The methodology for the asset inventory of the Elizabeth Township Fire Department District is exactly the same as for Miami County. In fact, the assets that are located within the corporate limits are listed on the composite asset and hazard lists that encompass the county assets. For the purpose of clarity, the following assets are located within the limits of the Elizabeth Township Fire Department District.

### **Assets**

Miami County's Hazard Risk Assessment identifies specific assets located throughout the municipalities within Elizabeth Township Fire Department District and the hazards to which these facilities are susceptible.

The following are assets located within Elizabeth Township Fire Department District.

- There are no incorporated municipalities within Elizabeth Township Fire Department District
- Bridges – Critical Facility (Transportation Infrastructure)
- Roads – Critical Facility (Transportation Infrastructure)



## **2.20 Multi-Jurisdictional Risk Assessment**

As part of the Risk Assessment process, the Miami County Hazard Mitigation Committee looked at each community and reviewed where unique and varied risks will occur. The following Multi-Jurisdictional Risk Chart indicates where the risk to Miami County residents will vary from the risks facing the entire Miami County planning area. See the attached chart – Multi-Jurisdictional Risk Chart.

The risks that vary include:

### **Riverine Flooding:**

The Village of Bradford, Casstown, Ludlow Falls, Potsdam, Pleasant Hill, and some unincorporated areas of the County are not threatened by riverine flooding as they do not have a 100-year floodplain within the village corporation limits or there are not structures within a 100-year floodplain. See Floodplain Maps located at the end of Section 2.5 Natural Hazards - Flooding which identify and show the locations of the 100-year floodplain areas.

### **Railroad Transportation Accident:**

Piqua, Troy, and Tipp City and Concord, Monroe, Staunton, and Springcreek Townships are the only areas that would be affected by a railroad accident. See Section 2.16 Transportation Accident which indicates the routing of the current active railroads through Miami County.

### **Class I Dam Failure:**

Piqua has three Class I Dam structures located nearby or within the city corporation. The City of Piqua and the downstream City of Troy and the adjacent unincorporated areas along the Great Miami River are subject to flooding should there be a Class I Dam failure. The Dam Map found in Section 2.17 Dam/Levee Failure identifies and indicates the Class I Dams located in Miami County.

### **Increased Risk Factor Due To Construction Method Techniques**

Past risk assessment data indicates mobile homes are more vulnerable to risk and damage incurred in tornado, wind, or severe summer storms.

Multi-Jurisdictional Risk Chart																	
Jurisdiction	Natural Hazards											Other Hazards					
	Tornado/Windstorm	Severe Winter Storms/Blizzard/Ice/Sleet	Riverine Flooding	Urban/Small Stream Flooding	Earthquake	Severe Thunderstorm/Lightning/Hail	Temperature Extremes & Heatwave	Epidemic/Disease Impact	Drought	Infestation/Invasive Species	Wildfire	Terrorism	Utility/Communication Failures	Hazardous Materials Incident	Transportation Accident Railway	Transportation Accident Air/Vehicle	Class I Dam/Levy Failure
Piqua	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tipp City	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N/A
Troy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bradford	X	X	N/A	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Casstown	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Covington	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Fletcher	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Laura	X	X	N/A	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Ludlow Falls	X	X	N/A	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Potsdam	X	X	N/A	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
West Milton	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N/A	X	N/A
Unincorporated Areas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N/A

## 2.21 Analyzing Development Trends

This section provides a general overview of future growth and development occurring throughout Miami County and what impact natural hazards will have on it. To determine growth patterns the Miami County Hazard Mitigation Committee reviewed cumulative county and community statistics. The profiles covered a broad range of characteristics including land development per the community's comprehensive plan, the population growth and decline of each prospective community. The County population increased from 98,868 in 2000 to 102,506 in 2010 for an approximate 4% increase in population. Communities showing the largest growth included Troy and Tipp City which are along the north/south I-75 corridor. Troy is the county seat and has experienced a population growth of nearly 14%. Other smaller communities lost population such as Fletcher and Laura. The projected county population for 2020 is 106,770 and for 2030 it is 107,930. Currently, there are 42,126 housing units within the county. Since 2005 there have been 819 new housing units added which is approximately 1.9% increase in the number of housing units.

Some moderate storm runoff problems have occurred in the McKaig and Kidder Ditch Systems, as well as home areas, near Troy due to the storm runoff in recent development areas. However, the City of Troy, Township Trustees, and County Officials have a good understanding of the problems and are working to address these issues through mitigation planning and cooperative efforts among the involved entities. Several of the County mitigation problem areas are along the north/south 25-A corridor that runs adjacent to the Great Miami River. Issues that are being addressed include:

- Continue to buyout older cottages and mobile homes along the bank of the Great Miami River that are in the floodplain and do not have central sewage systems.
- Removal of several additional buildings within the Miami County Fairgrounds that are within the 100-year floodplain.
- Modify the flood gate #25 on Morgan Ditch for improved drainage at the fairgrounds.

The Concord Township Trustees have a clear understanding of addressing the above needs and have already completed numerous mitigation projects in this corridor. This corridor is being preserved as open space along the Great Miami River and includes park land, preserves, bike ways, and waterway separation facilities. In August 2010 the Great Miami River and Stillwater River were designated as State water trails. The County has over 2,000 areas of scenic parks and wildlife areas many which border on these waterways. Many of the City, County and Regional Resource Agencies work together to educate, promote, and preserve the natural areas that border the Great Miami and Stillwater Rivers. This collaborative effort helps steer inappropriate development away from these natural riparian corridors. Commercial development is occurring in a well planned and structural growth primarily northwest of Troy along State Route 41 and

along the main I-75 and U.S. Route 36 interchange east of Piqua and at I-75 and U.S. Route 571 interchange in Tipp City. The industrial base growth areas for the County is mainly along and adjacent to the I-75 corridor or within existing community industrial development parks. Miami County is located just north of the I-70 and I-75 interchange known as the “Crossroads of America” and is within 600 miles of 64% of the U.S. population.

The Miami County Regional Planning Commission and Miami County communities encourage planned residential growth in proximity to existing residential areas where existing water and sanitary sewer is available. The Miami County Planning and Zoning Department administers county zoning for 8 of the 12 townships including: Concord, Monroe, Newberry, Springcreek, Staunton, Union, and Washington. The townships of Bethel, Brown, Elizabeth, and Lostcreek administer their own zoning. Miami County’s modern zoning resolution dates back to 1972. While there have been numerous text changes over the years, Miami County’s zoning districts are very established and well planned. The Miami County Planning Commission is “to provide quality public service assistance to the citizens of Miami County with the goal of protecting health, safety and welfare and property rights of our citizens and to promote community development for member political subdivisions”.

Miami County is within the Miami Valley Regional Planning Program which emphasizes “sustainable growth” philosophies, better integration of land use planning, and transportation planning. The general accepted principles of sustainable growth which includes several objectives supported by the Miami County Mitigation Committee. These objectives include:

- Preserve open space, farmland, natural beauty and critical environmental areas.
- Encourage community and stakeholder collaboration.
- Make development decisions predictable, fair and cost-effective.
- Provide a variety of transportation choices including pedestrian, bicycle, transit, rail and automobiles.
- Develop “walkable” communities.
- Strengthen and direct new development towards existing communities.

## **Mitigation Strategy**

- 3.1 Overview
- 3.2 Accomplishing Mitigation Strategies
- 3.3 2006 Plan Goals
- 3.4 2011 Plan Goals
- 3.5 Identifying Mitigation Activities
- 3.6 Re-Evaluating The County's Problems
- 3.7 Action Items (Priority Projects)
- 3.8 Updated Action Plan

### 3.1 Overview

Miami County has experienced numerous natural hazard events and disasters throughout history and has had for many years a very active Hazard Mitigation Planning Committee. The County has been very proactive with mitigation progress as indicated with the following highlights:

- A portion of the Miami Conservancy District is located within Miami County which was created in 1915 as a result of the 1913 flood. This Miami Conservancy District (MCD) is one of the most comprehensive flood management authorities in the region and has extensive flood control measures in place. It is designed to contain runoff that is 40% more than the 1913 flood which is well over a 1,000 year flood level. Representatives from the MCD serve on the Miami Hazard Mitigation Committee.
- All incorporated cities and villages within Miami County participated in and adopted the 2006 Miami County Multi-Jurisdictional Mitigation Plan.
- The cities of Piqua, Tipp City and Troy and the villages of Covington, Laura, Fletcher and West Milton are all participating communities with the National Flood Insurance Protection Program (NFIP). The county has been very proactive in promoting that homeowners and businesses that are within flood prone areas to participate in the NFIP.
- The Miami County Hazard Mitigation Committee has held an annual public meeting on the second Wednesday of February since 2006 to review progress and accountability for over 75 mitigation projects that have been identified throughout the county with approximately 33 of these being completed.
- The near completion of the north/south 30 miles of paved bike way corridor, which meanders along the path of the Great Miami River and the Miami and Erie Canal through the county.
- The August 26, 2010, dedication of the Great Miami, Stillwater, and Mad Rivers as official state water trails.
- A series of public planning meetings were held by the Miami County Mitigation Committee from November 2010 through June of 2011 to re-evaluate the current plan goals, objectives, actions, and to address any needs or changes necessary to update the Miami County Mitigation Plan.
- The Committee re-evaluated and ranked the natural hazards in order of priority with the top 3 being:
  - 1. Tornado/Windstorm
  - 2. Severe Winter Storm/Blizzards/Ice/Sleet
  - 3. Flooding

The Miami County Hazard Mitigation strategy in this section of the plan utilizes the following terminology based on FEMA's State and Local Mitigation Planning How-To Guide:

- *Goals* – General guidelines that explain what is desired to be achieved. They are usually broad policy-type statements, long term, and represent global visions.
- *Objectives* – Strategies or implementation steps to attain identified goals. Unlike goals, objectives are specific and measurable.
- *Mitigation Actions* – Specific actions to achieve a plan goal and its objectives. The action items are prioritized mitigation actions which identify a lead or coordinating agency for implementation, a time line and a method to track implementation status.

### **Progress on 2006 Goals, Objectives, and Action Items;**

The Miami County Mitigation Committee has met on the 2nd Wednesday of February each year from 2006-2011 to review the progress of each of action items listed in the plan and to raise awareness on any mitigation concerns. The meeting is an open meeting and the public is invited to attend.

The format used to report the goals, objectives, and mitigation actions in the 2011 plan update is consistent with the plan approved in July of 2006. During the annual meeting of the Miami County Hazard Mitigation Team the action item list has been updated to reflect completed action items as well as to incorporate any new action items. The list includes the name of the public entity, the hazard category type, the action item to be performed, the lead agency in charge of the project, timeline, priority level, and plan goals to be addressed. Overall, 33 mitigation action items have been successfully completed from 2006-2011 by the various county entities and agencies.

Some of the projects and action items completed include:

- The Red Cross of Northern Miami Valley has been proactive in the ongoing promotion of "Prepare Your School and Students Program" instructing students what to do in the event of an emergency that can help save lives at school and at home. The Red Cross also provides training assistance to prepare your workplace and employees in community disaster preparedness education activities.
- The Board of Commissioners implemented a countywide 911 emergency call system for all telephone subscribers throughout Miami County in 2006-2007. This allows warning notification county wide or to localized small geographic areas or households.
- The buyout and the removal of several residential and business structures within the 100-year flood zone located in Concord Township along 25A and the Miami River corridor. The newly constructed Barbee Park in the location of the buyout properties serves as a recreational facility and green space along the Great Miami Waterway.
- Completion of a hazardous materials railroad and truck survey in May 2009.

- Installation and upgrades to several community outdoor warning sirens.
- Installation of numerous NOAA weather radios for schools, commercial, industrial, and outdoor recreation facilities.
- Completion of the County FIRM Flood Plain Mapping updates.
- Completion of several community storm water management plans.
- Flood proofing of several critical facility pump stations and controls.
- Installation of emergency generator systems for critical facilities in several communities.
- Replacement of several bridges throughout the County.
- Addressing flooding issues for several County ditches.
- Completion of several municipal sanitary sewer systems and storm sewer upgrades.
- Alleviating urban and small stream flooding problems in various County locations.
- Completion of several ongoing dam maintenance projects.

For a complete reference of completed projects see the following Miami County Hazard Mitigation Action Item list following Section 3.2 – Accomplishing Mitigation Strategies.

Non-completion of several goals and action items was a result of: large ongoing workload with limited staff and volunteer resources; state, county and local budget issues; and lowering of priority or the goals became irrelevant based on current data, information, or processes.

The Miami County Mitigation Committee reviewed the progress and appropriateness of the former goals and found that while most of the goals are still appropriate some of the objectives have been modified to address current trend issues and priorities.

The following sections of this plan addresses the current status and progress of county mitigation action items and re-evaluates the county's mitigation goals and objectives.

## 3.2 Accomplishing Mitigation Strategies

The Plan Mission Statement:

*Provide leadership for Miami County's political jurisdictions to initiate and support sustained actions to reduce or eliminate long-term risk to people and property from natural and manmade hazards and their effects.*

From November 2010 through June 2011, the Hazard Mitigation Committee met monthly to address any new hazard mitigation problem statements and to reevaluate the past mitigation goals of the county. The goals were modified slightly to guide development and implement mitigation measures for the future. This Section reaffirms what the goals are and how they were developed. These goals are a refinement based on the hazard risk assessment update findings, research, discussions and public input received by the Committee members. They are intended to be compatible with the other planning goals of the community as expressed in these documents.

The goals and objectives represent a long-term vision for hazard reduction and enhancement of mitigation capabilities for the citizens of Miami County since its inception. The Hazard Mitigation Committee has sought to develop goals and activities that would be achievable, measurable, and effective in reducing or eliminating the hazards developed from the Hazard Mitigation Committee's problem statements.

Many local and several regional agencies have been involved in the hazard mitigation process for Miami County and they will have the authority to regulate development. Many local agencies as well as other businesses, academia and other private non-profit interests provided their assistance and their contribution has been an excellent source in helping to prepare this update to the Plan. Their existing plans, studies, reports and technical information have helped to develop a more comprehensive approach in reducing the effects of potential disasters.

Some of the main tools available include the Miami County Comprehensive Plan, Ohio Natural Hazard Mitigation Planning Guidebook, Miami Conservancy District web site data, various publications of the Ohio Emergency Management Agency, State of Ohio Mitigation Plan, FEMA, State and Location Mitigation How-To-Guides, the Miami County Emergency Operations Plan, the Miami County Hazard Risk Assessment, Stillwater Watershed Plan, County Greenspace Plan, Miami County Bikeway and Recreational Trail Plan, CAMEO Hazardous Materials Plan, County LEPC Plan, update County FIRM Flood Plain Maps, the Soil Survey of Miami County, questionnaire results received from Municipal and County officials, and from comments received from all of the 7 Public Planning Meetings and Special Calamityville presentation held in April 2011, Miami County Hazard Mitigation held in June 2004.

The Miami County Board of Commissioners has been very proactive in the mitigation planning efforts for the County over the past 5 years and is planning for the future. The updated Miami County Comprehensive Land Use Plan intended to protect the county's rural urban environment continued to be the county's guide for future development practices. The county, with its planning efforts ensured wise use of open space and farmland.

In November 2009, the County Board of Commissioners adopted the up-to-date Miami County Emergency Operations Plan to be prepared to cope with the effects of a disaster having a well integrated emergency management system involving all departments of local governments, private support agencies, as well as the private citizen.

The Miami County Communications Center opened in December 1989 and provides continuous consolidated emergency dispatch services for police, fire and EMS agencies in Miami County. It is an answering point for 101,000 customers covering a 407 square mile geographical area. The center provides not only call handling and dispatching but also radio service to 49 agencies and data services to 28 agencies within the county. The Miami County Dispatch Center is one of the most technologically advanced in the state and provides dispatchers with map based location of all incoming calls and access to state and federal data bases. On February 8, 2007 the Miami County Emergency notification System (MCENS) became fully operational. In the event of a significant emergency, weather event or other catastrophe, citizens can be alerted by telephone with information and instructions to publically published wireline numbers.

The county has fully equipped and educated police, fire and rescue personnel as well as health care workers to respond to the emergency needs of The Miami County citizens.

The county has been very proactive in mitigation of flooding hazards since the Great 1913 Flood. As a result of this flood, the Miami Conservancy District was created which operates and maintains a flood protection system for the Great Miami River Watershed through Miami County and adjacent counties. The system is made up of five dams and includes 60 miles of levee and 37 miles of modified river channel. One reason the Great Miami River corridor has remained relatively undeveloped is the Miami Conservancy District Flood easement and floodplain zoning as administered by the cities and county. Open space, conservation, recreation and designated nature areas exist throughout Miami County and also include the river/stream corridors of the scenic Stillwater River, scenic Greenville Creek, Spring Creek, Lost Creek, Indian Creek, Honey Creek, Brush Creek, Mill Creek as well as others. Many public open space quality recreational and scenic areas are preserved along these water corridors. Ludlow Falls, Greenville Falls, Stillwater Prairie Preserve, Goode Prairie Preserve, Blankenship Preserve, West Milton and Covington Parks, and Big Wood Preserve are some of the natural conservation and open space recreational areas.

The Miami County Bike Trail Task Force has been in existence for many years and has almost met its goal to connect parks, historic sites, and Miami County communities by a system of paved, well-planned and maintained bike trails. Some of the trails will run along and parallel to the Great Miami River corridor as well as the Miami & Erie Canal. The North/South corridor through the county connecting the City's of Piqua, Troy and Tipp City is almost complete. The bikeway begins at the southern Miami County border and leads north through Monroe Township entering Tipp City at Thomas B. Kyle Park which has many recreational activities to enjoy. The trail also is along the former Miami & Erie Canal within close proximity to historic downtown Tipp City. The trail heads north from Tipp City to Troy along the Tipp City Park and the Tipp City National Preserve running along the Great Miami River corridor. The Miami and Erie Canal also runs parallel to the River corridor. The bike trail in the Troy vicinity continues to meander along the pristine Great Miami

River through Troy and near the 1860 Eldean Covered Bridge which is the second longest covered bridge of its type in Ohio. From Troy the bike path continues its course along the Miami County Fairgrounds and the Great Miami River corridor to connect to the existing bike paths in service in the City of Piqua which has one of the first nuclear power plants and museum of the Piqua historical area.

The Miami County Hazard Mitigation Committee continues to meet regularly to strive to have its goals match with the capital improvements plans of its county, cities, villages and townships.

All of the Miami County cities and villages also have in place mitigation goals and opportunities. For example, all cities, villages and townships in Miami County have planning and zoning documents which limit development in established flood zones. Over the past 5 years the City of Troy's capital improvement plan continued to include funding for hazard mitigation activities such as:

- Improvements to storm and sanitary sewer lines to Troy's southeast side.
- Installation of generators at the waste water treatment plant facilities.
- Purchase and installation of generators at the water treatment plant facilities.
- Repair and replace most of storm sewer catch basins.
- Kidder Ditch regarding, clearing and paving.
- Completion of Terry Street Bridge Replacement.
- Adams Street Bridge Replacement in progress
- Stormwater utility development.

The City of Troy also installed a bridge connecting Treasure Island Park and the Paul G. Duke Park. The project also included dredging a stretch of the West Miami River between Market Street Bridge and Treasure Island which will make it more suitable for motorboats. The City of Tipp City has implemented stormwater programs in the Great Miami Watershed that affect Tipp City management practices and the City's relationship with the Miami Conservancy District. The City of Tipp City has also appointed a citizen's capital program review Committee comprised of 21 volunteers to evaluate the long term capital needs of the City. Their recommendations include storm sewer upgrades to reduce flooding.

The Miami County Emergency Management Agency and the Miami County Hazard Mitigation Committee is pleased that Miami County has taken a proactive role with many mitigation activities already occurring. The county has developed, as part of its Comprehensive Plan, a goal to manage surface water and ground water in a manner providing safety for the people while maintaining environmental quality and conserving both surface water and groundwater as a valuable resource. The objectives include a stormwater management program to utilize and maintain the existing drainage system, to maintain the water quality at or above State of Ohio water quality standards, to utilize and enhance the storage capacity of the natural systems while conserving values and function and also to protect the Miami County residents from flood hazards.

The open space, conservation and recreation designation along parts of the Great Miami River and its tributaries continues to restore the river systems to a healthy environment. This corridor also serves as a water supply for three communities. The Hazard Mitigation Committee

continues to support and re-emphasize its goals that coincide with the Miami County Comprehensive Plan goals to maintain the county river corridors as open space and to protect the woodlands, wetlands, and compatible farming practices that contribute to a healthy river system. Open spaces are encouraged within the drainage basin of Swift Run Lake north of Piqua and around the Tipp City and Troy well fields. Recreation facilities and sites are very appropriate along this corridor and fit well with the bike path plan and recreational facilities that are already established. Some examples of the major recreational sites include Piqua Country Club, Johnston Farm, the Hollow, Forest Park, Eldean Road Covered Bridge, Mark Knoop Ball fields, Paul G. Duke Park, North Market Street Ball Fields, Archer Park, Troy Community Park and Miami Shores Golf Course next to the river. Hobart Arena recreation area and the Troy High School and associated recreational facilities are landmarks in this downtown area. Remnants of the old canal wind through this corridor and are tied into the historic downtown Tipp City area. Cliffside Gold Course, Charleston Falls, and Taylorsville Reserve are prominent large recreational facilities. The completed bikeway from Piqua south to the county line is another example of the recreation excitement of the river corridor which is in process. The purchase and removal of 3 numerous commercial and residential structures along the Great Miami River in Concord Township and the construction and dedication of Barbee Park is another mitigation success story for the County.

In addition, the scenic Stillwater River corridor is meant to encourage conservation and maintain good water quality. Both the Stillwater River and Greenville Creek are designated scenic rivers by the State of Ohio. The Villages of West Milton, Ludlow Falls and Covington are found along this scenic waterway. Limited residential development is encouraged to preserve the open space and floodplains in the southeast corner of the county. The Honey Creek corridor has flood hazard conditions overseen by the county and the Miami Conservancy District as well as the Honey Creek Watershed Association. Again, the Hazard Mitigation Committee supports to maintain its open space, protection of the floodplains, several significant woodlands, and wetlands.

The following action item table summarizes all of the Miami County Hazard Mitigation 2006-2011 projects as completed, deleted, no change or as ongoing. If the project was not completed a reference note in the far right hand column indicates the reasoning for the uncompleted project.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note							
																					Hazard Type				Plan Goals Addressed		
1				X	Countywide	X	X	X	X	Provide workshops, promotions, and distribution of natural and manmade disaster & tornado safety flyers & data through school system, public functions to increase people's awareness to their vulnerability during these events.	Miami County EMA Northern Miami Valley Red Cross Chapter	Ongoing	High	X						X							
1A				X	Countywide				X	Special Needs Assessment	Miami County EMA Northern Miami Valley Red Cross Chapter	1-3 Years	High	X				X									
2				X	Countywide	X	X	X	X	On-going training of Emergency Service Personnel on what to do and how to respond during disaster and hazard events.	Miami County EMA	3-5 Years	Low			X											
2A	X				Countywide	X	X	X	X	Hazardous commodity flow study.	Miami County EMA Northern Miami Valley Red Cross Chapter	Complete 2009	High	X		X			X								
3				X	Countywide		X			Recommend code updates to include tornado resistant construction techniques such as hurricane straps, tiedowns, & tornado saferooms within structures.	Miami County Building Regulations	2 - 3 Years	Moderate	X	X												
4	X				Countywide	X	X	X	X	Utilize upgraded technology advances by using localized indoor warning system such as reverse 911 system.	Miami County EMA	Complete 2006	High	X		X			X								
5				X	Countywide		X			Promote & expand outdoor warning siren use for all communities & for remote county park areas.	Miami County EMA Miami County Park District	3 - 5 Years	Low	X	X				X								
6				X	Countywide		X			Set up & perform public building & school building assessment program to establish designated tornado safety areas.	Miami County EMA Northern Miami Valley Red Cross Chapter	2 - 4 Years	Moderate	X		X			X								
7	X				Countywide	X				Provide new, updated flood zone mapping (GIS mapping) for entire county. Last report from FEMA regarding flood map updates was that they were moving forward.	Miami County Planning & Zoning FEMA	Complete 2011	Moderate	X													

Reference Note:

- A. Not completed due to lack of staffing and funding.
- B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note	
						Hazard Type								Plan Goals Addressed							
8			X		Countywide	X				Develop plan to review base flood plain elevations throughout county.	Miami County EMA Miami County Planning & Zoning	3 - 5 Years	Moderate	X	X						A
9				X	Countywide	X				Preserve floodplain areas as natural areas, wetland protection, bike trails, etc. along river corridors, in & around designated flood plains.	Miami Conservancy District Miami County Commissioners Miami County Park District	Ongoing	High	X	X			X			
10	X				Countywide	X				Continued development of stormwater management, ordinances & regulations. Continue countywide drainage maintenance program, storm drainage improvements & storm sewer maintenance.	Miami County Engineer	Complete 2007	Moderate	X	X		X	X			
11				X	Countywide	X				Continue to replace bridges & roadways so they are constructed and elevated above base flood elevations.	Miami County Engineer	Ongoing	Low		X		X				
12				X	Countywide	X				Continued strong participation & maintenance in the Miami Conservancy District structures including protection of existing dams, dikes, floodwalls, levees.	Miami Conservancy District	Ongoing	High	X	X		X	X			
13				X	Countywide	X	X		X	Identify critical facilities that need emergency backup generator systems.	Miami County EMA	2 - 4 Years	Moderate	X		X					
14				X	Countywide		X			Continued maintenance & operation of existing tornado warning sirens.	Miami County EMA	Ongoing	Moderate	X		X			X		
15				X	Countywide	X	X	X		Increase communication, coordination & collaboration between community leaders, property owners, local & county building regulations and zoning authorities to address risk & to provide uniformity & consistency in implementing sound mitigation practices.	Local & City Village Officials Township Zoning & Planning Officials Miami County Hazards Mitigation Planning Committee	Ongoing	Moderate	X					X		
16				X	Countywide		X			Encourage construction of saferooms at county & community parks, large mobile home parks, campgrounds, fairgrounds.	Miami County EMA Local Park Boards Private Park Owners	Ongoing	Moderate	X			X		X		

Reference Note:

A. Not completed due to lack of staffing and funding.

B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note	
						Hazard Type								Plan Goals Addressed							
17				X	Countywide	X	X			Continue promotion of NOAA Weather Radio program for festivals, fairgrounds, campgrounds, parks, recreation areas, & medical facilities.	Miami County EMA	Ongoing	Moderate	X						X	
18			X		Countywide	X				Identify surface water/county tile drainage obstructions for unincorporated areas of Miami County.	Miami County Engineer Township Trustees	2 - 4 Years	Moderate	X	X		X				A
19	X				Countywide	X	X		X	Installation of emergency generator system for Miami County Health District facility.	Miami County Health District	Complete 2006	High	X	X	X					
20				X	Countywide		X			Tornado saferoom for Community Parks. (Stillwater Preserve Restroom Completed)	Miami County EMA Miami County Park District	3 - 5 Years	Low	X			X				
21			X		Countywide			X		Evaluate traffic hazard warning devices/systems.	Miami County EMA	3 - 5 Years	Low	X	X	X		X			A
22				X	City of Piqua	X				Floodproof lower level of floodprone commercial structure along Miami River (St. Rt. 25A, south of Piqua).	Miami County EMA	2 - 4 Years	Moderate	X	X		X				
23			X		City of Piqua	X				Mitigate 3 or 4 houses in the 100 year flood plain below Swift Run at the water plant within the City of Piqua.	Miami County EMA City of Piqua	2 - 4 Years	Moderate	X	X		X				A
24				X	City of Piqua	X				Mitigate flooding of homes in floodprone area, City of Piqua along Lockington Road area.	Miami County EMA	2 - 4 Years	Moderate	X	X		X				
25				X	City of Piqua	X				Continued maintenance of the Swift Run Class I Dam (#1) (Public Recreation)	City of Piqua	Ongoing	High	X	X		X	X			
25A	X				City of Piqua				X	Completed EOP (Emergency Operations Plans)	City of Piqua	Complete	High			X					
26				X	City of Piqua	X				Continued maintenance of the Swift Run Class I Dam (#2) (Public Recreation)	City of Piqua	Ongoing	High	X	X		X	X			

**Reference Note:**

A. Not completed due to lack of staffing and funding.

B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note
						Hazard Type								Plan Goals Addressed						
27				X	City of Piqua	X				Continued maintenance of the Swift Run Class I Dam (Water Supply Dam)	City of Piqua	Ongoing	High	X	X		X	X		
28				X	City of Tipp City		X			Provide for additional tornado sirens.	Tipp City Officials	2 - 4 Years	Moderate	X					X	
29	X				City of Tipp City	X				East Tipp City levee closure (sand bag closure) - South End.	Tipp City Officials Miami Conservancy District	Complete 2007	High	X	X		X			
29A				X	City of Tipp City	X				East Tipp City levee closure (sand bag closure) - North End.	Tipp City Officials Miami Conservancy District	1 - 2 Years	High	X	X		X			
30				X	City of Tipp City	X				Mitigate 3 homes, garages, farm bldgs., a sewer pumping station, 2 well head bldgs., 2 park bldgs., & 1 athletic field on E. Main Street and 1 home, 1 athletic field & 1 parking lot on Wagon Wheel Road all of which are in 100 year flood plain.	Tipp City Officials	2 - 4 Years	Moderate		X		X			
30A	X				City of Tipp City	X				Controls of wells elevated above floor levels and athletic field structures are food proofed.	Tipp City Officials	Complete	Moderate	X	X					
31				X	City of Tipp City	X				Develop Storm Water Plan.	Tipp City Officials	2 - 4 Years	Moderate	X	X		X		X	
32	X				City of Troy (or Concord Township)	X				Mitigate mobile homes located in the Harrison Street Mobile Home Court that are located within the 100 year flood plain. Sewer and water utilities are being installed.	Mobile Home Court Owner Miami County EMA	Complete 2009	Moderate	X	X		X			
33	X				City of Troy	X			X	Provide improvements to storm and sanitary sewer lines to City of Troy's southeast side.	City of Troy Officials	Complete	Moderate	X			X	X		
34	X				City of Troy		X		X	Install emergency generators at the Sewage Treatment Plant and Water Treatment Plant.	City of Troy Officials	Complete 2006	High	X	X					

**Reference Note:**

- A. Not completed due to lack of staffing and funding.
- B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note
						Hazard Type								Plan Goals Addressed						
35	X				City of Troy	X				Phase I: Repair and replace catch basins.	City of Troy Officials	Complete 2010	Low				X			
35A				X	City of Troy	X				Phase II: Repair and replace catch basins.	City of Troy Officials	3 - 5 Years	Moderate				X			
36	X				City of Troy	X				Provide Terry Street bridge replacement.	City of Troy Officials	Complete	Moderate				X			
37	X				City of Troy	X				Address basement flooding of residence in Westbrook Subdivision.	City of Troy Officials	1 - 3 Years	Moderate		X		X			
38	X				City of Troy	X				Phase I: Address flooding of McKaig Ditch and Kidder Ditch systems.	City of Troy Officials	Complete	Moderate		X		X			
38A				X	City of Troy	X				Phase II: Address flooding of McKaig Ditch and Kidder Ditch systems.	City of Troy Officials	1 - 3 Years	Moderate		X		X			
39	X				Village of Bradford		X			Outdoor warning siren system for Bradford.	Miami County EMA City of Bradford	Complete	Low	X						X
39A				X	Village of Bradford		X			Connect outdoor warning siren system to Darke County.	Miami County EMA City of Bradford	1 - 3 Years	High							X
40	X				Village of Casstown	X			X	Perform evaluation of sanitary sewer.	Miami County Health Department Village Officials	Complete 2007	Low				X	X		
40A				X	Village of Casstown				X	Perform evaluations of water system.	Miami County Health Department Village Officials	3 - 5 Years	Low	X	X		X	X	X	
40B	X				Village of Casstown				X	Construction of sanitary sewer system.	Miami County Health Department Village Officials	Complete 2009	Medium	X	X		X	X	X	
41	X				Village of Covington		X			Implement tornado sirens for Covington Community Park.	Miami County EMA Village Officials	Complete 2008	High	X						X

**Reference Note:**

A. Not completed due to lack of staffing and funding.

B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note
						Hazard Type								Plan Goals Addressed						
42	X				Village of Covington	X	X			Provide emergency generator for Police Department and Fire Department.	Village Officials	Complete 2008	High	X		X			X	
43				X	Village of Fletcher	X			X	Storm sewer work.	Village Officials	2 - 4 Years	Moderate	X				X		
43A	X				Village of Fletcher	X			X	Sanitary sewer work.	Village Officials	Complete 2010	Moderate	X				X		
44	X				Village of Laura		X			Implement community tornado sirens. Placed on water tower.	Miami County EMA Village Officials	Complete	Moderate	X					X	
45				X	Village of Laura		X			Construct community tornado saferoom for the Mobile Homes.	Miami County EMA Village Officials	3 - 5 Years	Low	X			X		X	
45A				X	Village of Laura				X	Emergency generator power line from sewer plant to water plant	Village Officials	1 - 2 Years	High	X	X	X				
45B				X	Village of Laura	X			X	Extend storm sewers for flood prone homes on Pemberton Road	Village Officials	2 - 3 Years	Moderate	X	X		X			
46	X				Village of Ludlow Falls	X			X	Evaluate flooding and storm water needs.	Village Officials	Complete	Moderate	X				X		
47	X				Village of Pleasant Hill		X			Update community tornado siren.	Miami County EMA Village Officials	Complete 2007	Moderate	X			X		X	
48		X			Village of Pleasant Hill	X				Mitigate Village water pumps in flood zone.	Village Officials	1 - 2 Years	High	X	X			X		
48A				X	Village of Pleasant Hill	X				Sanitary sewer infiltration protection.	Village Officials	3 - 5 Years	Moderate	X	X			X	X	
49	X				Village of Pleasant Hill	X				Address flooding at residences along S.R. 718, Pleasant Hill and local flooding in this vicinity.	Miami County EMA Village Officials	Complete 2008	High		X		X			

**Reference Note:**

- A. Not completed due to lack of staffing and funding.
- B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note			
						Hazard Type								Plan Goals Addressed									
50	X				Village of Pleasant Hill	X				Address flooding of residence Lauver Road, Pleasant Hill.	Miami County EMA Village Officials	Complete	Moderate		X		X						
51	X				Village of Potsdam	X				Generalized flooding due to deteriorating farm drainage tiles (east & west portions of Village).	Miami County Engineer Village Officials	Complete 2010	Moderate	X	X								
52	X				Village of West Milton		X			Implement outdoor tornado sirens at 4th of July celebration.	Miami County EMA Village Officials	Complete	Low	X						X			
53				X	Bethel Township	X				Phase I, II & III - Honey Creek Stream Bank Repair	Honey Creek Watershed Miami Conservancy District Miami County Park District	2 - 4 Years	Moderate	X	X		X	X					
54		X			Brown Township	X				Identify surface water & drainage tile obstructions.	Brown Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X				B		
55			X		Concord Township		X			Evaluate potential tornado saferoom for the Fairgrounds.	Miami County Fair Board Miami County EMA	3 - 5 Years	Moderate	X			X				A		
56	X				Concord Township	X				Elevate or buy out of flood prone structures in the flood plain along the Miami River north of Troy. (Barbee Park)	Township Trustees Miami County EMA Miami Conservancy District	Ph. I - Complete 2006	High	X	X		X	X					
56A	X				Concord Township	X				Elevate or buy out of flood prone structures in the flood plain along the Miami River north of Troy.	Township Trustees Miami County EMA Miami Conservancy District	PH II - Complete 2010	High	X	X		X	X					
56B				X	Concord Township	X				Elevate or buy out of flood prone structures in the flood plain along the Miami River north of Troy.	Township Trustees Miami County EMA Miami Conservancy District	Ph. III - 3 - 4 Years	Moderate	X	X		X	X					
57	X				Concord Township	X				Mitigate buildings within the Fairgrounds that are in the 100 year flood plain. Demolition of several fairground structures has occurred within the flood plain.	Township Trustees Miami County Fair Board Miami County EMA Miami County Commissioners Miami Conservancy District	Complete 2011	Moderate	X	X		X						
58				X	Concord Township	X				Modify flood gate #24 on Morgan Ditch for improved drainage of Fairgrounds.	Miami Conservancy District	1 - 3 Years	High	X	X		X	X					

**Reference Note:**

A. Not completed due to lack of staffing and funding.

B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note
						Hazard Type								Plan Goals Addressed						
59	X				Concord Township	X				Mitigate flooding of homes in Troy southern subdivision area. (Home Acres)	Concord Township Trustees Miami County Engineer	Complete 2008	Moderate	X	X		X			
60				X	Concord Township	X				South Concord Township flooding along Fenner Road areas west of Barnhart Rd. and near Wilson Rd. City of Troy's corrective plan has been adopted and is moving forward.	Concord Township Trustees Miami County Engineer	2 - 4 Years	Moderate	X	X		X			
61				X	Concord Township	X				Mitigate floodprone structures north of Boone Hill, +/- 1/2 mile strip along both sides of C.R. 25A (several businesses, residences).	Concord Township Trustees Miami County EMA	2 - 4 Years	Moderate	X	X		X			
61A				X	Concord Township	X				State Route 718 Ziegenfelder ditch.	Concord Township Trustees Miami County EMA	2 - 4 Years	Moderate	X	X		X			
61B				X	Concord Township	X				Camp Troy/Boone Hill ±100 properties. Water & Sanitary Sewer System Extension to replace wells and septic systems	Concord Township Trustees Miami Co. Sanitary Engineering	1 - 2 Years	High	X	X		X		X	
62		X			Elizabeth Township	X				Identify surface water & drainage tile obstructions.	Elizabeth Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X			B
63		X			Lost Creek Township	X				Identify surface water & drainage tile obstructions.	Lost Creek Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X			B
64	X				Monroe Township		X			Tornado sirens. Tornado sirens are moving forward and will operate in conjunction with Tipp City's warning sirens.	Monroe Township Trustees	Complete 2011	Moderate	X						X
65		X			<del>Monroe Township</del> (DELETED - This is covered by Activity 30.)	X				<del>Mitigate 3 homes in 100-year flood plain along S.R. 571.</del>	<del>Monroe Township Trustees</del> Miami County EMA	<del>2-4</del> Years	Moderate	X	X		X			
66			X		Newberry Township	X				Identify surface water & drainage tile obstructions.	Newberry Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X			
67				X	Newton Township	X				Owens Road flooding.	Newton Township Trustees Miami County Engineer	2 - 4 Years	Moderate	X	X		X			

**Reference Note:**

- A. Not completed due to lack of staffing and funding.
- B. No issues identified by township.

# MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS

January 2006 - July 2011

Activity	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Hazardous Materials	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	Reference Note
						Hazard Type								Plan Goals Addressed						
67A	X				Newton Township	X				Flooding along S.R. 718 east of Pleasant Hill.	Newton Township Trustees Miami County Engineer	2 - 4 Years	Moderate	X	X		X			
68		X			Spring Creek Township	X				Identify surface water & drainage tile obstructions.	Spring Creek Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X			B
69			X		Spring Creek Township (or City of Piqua)		X			Tornado saferoom for the Mobile Home Court on 25A.	Mobile Home Court Owner Miami County EMA	3 - 5 Years	Low	X			X			A
70				X	Staunton Township	X				Identify surface water & drainage tile obstructions.	Staunton Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X			
71		X			Union Township		X			Tornado saferoom for Mobile Home Court located west of West Milton on S.R. 571.	Mobile Home Court Owner Miami County EMA	3 - 5 Years	Low	X			X			B
72		X			Washington Township	X				Identify surface water & drainage tile obstructions.	Washington Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X			B
73				X	Miami County Park District	X	X		X	Expand weather warning sirens in the major county parks.	Miami County EMA Miami County Park District	2 - 4 Years	Moderate	X	X				X	
74				X	Miami County Park District		X			Provide multi-purpose safe building at the Stillwater Prairie Reserve. New concrete masonry block restroom facility was constructed at the Stillwater Prairie Reserve which affords some safety from storms.	Miami County Park District Miami County Building Regulations	2 - 4 Years	Moderate	X	X					
75	X				Miami Co. Sanitary Engineering Dept.	X				Lytle Road Pump Station north of Troy.	Miami County Officials Miami County Sanitary Engineering Dept.	Complete 2008	High	X	X		X			
76	X				Miami Co. Sanitary Engineering Dept.	X			X	Phase III: North County Road 25A Sewer Extension Project	Miami County Officials Miami County Sanitary Engineering Dept.	Complete 2011	High				X			

**Reference Note:**

A. Not completed due to lack of staffing and funding.

B. No issues identified by township.

### 3.3 2006 Plan Goals

Many of the Miami County communities have stressed the need for emergency backup power for their critical facilities. The Hazard Mitigation Team, through its research, found that several cities and villages expressed the need for these systems. The City of Troy, Miami County Health Department and the Village of Covington all indicated this need. Emergency backup power generators could be used during a power outage which could be the result of almost any natural or manmade hazard.

F-3 and F-4 tornados in nearby counties, such as the Arcanum and Van Wert tornados, have shown the importance of advance warning systems, better tornado resistance techniques, and well-trained first responders. Public education and information also would greatly aid in reducing risk and loss of life to Miami County's citizens.

The Miami County Hazard Mitigation Team put together the following goals and objectives in order for Miami County to achieve its mitigation strategy of reducing the potential losses and long-term vulnerabilities to the identified hazards.

#### **Goal #1:**

It shall be the goal of the Miami County Hazard Mitigation Team to promote the continued preservation of open space, floodplains, wetlands, woodlands and recreation areas along Miami County's stream and river corridors.

#### **Objectives:**

- Promote Hazard Mitigation Grant Program initiatives for voluntary buyout for floodplain structures within the 100 year floodplain and flood districts along Miami County's river and stream corridors.
- Promote and acquire conservation easements to allow for preservation of open space, recreation areas, bike paths along the Miami County stream and river corridors.
- Provide and update new flood zone mapping for the county.
- Enhance data and mapping of floodplain information within Miami County and identify flood prone areas that exist outside of the 100 year floodplain.
- Identify additional sources of funding.

#### **Goal #2:**

It shall be the goal of the Miami County Hazard Mitigation Team to identify and reduce existing flash flooding/surface drainage problems throughout the Miami County communities.

#### **Objectives:**

- Protect Miami County residents from flooding.
- To utilize and improve the storage capacity of manmade and natural systems while conserving values and functions.
- To enforce the program for the management of surface water and ground water in Miami County.
- To develop strategic partnerships with other organizations for opportunities that will help reduce flooding.

**Goal #3:**

It shall be the goal of the Miami County Hazard Mitigation Team to promote the continued maintenance and improvement of the county flood protection structures such as floodwalls, levees, floodgates, dam and spillway structures, retention/detention basins, storm sewer and county drainage systems.

**Objectives:**

- To utilize, maintain and improve the existing drainage structures in a safe condition and manner.
- To protect the Miami County residents from flood hazards.
- To periodically assess the conditions of existing drainage systems and drainage structures.
- To update weakened or deteriorating structures in order to maintain safety for the Miami County residents.

**Goal #4:**

It shall be the goal of the Miami County Hazard Mitigation Team to encourage, promote and implement public awareness and education programs of manmade and natural hazards for citizens, private property owners, public agencies, businesses, industry and schools.

**Objectives:**

- Develop curriculum for school programs and public education on reducing risk and implementing mitigation techniques.
- Develop promotional mitigation materials for disbursement to the public.
- Effectively communicate with the public through workshops to raise awareness of various mitigation programs and techniques.

**Goal #5:**

It shall be the goal of the Miami County Hazard Mitigation Team to promote and support the on-going training of emergency service personnel and first responders with hazard mitigation programs.

**Objectives:**

- Encourage individual family and group preparedness through public education projects.
- Identify opportunities for partnering with citizens, private contractors and other jurisdictions to increase the availability and coordination of manpower and equipment.
- Continue support of the CERT teams.
- Familiarize public officials of requirements regarding public assistance for disaster response.

**Goal #6:**

It shall be the goal of the Miami County Hazard Mitigation Team to encourage and promote up-to-date warning and communication systems throughout the county.

**Objectives:**

- Evaluate the feasibility of implementing a countywide Reverse 911 System.

- Evaluate current tornado warning systems to assure effectiveness and efficiency and increase coordination between local jurisdictions.
- Work with Ohio Department of Transportation on encouraging the installation and use of electronic message boards along the I-75 corridor.
- Encourage tornado siren systems with battery backup for remote park system areas and for festival areas.
- Encourage continued use of NOAA weather radios for business, industry, schools
- Identify additional sources of funding.

**Goal #7:**

It shall be the goal of the Miami County Hazard Mitigation Team to establish and implement measures that will reduce damage, risk and loss of life from tornado and severe weather events.

**Objectives:**

- To promote the construction of community tornado safe rooms for community parks, recreational areas, mobile home parks and other vulnerable areas.
- To promote the benefits of incorporating tornado safe rooms into new residential building construction.
- To encourage local building code updates to include tornado resistant techniques such as hurricane straps/tiedowns and safety glazing.
- Encourage private and public removal of potentially hazardous tree failure which threatens lives, property and public infrastructure.
- Support and encourage underground utility use.

**Goal #8:**

It shall be the goal of the Miami County Hazard Mitigation Team to improve critical facilities so they are located out of the 100 year floodplain, are constructed using tornado resistant construction techniques, have emergency backup power, are secure and afford adequate security for the purposes they serve.

**Objectives:**

- To protect critical facilities from natural and manmade hazards.
- Determine vulnerability of all existing critical facilities.
- Perform assessment of mitigation actions to be taken for each critical facility.
- Develop and introduce measures that will reduce damage and risk to critical facilities.
- Identify additional sources of funding.

### 3.4 2011 Plan Goals

#### **GOAL #1 Continuation (Property Protection and Natural Resource Protection)**

It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued preservation of open space, floodplains, wetlands, woodlands, and recreation areas along Miami County's stream and river corridors.

#### Objectives

- Promote and acquire conservation easements to allow for preservation of open space, recreation areas, and recreational trails along the Miami County stream and river corridors.
- Protect Miami County residents from flooding by promoting and utilizing Hazard Mitigation Grant Program funding and alternate source funding initiatives including voluntary buyout or flood proofing of structures within the 100 year floodplains. A priority emphasis will be placed on the current list of repetitive loss structures.
- Relocate critical facilities out of the 100 year floodplain.
- Continue to compile enhanced data regarding floodplain structures and elevations within Miami County and seek funding to alleviate flood prone area problems that exist within the 100 year floodplain.
- Identify funding opportunities and obtain funds from various federal, state, and local entities to implement mitigation activities.
- Obtain public support and seek source funding for the above objectives.

#### Discussion

Miami County continues to make good progress in preserving green space within the 100 year flood plain areas with acquisition of additional land for that purpose and by the removal of several structures. However, according to the updated FIRM flood plain maps numerous residences and buildings still exist within the 100-year designated floodplains in various areas of Miami County.

Several of these structures are located along the Great Miami River north of Troy. Some of these structures have failing septic systems and these buildings have been damaged numerous times during past major flooding events. With the recent updating of county flood plain maps, several additional repetitive structures in Troy and within the unincorporated areas of the county, have been identified. A new objective has been added to this goal to address these repetitive loss structures. The county has approximately six critical facilities that are within the 100 year floodplain.

#### **GOAL #2: Continuation (Property Protection and Structural Projects)**

It shall be the goal of the Miami County Hazard Mitigation team to identify and reduce the impact of urban and small stream flooding and surface drainage problems throughout Miami County and its communities and continue to promote ongoing maintenance and improvement to storm drainage systems and flood control structures.

### Objectives

- To protect Miami County residents from flooding.
- To support the programs for the management of surface water and groundwater in Miami County and promote sustainable land design, construction and maintenance practices.
- To develop strategic partnerships with other organizations for opportunities that will reduce flooding.
- To utilize, maintain, and improve storm sewers, county drainage systems, detention and retention basins, flood protection structures, flood walls, levees, dams, and spillway structures in good condition.
- To repair or replace weakened or deteriorating structures in order to maintain safety for the Miami County residents.
- Identify funding opportunities and obtain funds from various federal, state, and local entities to implement mitigation activities.
- Obtain public support and seek source funding for the above objectives.

### Discussion

Several areas of Miami County have had past urban and small stream flooding issues and these structures are not located within a designated river line flood plain area. These drainage problems in some cases are a result of poor site selection during the initial construction of these homes or businesses. The sites lack proper drainage and generally were built during the large growth period of the 1950's – 1970's. Progress is being made with enhanced storm management practices which help to address these types of flooding issues. This goal is still valid and the objectives have been modified slightly to address changing conditions. Several of these types of mitigation activities have been addressed as indicated within the completed list of action items.

Having adequately sized drainage structures, storm sewers, detention/retention facilities, and maintaining dams, levees, and flood control structures in good condition is essential to reduce flood damage, injuries, and loss of life during major flooding events. Miami County continues to have good ongoing initiatives to maintain or replace these systems and the Miami County Hazard Mitigation Committee concurred that these goals and objectives shall remain. Several mitigation activities relative to this goal are identified and addressed within the action items.

### **GOAL #3: Continuation (Public Information)**

It shall be the goal of the Miami County Hazard Mitigation Committee to encourage, promote and implement public awareness and education programs of manmade and natural hazards for citizens, private property owners, public agencies, businesses, industry and schools.

### Objectives

- Continue curriculum for school programs and public education on reducing risk and implementing mitigation techniques.
- Continue promotional mitigation materials for disbursement to the public.

- Effectively communicate with the public through workshops to raise awareness of various mitigation programs and techniques.

### Discussion

The disruptions caused by the loss of use of structures and infrastructure can leave the general population vulnerable and jeopardize the safety and well being of communities. Temporary loss of facilities cause stoppage of goods and services, lost wages, and tax revenue for all sizes of government. Large devastation can result in the interference of the social well being of a community. The Miami County Hazard Mitigation Committee with the assistance of such organizations as the Northern Miami Valley of the Red Cross, Calamityville (in association with Wright State University), the Miami County Emergency Management Agency, and the Miami County Local Emergency Planning Committee continues to promote awareness and education of natural and manmade hazards that threaten them. Community representatives, public service announcements, workshops, and printed, electronic, and video materials were disseminated throughout the past 5 years that inform the public about how to stay safe and protect their homes, businesses, and families. The Miami County Hazard Mitigation Committee intends to continue this Community Disaster Education (CDE) Program.

### **GOAL #5: New (Preventative-Public Information)**

Provide improved integration and coordination of hazard mitigation policies and programs throughout the county and with the State of Ohio mitigation policies and procedures.

### Objectives

- Work with county municipalities, townships, county agencies and Ohio Emergency Management to better align mitigation policies and programs so they see how all the pieces of the mitigation puzzle fit together.
- Create a “hazard mitigation specialist” program whereby representative(s) from each community or agency can be trained and learn the importance of integrating and coordinating hazard mitigation programs and policies into local planning mechanisms.
- Educate municipalities and county agencies on hazard mitigation funding opportunities available from various federal, state, and local entities for implementation of mitigation activities.
- Obtain public support for the above objectives.

### Discussion

Many communities do not fully understand the importance of hazard mitigation planning strategies and how such activities can reduce risk, save lives and make for a better community. Communities must be educated to understand that the results of being proactive and implementing pre-disaster mitigation activities can lead to results that save lives, reduce risk and lessen hazard event damages.

**GOAL #6: Continuation (Public Information-Emergency Service Measures)**

It shall be the goal of the Miami County Hazard Mitigation Committee to encourage and promote installation of up-to-date hazard warning and communication systems throughout the county and address proper response for the special needs population of the county.

Objectives

- Evaluate current tornado warning systems to assure effectiveness and efficiency and increase coordination and implementation between local jurisdictions.
- Work with Ohio Department of Transportation on encouraging the installation and use of electronic message boards along the I-75 corridor.
- Encourage adding tornado siren systems with battery backup for remote park system areas and for festival areas.
- Encourage continued use of NOAA weather radios for business, industry, schools, daycare center, hospitals, nursing homes, and private residences.
- Assess the “special needs population” for Miami County.
- Identify funding opportunities and obtain funds from various Federal, State, and Local entities to implement mitigation activities.
- Obtain public support and seek source funding for the above objectives.

Discussion

The Miami County Communications Center telecommuters respond to an average of over 81,000 incoming calls per year. On February 8, 2007 the Miami County Emergency Notification System (MCNS) became fully operational. In the event of a significant emergency, extreme weather event, or other catastrophe citizens can be alerted by telephone with information and instructions.

The Miami County Communications Center provides not only call handling but radio communication services to 49 agencies and data services for 28 agencies in the county. The data services are provided to public service organizations through (CAD) computer aided dispatch and records systems. The Miami County dispatch center and communications center is one of the most technologically advanced in the state and it is the intent of the Miami County Hazard Mitigation Committee to continue to promote the use of the latest technology systems for hazard warning and communication systems for the good of its citizens.

**GOAL #7: Continuation (Preventative-Property Protection)**

It shall be the goal of the Miami County Hazard Mitigation Committee to establish and implement measures that will reduce damage, risk, and loss of life from earthquake, tornado and high wind events.

Objectives

- To promote the construction of community tornado shelters for community parks, recreational areas, mobile home parks and other vulnerable areas.
- To promote the benefits of incorporating tornado shelters into new residential building construction.

- To encourage local building officials to include in building code updates the latest industry and technology which improves seismic and wind design and construction techniques.
- Encourage private and public removal of potentially hazardous tree failure which threatens lives, property and public infrastructure.
- Support and encourage urban forestry recommendations and practices and recommend implementation into planning documents.
- Support and encourage underground utility use.
- Identify funding opportunities and obtain funds from various Federal, State, and Local entities to implement these mitigation activities.
- Obtain public support and seek source funding for the above objectives.

### Discussion

It is essential that mitigation planning be incorporated into the local land use initiatives and building code regulations. Strengthening the codes for building design to resist the forces of nature and by locating buildings out of high hazard areas will reduce physical, social, and large economic disruption that accompanies disasters. Damages and loss of lives by falling trees is substantial. Taking advantage of urban forestry programs and policies can pay huge dividends in regards to reducing wind storm losses caused by downed limbs or trees.

### **GOAL #8: New Goal (Preventative Public Information)**

It shall be the goal of the Miami County Hazard Mitigation Committee to reduce risk, loss of lives by promoting preparedness and awareness of Severe Winter Storm events to its county residents.

### Objectives

- To better prepare the citizens of Miami County for severe winter storms.
- Educate the public on the safety precautions and procedures for such an event.
- Develop programs to assist the segments of the population that are more vulnerable to the severe winter storm events.

### Discussion

It is desirable that mitigation planning for severe winter storms be incorporated into the local planning initiatives. Past severe winter storms have caused some of the most significant property damages and loss of life for county residents. Better education, awareness and preparation for these events can help lessen the impact and reduce risk and loss of life. Because the county is largely rural it is prone to greater risk from such a hazard. A larger elderly population can also make the county more vulnerable for such an event. Taking advantage of better communication systems and pre-disaster planning and public awareness can help reduce risk and loss of life for such an event.

### 3.5 Identifying Mitigation Activities

Since the 2006 Miami County Hazard Mitigation Plan approval the Miami County Hazard Mitigation Committee has met yearly and on an “as needed” basis to add, delete, change or reprioritize hazard mitigation activities based on Miami County’s changing needs and conditions. The Miami County Hazard Mitigation Committee’s annual review and re-evaluation process has permitted steady progress to occur and allows for good communication with all project stakeholders. The ongoing collaborative effort lets the stakeholders be aware of progress, new funding opportunities (which are crucial to project success) and changes necessary to accomplish the overall plan goals..

Generally the activity items determined are a result of the following:

- From analyzing the results of the Miami County Hazard Risk Assessment.
- From problem statements developed by the Miami County Hazard Mitigation Committee.
- Public input from public meetings, contributions from County agencies and from County mitigation workshops and good participation from municipalities in the ongoing planning process.
- The activities selected are in line with the plans overall goals as established by a consensus of the Miami County Hazard Mitigation Committee.

The research and problem statements tend to show that high winds/tornados, severe winter storms, and flooding events are of primary concern and were the most “probable” and “critical” of the hazards identified within the County. According to the NCDC past losses for these three hazards in the Miami County Hazard Risk Assessment were \$17,082,000 for severe winter storms; \$3,753,000 for windstorms/tornados; and \$1,632,000 for flooding events.

Although many of the action items considered and chosen as priority will reduce risk and losses for all of the potential County hazards identified in the Miami County Hazard Risk Assessment, the Hazard Mitigation Committee considered tornados/high wind events, flooding and winter storm hazard categories the priority hazard activities to mitigate over the next five year plan period. In addition to the hazard risk assessment severity level, other county planning document goals and citizens input were influential in the committees preferences on which mitigation activities should be considered.

The Miami County Hazard Mitigation Committee has continued to use the following criteria in ranking and selection of the general hazard mitigation activities:

- Cost effectiveness.
- Technical feasibility.
- Environmental soundness.
- Social impacts.
- Does the activity address the problem?
- Does the activity meet federal, state and local regulations?
- Is the activity politically acceptable?
- Does the activity reduce the risk?

The Hazard Mitigation Committee then determined a rating scale for each of these activity categories which were as follows:

Excellent	5
Good	4
Fair	3
Bad	2
Unacceptable	1

The general activity categories were originally developed by the Miami County Hazard Mitigation Committee and the members unanimously agreed to these general overall hazard categories. The committee members continue to form a consensus before scoring each category with a one through five ranking. Each general activity is then discussed and the committee members, in consensus, gave each criteria category a ranking. All of the criteria category scores are totaled to see which general hazard activity would be given a priority rating.

Consistently the top priority activity categories, by score, have been determined to be as follows (see Table 1 for complete results):

- Continued strong participation in maintenance and replacement of county flood structures such as dams, dikes, floodwalls, levees and floodgates along Miami County's rivers, lakes and streams.
- Presentation of river and stream corridor areas which are generally floodplain areas, open natural areas which are generally preserved open space, wetlands, woodlands and floodplain areas that may be used for recreation, park land, bike trails, nature and preserve areas.
- Providing the citizens of Miami County state-of-the-art communication and hazard warning systems
- Provide public information and awareness programs through county agency partnerships.
- Continued hazard assessment program of public buildings and school buildings for emergency shelter needs as well as occupant safety needs.

The mid-ranking activities were then assigned a medium priority ranking. The medium priority categories, by score, were determined to be as follows:

- Update building codes to include the latest in technology and upgraded construction techniques.
- Continue to promote and expand outdoor warning sirens for all communities.
- Mitigate structures from flood zones and implement dry and wet flood proofing techniques.
- Continued implementation of storm water management ordinances and regulations.
- Continue enhancements to the countywide drainage maintenance program, storm drainage improvements and storm sewer maintenance.
- Dam and levee safety maintenance programs.
- Improve mitigation activity interface between all county municipalities and agencies

The low priority categories, by score, were determined to be as follows:

- On-going training of emergency service personnel on what to do and how to respond during tornado disaster events. (The committee felt this activity was better addressed by

- the first responder groups)
- Tornado safe rooms (due to readiness of available funding )
- Continue to replace bridges and roadways so they are constructed and elevated above base flood elevations. (lesser degree of anticipated damages)

The activities list includes individual activities and projects recommended by the county, cities, villages, townships or other agencies or groups. At least one project activity was established for each community. The Hazard Mitigation Committee included for each action item:

- Identified the name of the community.
- Identified type of hazard.
- Provided a description of the action item.
- Established a coordinating organization or service agency.

Each Action Item includes a priority level of high, medium or low.

Plan goals that are to be addressed use the following six categories of hazard mitigation activities:

1. **Preventative:** Activities that keep problems from getting worse. The use and development of hazard areas are limited through planning or regulations. These activities are usually administered by building, zoning, planning, and/or code enforcement officials.
2. **Property Protection:** This is usually undertaken by property owners on a building-by-building or parcel basis.
3. **Emergency Service Measures:** Measures are taken during disaster events to minimize their impact. These measures are usually the responsibilities of city or county emergency management staff.
4. **Structural Projects:** These projects keep hazards away from an area. They include dams, dikes and levees and are usually long-term actions that have very high up-front costs and on-going maintenance costs.
5. **Natural Resource Protection:** This preserves or restores natural areas or the natural function of hazard areas. A floodplain or wetland area maintained in its natural state is an example of this.
6. **Public Information:** Programs that advise property owners, potential property owners, and visitors to hazard areas, as well as protect people and property from them. Public information can also increase people's awareness to their vulnerability and property risk.

**TABLE 1**  
**Miami County Hazard Mitigation Planning**  
**General Mitigation Activities Evaluation Criteria**

Proposed Types of Activities		Criteria								Total
		Cost Effective	Technically Feasible	Environmentally Sound	Social Impacts	Activity Addresses The Problem	Meets Federal, State & Local Regulations	Politically Acceptable	Activity Reduces the Risk	
Activity 1	Public Information ~ Distribution of tornado safety flyers and data through school system, public functions. Joint effort by Miami County EMA and North Miami Valley Red Cross Chapter to increase people's awareness to their vulnerability and property.	5	5	4	4	3	4	4	3	32
Activity 2	On-going training of Emergency Service Personnel on what to do and how to respond during tornado disaster events.	3	4	4	5	3	4	4	2	29
Activity 3	Update codes to include new construction technology.	3	4	4	3	5	4	3	5	31
Activity 4	Communication system upgrades.	4	3	5	5	5	4	4	5	35
Activity 5	Promote and expand outdoor warning siren use for all communities. (Alert radios tied to outdoor warning system.)	3	4	4	4	3	4	4	4	30
Activity 6	Set up and perform public building and school building assessment program.	3	3	5	5	3	4	5	4	32
Activity 7	Compile additional floodplain building and elevator data.	3	2	4	4	4	4	3	2	26
Activity 8	Remove structures from flood zones, implement dry and wet floodproofing techniques.	3	3	4	3	4	4	3	5	29
Activity 9	Preserve floodplain areas as natural areas, wetland protection, recreational trails, etc. along river corridors.	4	4	4	3	4	5	3	5	32
Activity 10	Continued implementation of stormwater management, ordinances and regulations. Continue countywide drainage maintenance program, storm drainage improvements, and storm sewer maintenance.	3	4	3	3	4	4	3	4	28
Activity 11	Continue to replace bridges and roadways so they are constructed and elevated above base flood elevations.	3	3	3	3	4	4	4	3	27
Activity 12	Promote dam and levee safety maintenance programs.	5	4	3	4	5	5	4	5	35

Rating Scale:  
 Excellent = 5  
 Good = 4  
 Fair = 3  
 Bad = 2  
 Unacceptable = 1

### 3.6 Re-Evaluating the County's Problems

During the November 2010 – May 2011 monthly planning sessions, the Miami County Hazard Mitigation Committee reviewed the updated Hazard Risk Assessment information as compiled by Mote & Associates. The committee re-evaluated the vulnerability analysis and estimate of losses, redefined problem statements, re-examined goals, identified additional mitigation activities, and update action plans necessary for the multi-jurisdictional plan of Miami County. In addition, the Miami County Hazard Mitigation Committee also held open public meetings and sent out questionnaires to all of the municipal officials to update the status of current mitigation activities and identify any new or changing mitigation issues experienced in their communities. The mitigation activity update process has been ongoing with the Miami County participating communities since the approval of the 2006 plan. By identifying and confronting problems and utilizing a continuous mitigation process the residents are more likely to understand the threat of future hazards and how they may impact the county.

The Hazard Mitigation Committee re-evaluated ongoing activities and discussed new issues that have come about since those originally identified as a part of the 2004 Miami County Hazard Risk Assessment. The Hazard Mitigation Committee reviewed and discussed the many types of hazards that can and will affect Miami County. Such as the August 1995 flooding in Piqua and the flooding of the Troy Fairgrounds area, progress has been made with several Fairground structures have been removed and new ones constructed that are elevated above the 100-year flood elevations. The City of Piqua was able to address some of the flooding problems by installing larger relief storm sewer systems, some of which were already designed. This is an example of continuous mitigation planning and actions already at work within Miami County communities. Some of the storm sewer projects that various Miami County communities have undertaken have lessened the losses of localized storms. While they will not prevent future major flooding, the new sewer systems will lessen the effects. The Cities of Piqua, Troy, and Tipp City, and the Villages of Covington, Fletcher, Laura, and West Milton are all listed as participating communities within the Federal Emergency Management Agency National Flood Insurance Protection Program (NFIP). The county has been very proactive in recommending homeowners that are in flood prone areas to participate in the NFIP program.

In addition to flooding, the other most likely hazard to significantly affect the county is tornadoes and high wind events. The damaging events of Tropical Storm Ike in 2008 indicated how vulnerable the County can be to a prolonged high wind event. In some cases power was out for five days causing considerable downtime and loss of revenue for many businesses. The benefits of incorporating mitigation strategies over time can help reduce the impact of future events such as tropical storm winds. For example, the benefits of an urban tree program can help lessen the impact by having fewer falling limbs and trees fall down on power and utility lines. Having emergency shelters with backup emergency power can be of great assistance to those that must have power for medical equipment needs. During high wind events the costs for shingle repairs and debris removal can be extensive. Heavier grade, higher wind resistant shingles can reduce the need for future roof repairs. Incorporating increased wind load requirements in to building codes will most likely lessen the damage and impact from future high wind events.

The Miami County Board of Commissioners adopted an updated Emergency Operations Plan on November 19, 2009, so that the County and local government would have a plan to

adequately confront the aftermath of natural and manmade disasters. The Miami County Emergency Operations Plan provides a comprehensive framework for countywide emergency management. While the countywide Hazard Mitigation Committee believes the County is well prepared to respond to these manmade and natural disasters, it is this committee's challenge to further identify problems in order to mitigate them. These mitigation activities will also help lessen the burdens experienced by the public officials, emergency operations staff and emergency personnel. The National Center for Medical Readiness at Wright State University in Fairborn, Ohio, is operating the Calamityville Tactical Laboratory Project, a state-of-the-art, innovative, integrated, collaborative training and research facility to provide a one-of-a-kind training opportunity for the world's medical, public health, public safety, and civilian and military disaster response decision. The recent 2010 opening of this facility allows emergency operations personnel and emergency management personnel to improve their skills and to be better prepared to respond to both natural and manmade hazards.

The Miami County Hazard Mitigation Committee decided to continue to utilize the current plan goals with just a few minor modifications to coincide with other goals of the Miami County community. The Committee focused on the main tools available which included the Miami County Emergency Operations Plan, Miami County Zoning, Subdivision and Area Planning Regulations, Miami County Comprehensive Plans, City Comprehensive Plans, Local Township and Village Zoning Regulations, Miami County Economic Planning and area accepted stormwater practices, and the Miami County Park District's open space goals and objectives. Also considered was the agricultural influence in the county and available watershed studies, floodplain studies, and the Miami Conservancy District goals and objectives.

The Miami County Emergency Management Agency is pleased that the Miami County community and its leaders have taken a proactive role with the completion of many of the 2006 priority mitigation activities outlines in the plan.

Some areas flash flooding and urban and small stream flooding still exist due to the 1960's and 1970's rapid development, and limited inspections for homes built during that time period. As a result of these problems, several countywide flash flooding areas and issues have been identified and are listed as mitigation activity items.

Many of the tools, such as the Miami County zoning and land use ordinances, are in place to prevent similar poor development practices. Over time with good mitigation practices and corrective measures the impact of future hazard events such as flooding should be eventually reduced.

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information														
																				Action Taken				Hazard Type				Plan Goals Addressed					
1					Countywide	X	X	X	X	Provide workshops, promotions, and distribution of natural and manmade disaster & tornado safety flyers & data through school system, public functions to increase people's awareness to their vulnerability during these events.	Miami County EMA Northern Miami Valley Red Cross Chapter	Ongoing	High	X						X													
2									X	Special Needs Assessment	Miami County EMA Northern Miami Valley Red Cross Chapter	1-3 Years	High	X					X														
3					Countywide	X	X	X	X	On-going training of Emergency Service Personnel on what to do and how to respond during disaster and hazard events.	Miami County EMA	3-5 Years	Low			X																	
4					Countywide		X			Recommend code updates to include tornado resistant construction techniques such as hurricane straps, tiedowns, & tornado saferooms within structures.	Miami County Building Regulations	2 - 3 Years	Moderate	X	X																		
5					Countywide		X			Promote & expand outdoor warning siren use for all communities & for remote county park areas.	Miami County EMA Miami County Park District	3 - 5 Years	Low	X	X					X													
6					Countywide		X			Set up & perform public building & school building assessment program to establish designated tornado safety areas.	Miami County EMA Northern Miami Valley Red Cross Chapter	2 - 4 Years	Moderate	X		X				X													
7					Countywide	X				Implement plan to collect base flood plain elevations and building inventory throughout county.	Miami County EMA Miami County Planning & Zoning	1-3 Years	High	X	X																		

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information
	Action Taken					Hazard Type								Plan Goals Addressed					
8					Countywide	X				Preserve floodplain areas as natural areas, wetland protection, bike trails, etc. along river corridors, in & around designated flood plains.	Miami Conservancy District Miami County Commissioners Miami County Park District	Ongoing	High	X	X				X
9					Countywide	X				Continue to replace bridges & roadways so they are constructed and elevated above base flood elevations.	Miami County Engineer	Ongoing	Low		X		X		
10					Countywide	X				Continued strong participation & maintenance in the Miami Conservancy District structures including protection of existing dams, dikes, floodwalls, levees.	Miami Conservancy District	Ongoing	High	X	X		X	X	
11					Countywide	X	X		X	Identify critical facilities that need emergency backup generator systems.	Miami County EMA	2 - 4 Years	Moderate	X		X			
12					Countywide		X			Continued maintenance & operation of existing tornado warning sirens.	Miami County EMA	Ongoing	Moderate	X		X			X
13					Countywide	X	X	X		Increase communication, coordination & collaboration between community leaders, property owners, local & county building regulations and zoning authorities to address risk & to provide uniformity & consistency in implementing sound mitigation practices.	Local & City Village Officials Township Zoning & Planning Officials Miami County Hazards Mitigation Planning Committee	Ongoing	High	X					X
14					Countywide		X			Encourage construction of saferooms at county & community parks, large mobile home parks, campgrounds, fairgrounds.	Miami County EMA Local Park Boards Private Park Owners	Ongoing	Moderate	X			X		X
15					Countywide	X	X			Continue promotion of NOAA Weather Radio program for festivals, fairgrounds, campgrounds, parks, recreation areas, & medical facilities.	Miami County EMA	Ongoing	Moderate	X					X

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information														
																				Action Taken				Hazard Type				Plan Goals Addressed					
16					Countywide	X				Identify surface water/county tile drainage obstructions for unincorporated areas of Miami County.	Miami County Engineer Township Trustees	2 - 4 Years	Moderate	X	X		X																
17					Countywide		X			Tornado saferoom for Community Parks. (Stillwater Preserve Restroom Completed)	Miami County EMA Miami County Park District	3 - 5 Years	Low	X			X																
18					Countywide			X		Evaluate traffic hazard warning devices/systems.	Miami County EMA	3 - 5 Years	Low	X	X	X		X															
19					City of Piqua	X				Floodproof lower level of floodprone commercial structure along Miami River (St. Rt. 25A, south of Piqua).	Miami County EMA	2 - 4 Years	Moderate	X	X		X																
20					City of Piqua	X				Mitigate 3 or 4 houses in the 100 year flood plain below Swift Run at the water plant within the City of Piqua.	Miami County EMA City of Piqua	2 - 4 Years	Moderate	X	X		X																
21					City of Piqua	X				Mitigate flooding of homes in floodprone area, City of Piqua along Lockington Road area.	Miami County EMA	2 - 4 Years	Moderate	X	X		X																
23					City of Piqua				X	Complete Flood Innundation Study for 3 Class I Dams	City of Piqua	1-3 Years	High			X																	
22					City of Piqua	X				Continued maintenance of the Swift Run Class I Dam (#1) (Public Recreation)	City of Piqua	Ongoing	Moderate	X	X		X	X															
24					City of Piqua	X				Continued maintenance of the Swift Run Class I Dam (#2) (Public Recreation)	City of Piqua	Ongoing	Moderate	X	X		X	X															
25					City of Piqua	X				Continued maintenance of the Swift Run Class I Dam (Water Supply Dam)	City of Piqua	Ongoing	Moderate	X	X		X	X															

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information	
	Action Taken					Hazard Type								Plan Goals Addressed						
26					City of Tipp City		X			Provide for additional tornado sirens.	Tipp City Officials	2 - 4 Years	Moderate	X						X
27					City of Tipp City	X				East Tipp City levee closure (sand bag closure) - North End.	Tipp City Officials Miami Conservancy District	1 - 2 Years	High	X	X		X			
28					City of Tipp City	X				Mitigate 3 homes, garages, farm bldgs., a sewer pumping station, 2 well head bldgs., 2 park bldgs., & 1 athletic field on E. Main Street and 1 home, 1 athletic field & 1 parking lot on Wagon Wheel Road all of which are in 100 year flood plain.	Tipp City Officials	2 - 4 Years	Moderate		X		X			
29					City of Tipp City	X				Provide New Storm Sewer Systems associated with Street Projects	Tipp City Officials	2 - 4 Years	Moderate	X	X		X			X
30					City of Troy	X				Phase II: Repair and replace catch basins.	City of Troy Officials	3 - 5 Years	Moderate				X			
31					City of Troy	X				Phase II: Address flooding of McKaig Ditch and Kidder Ditch systems.	City of Troy Officials	1 - 3 Years	Moderate		X		X			
32					Village of Bradford		X			Connect outdoor warning siren system to Darke County warning system.	Miami County EMA City of Bradford	1 - 3 Years	High							X
33					Village of Casstown				X	Perform evaluations of water system.	Miami County Health Department/Village Officials	3 - 5 Years	Low	X	X		X	X	X	X
34					Village of Fletcher	X			X	Storm sewer work.	Village Officials	2 - 4 Years	Moderate	X					X	

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information														
																				Action Taken				Hazard Type				Plan Goals Addressed					
35					Village of Laura		X			Construct community tornado saferoom for the Mobile Homes.	Miami County EMA Village Officials	3 - 5 Years	Low	X			X			X													
36					Village of Laura				X	Emergency generator power line from sewer plant to water plant	Village Officials	1 - 2 Years	High	X	X	X																	
37					Village of Laura	X			X	Extend storm sewers for flood prone homes on Pemberton Road	Village Officials	2 - 3 Years	Moderate	X	X		X																
38					Village of Pleasant Hill	X				Sanitary sewer infiltration protection.	Village Officials	3 - 5 Years	Moderate	X	X			X	X														
39					Bethel Township	X				Phase III - Honey Creek Stream Bank Repair	Honey Creek Watershed Miami Conservancy District Miami County Park District	2 - 4 Years	Moderate	X	X		X	X															
40					Brown Township	X				Identify surface water & drainage tile obstructions.	Brown Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X																
41					Concord Township		X			Evaluate potential tornado saferoom for the Fairgrounds.	Miami County Fair Board Miami County EMA	3 - 5 Years	Moderate	X			X																
42					Concord Township	X				Elevate or buy out of flood prone structures in the flood plain along the Miami River north of Troy.	Township Trustees Miami County EMA Miami Conservancy District	Ph. III - 3 - 4 Years	High	X	X		X	X															
43					Concord Township	X				Modify flood gate #24 on Morgan Ditch for improved drainage of Fairgrounds.	Miami Conservancy District	3 - 5 Years	Low	X	X		X	X															

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information
	Action Taken					Hazard Type								Plan Goals Addressed					
44					Concord Township	X				South Concord Township flooding along Fenner Road areas west of Barnhart Rd. and near Wilson Rd. City of Troy's corrective plan has been adopted and is moving forward.	Concord Township Trustees Miami County Engineer	2 - 4 Years	Moderate	X	X		X		
45					Concord Township	X				Mitigate floodprone structures north of Boone Hill, +/- 1/2 mile strip along both sides of C.R. 25A (several businesses, residences).	Concord Township Trustees Miami County EMA	2 - 4 Years	Moderate	X	X		X		
46					Concord Township	X				State Route 718 Ziegenfelder ditch.	Concord Township Trustees Miami County EMA	2 - 4 Years	Moderate	X	X		X		
47					Concord Township	X				Camp Troy/Boone Hill ±100 properties. Water & Sanitary Sewer System Extension to replace wells and septic systems	Concord Township Trustees Miami Co. Sanitary Engineering	1 - 2 Years	High	X	X		X		X
48					Elizabeth Township	X				Identify surface water & drainage tile obstructions.	Elizabeth Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X		
49					Lost Creek Township	X				Identify surface water & drainage tile obstructions.	Lost Creek Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X		
					Monroe Township					Water and Sewer extensions to serve township residents	Monroe Township Trustees, Tipp City Officials	3-5 Years	Moderate						
50					Newberry Township	X				Identify surface water & drainage tile obstructions.	Newton Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X		
51					Newton Township	X				Owens Road flooding.	Newton Township Trustees Miami County Engineer	2 - 4 Years	Moderate	X	X		X		

**MIAMI COUNTY HAZARD MITIGATION ~ ACTION ITEMS**

**July 2011- 5 Year Plan Update**

Action Item Number	Completed	Deleted	Unchanged	Ongoing	City Village Township Countywide	Flooding	Tornados	Severe Winter Storm	Other	Action Item	Coordinating Organization or Service Agency	Timeline	Priority Level	Preventative	Property Protection	Emergency Service Measures	Structural Projects	Natural Resource Protection	Public Information														
																				Action Taken				Hazard Type				Plan Goals Addressed					
52					Spring Creek Township	X				Identify surface water & drainage tile obstructions.	Spring Creek Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X																
53					Spring Creek Township (or City of Piqua)		X			Tornado saferoom for the Mobile Home Court on 25A.	Mobile Home Court Owner Miami County EMA	3 - 5 Years	Low	X			X																
54					Staunton Township	X				Identify surface water & drainage tile obstructions.	Staunton Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X																
55					Union Township		X			Tornado saferoom for Mobile Home Court located west of West Milton on S.R. 571.	Mobile Home Court Owner Miami County EMA	3 - 5 Years	Low	X			X																
56					Washington Township	X				Identify surface water & drainage tile obstructions.	Washington Township Trustees Miami County Engineer	3 - 5 Years	Low	X	X		X																
58					Miami County Park District	X	X		X	Expand weather warning sirens in the major county parks.	Miami County EMA Miami County Park District	2 - 4 Years	Moderate	X	X				X														
59					Miami County Park District		X			Provide multi-purpose safe building at the Stillwater Prairie Reserve. New concrete masonry block restroom facility was constructed at the Stillwater Prairie Reserve which affords some safety from storms.	Miami County Park District Miami County Building Regulations	2 - 4 Years	Moderate	X	X																		

### 3.8 Updated Action Plan

The Miami County Hazard Mitigation Committee outlined and ranked possible hazard mitigation activities in the preceding Section 3.05 “Identifying Mitigation Activities.” Those activities ranked as a high priority activity were then analyzed and put into an Action Plan format. Some of the activities were chosen by the Hazard Mitigation Committee to fulfill countywide projects and some were selected for each jurisdiction such as a city, village or township entity within Miami County. Some of the projects were unable to be completed in the previous 5-year plan due to funding issues and therefore are still considered high priority projects with in this plan update. The Action Plan indicates those program’s policies or resources that can be used to implement the project. It also indicates which primary goal has been met, the implementation timeline, possible funding sources, and the agency or personnel responsible for carry-out actions.

#### Reference Activity #1

- Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to encourage, promote and implement public awareness and education programs of manmade and natural hazards for citizens, private property owners, public agencies, businesses, industry and schools.
- Activity:** Promote public awareness of manmade and natural hazards at public events and hold workshops to educate the public. Distribute appropriate mitigation publications.
- Reason Chosen:** The Mitigation Committee, from group meetings, questionnaires and public workshops, sees the need for increased public awareness, education and integration of hazard mitigation for the communities and its citizens of Miami County. It is imperative to get a system implemented throughout the county whereby hazard mitigation is incorporated into all county planning mechanisms.
- Hazard Type:** All Hazards
- Hazard Category:** Public Information
- Lead:** North Miami Valley Red Cross Chapter  
Miami County Emergency Management Agency
- Start Date:** Ongoing
- End Date:** Ongoing
- Task 1:** Determine and obtain available FEMA publications and other promotional publications.
- Task 2:** Determine type and location of events to attend.

- Task 3:** Establish volunteer base.
- Task 4:** Secure possible funding sources (Red Cross Funding, County General Fund, and Community Funds).
- Task 5:** Organize program.
- Task 6:** Implement program and events.

### **Reference Activity #2**

- Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to encourage and promote installation of up-to-date hazard warning and communication systems throughout the county and address proper response for the special needs population of the county.
- Activity:** Complete special needs assessment of the county.
- Reason Chosen:** The Miami County Hazard Risk Assessment identifies the importance of evaluating the special needs population of Miami County. Many individuals have limited mobility, need continuous power to operate medical equipment or may have a language barrier during a hazard event. These individuals must be identified so their priority needs can be met.
- Hazard Type:** All Hazards
- Hazard Category:** Preventative and Emergency Service Measures
- Lead:** Northern Miami Valley Red Cross Chapter  
Miami County EMA
- Start Date:** January 2012
- End Date:** January 2015
- Task 1:** Establish special needs reporting criteria and system.
- Task 2:** Gather data.
- Task 3:** Summarize data into a reporting document.
- Task 4:** Release document to first responder agencies.

**Reference Activity #7**

- Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued preservation of open space, flood plains, recreation areas, wetlands, woodlands and recreation areas along Miami County's stream and river corridors.
- Activity:** Update and complete an inventory of buildings and building data within the 100 year flood plain boundaries of Miami County. Coordinate with recently completed GIS flood plain maps.
- Reason Chosen:** The Miami County Hazard Risk Assessment identifies the Great Miami River corridor as a source of flooding. Development within this area per the Miami County Comprehensive Plan should be limited to natural open spaces. Numerous structures have been identified to exist within these flood plain boundaries. Having an inventory of these structures, building data, and determined elevations will help to better prioritize the mitigation process for these structures.
- Hazard Type:** Flooding
- Hazard Category:** Natural Resource Protection, Property Protection, Structural
- Lead:** Miami County Board of Commissioners  
Miami County Area Planning Department
- Start Date:** January 2012
- End Date:** January 2015
- Task 1:** Identify master list of residential, commercial, industrial and agricultural structures in coordination with the recently updated 100 year flood plain areas.
- Task 2:** Gather data on structures such as construction date, construction type, foundation type, structure type, lowest floor elevation, repetitive loss status.
- Task 3:** Prioritize structures based on repetitive losses and elevations.
- Task 4:** Update risk assessment.

**Reference Activity #8**

**Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued preservation of open space, flood plains, recreation areas, wetlands, woodlands and recreation areas along Miami County's stream and river corridors.

**Activity:** Preserve floodplain areas along river corridors as natural open space areas. Provide for wetlands and woodlands protection.

**Reason Chosen:** The Miami County Hazard Risk Assessment identifies the Great Miami River corridor as a source of flooding. Development along this area per the Miami County Comprehensive Plan should be limited to natural open spaces. The Comprehensive Plan further states, "The bike path from Piqua south to the county line is another example of the recreation potential of the River corridor which should be further explored." Another reason this area remains relatively undeveloped is due to Miami Conservancy Flood Easement and 100 year floodplain.

"Fingers of open space/conservation/recreation are designated in parts of the corridor away from the Great Miami River. These are designated to encourage conservation of existing woodlands and drainage capacity of the waterways passing through future urban areas and feeding into the river. A coordinated system of open space and greenways should be built along the waterways as these areas develop. Thus, the four objectives of providing recreation corridors for walking and biking, connecting parks, maintaining water quality, and stormwater management could all be met with one system." (Miami County Comprehensive Plan, Page 21).

**Hazard Type:** Flooding

**Hazard Category:** Natural Resource Protection

**Lead:** Miami County Board of Commissioners  
Concord Township Trustees

**Start Date:** June 2012

**End Date:** June 2015

**Task 1:** Identify possible flood prone structures to be mitigated along this corridor.

**Task 2:** Establish damaged and frequency relationship for floods.

**Task 3:** Perform a benefit/cost analysis.

- Task 4:** Identify interest in buyouts. Identify and consider voluntary buyouts through the Hazard Mitigation Grant Program.
- Task 5:** Secure possible funding sources (Clean Ohio Funds—local funds; Hazard Mitigation Grant Program—HMGP; local county funds; Ohio Department of Natural Resources funds—ODNR).
- Task 6:** Identify open space Conservation District easements.
- Task 7:** Make offer on applicable structures.
- Task 8:** Bidding and demolition of structures

### **Reference Activity #10**

- Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued maintenance and improvement of the county flood protection structures such as floodwalls, levees, floodgates, dam and spillway structures, retention/detention basins, storm sewer and county drainage systems.
- Activity:** Ongoing levee system maintenance.
- Reason Chosen:** The levee systems through Miami Counties Cities of Piqua, Troy and Tipp City require continuous maintenance to retain in good condition. Tree removal, groundhog hole filling, ditch obstruction removal procedures and erosion control measures are necessary.
- Hazard Category:** Preventative-Property Protection
- Lead:** Miami Conservancy District
- Start Date:** Ongoing
- End Date:** Ongoing
- Task 1:** Identify Maintenance Issues.
- Task 2:** Secure funding sources for ongoing maintenance projects.
- Task 3:** Make repairs.

**Reference Activity #13**

- Goal:** Provide improved integration and coordination of hazard mitigation policies and programs throughout the County and with the State of Ohio mitigation policies and procedures.
- Activity:** Increase communication, coordination, and collaboration between community leaders, property owners, local and county building regulations, and zoning authorities to address risk and to provide uniformity and consistency in implementing sound mitigation practices.
- Reason Chosen:** Because of the challenges with the many levels of government and the numerous types of regulations and codes, it is difficult for communities to understand how all of the mitigation planning requirements and activities fit together. Integration of planning documents and code consistency is one significant way hazard mitigation policies and problems can be interfaced.
- Hazard Type:** All
- Hazard Category:** Public Information
- Lead:** Miami County Board of Commissioners  
Miami County EMA
- Start Date:** June 2012
- End Date:** Ongoing
- Task 1:** Miami County EMA shall develop program to encourage inter-agency participation.
- Task 2:** Provide training for local communities and start a “Volunteer Mitigation Specialist” program.
- Task 3:** Coordinate training events and obtain the help of Ohio EMA specialists.
- Task 4:** Create three-year activity plan and schedule of events.
- Task 5:** Implement Action Plan.

**Reference Activity #22**

- Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued maintenance and improvement of the county flood

protection structures such as floodwalls, levees, floodgates, dam and spillway structures, retention/detention basins, storm sewer and county drainage systems.

**Activity:** Complete flood inundation study for three City of Piqua, Class I Dams (#1 and #2) and water supply dam.

**Reason Chosen:** These three dams are Class I dams as identified in the Miami County Hazard Risk Assessment and are on Swift Run Creek upstream of the City of Piqua. Failure of these structures during a heavy rain event could be catastrophic and affect a large population. The Miami County Comprehensive Plan recommends open space within the Swift Run drainage basin. Development along this area is discouraged due to it being within the 100 year floodplains.

**Hazard Type:** Dam Failure / Flooding

**Hazard Category:** Structural Project

**Lead:** Piqua City Engineer, County EMA Director  
Ohio Department of Natural Resources-Water-Dam Safety Division

**Start Date:** June 2012

**End Date:** June 2015

**Task 1:** Provide flood inundation study for three existing Class 1 dam structures.

**Task 2:** Prepare summary of work to be performed.

**Task 3:** Secure possible funding from the following sources: Ohio Dept. of Natural Resources funds (ODNR), FEMA, and City of Piqua local funds.

**Task 4:** Make determination of next steps based on findings of study.

### **Reference Activity #27**

**Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued maintenance and improvement of the county flood protection structures such as floodwalls, levees, floodgates, dam and spillway structures, retention/detention basins, storm sewer and county drainage systems.

**Activity:** Levee repairs along Miami River within City of Tipp City. (Phase 2)

**Reason Chosen:** In accordance with the Miami County Hazard Risk Assessment profile of riverine flooding, this area has received past flooding and is very likely to be repeated in the future in these areas. The surrounding area is located within the 100 year floodplain. This levee area needs repair as it protects considerable amounts of the eastern portion of the Tipp City area including historic downtown Tipp City and is also identified in the Miami Conservancy District Maintenance Plan.

**Hazard Type:** Flooding

**Hazard Category:** Structural Project

**Lead:** Miami Conservancy District  
Village Administrator, City of Tipp City

**Start Date:** June 2012

**End Date:** June 2015

**Task 1:** Establish damage and frequency relationship for floods.

**Task 2:** Perform cost/benefit analysis.

**Task 3:** Provide project description.

**Task 4:** Secure possible funding sources such as Miami Conservancy District funds, City of Tipp City local funds, and Hazard Mitigation Grant Program funds.

**Task 5:** Provide plans and specifications.

**Task 6:** Perform construction work.

### **Reference Activity #32**

**Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to encourage and promote installation of up-to-date hazard warning and communication systems throughout the county and address proper response for the special needs population of the county.

**Activity:** Change the point of warning siren activation to Darke County authorities from Miami County authorities.

**Reason Chosen:** Whereas the Village of Bradford is partially situated in both Darke and Miami Counties. Severe storms generally move from the west to the east

and therefore to give advanced warning to the Village of Bradford residents it is better to have the tornado sirens activated with the Darke County warning notification system.

**Hazard Category:** Emergency Service Measures

**Lead:** Mayor, Village of Bradford

**Start Date:** June 2012

**End Date:** June 2015

**Task 1:** Perform a cost/benefit analysis.

**Task 2:** Secure possible funding sources such as Village funds, FEMA funds.

**Task 3:** Coordinate warning system activation system changeover with Darke and Miami County authorities.

**Task 4:** Complete system changeover.

### **Reference Activity #36**

**Goal:** It shall be the goal of the Miami County Hazard Mitigation Team to improve critical facilities so they are located out of the 100 year floodplain, are constructed using tornado resistant construction techniques, have emergency backup power, are secure and afford adequate security for the purposes they serve.

**Activity:** Provide power line for emergency backup power generator for the Village of Laura From the wastewater treatment facilities to the Water Treatment facilities

**Reason Chosen:** The Miami County Hazard Risk Assessment lists Water and Wastewater Treatment Plants as critical facilities. The water and wastewater system is needed to operate at all times to maintain sanitary operations and water supply for the safety of public health. Public water supply is also essential for fire protection systems. An emergency backup power unit is necessary for these facilities during periods of power outages that may occur due to many various hazards.

**Hazard Category:** Property Protection

**Lead:** Mayor, Village of Laura

- Start Date:** June 2012
- End Date:** June 2015
- Task 1:** Perform a cost/benefit analysis.
- Task 2:** Secure possible funding sources (i.e. Village funds, FEMA funds).
- Task 3:** Develop plans and specifications.
- Task 4:** Seek bids and provide for installation.

### **Reference Activity #42**

**Goal:** It shall be the goal of the Miami County Hazard Mitigation Committee to promote the continued preservation of open space, flood plains, recreation areas, wetlands, woodlands and recreation areas along Miami County's stream and river corridors.

**Activity:** Buy out of additional flood prone residences, businesses and structures in Concord Township, north of Troy along scenic Great Miami River.

**Reason Chosen:** Per the Miami County Hazard Risk Assessment and per historic data available, this area has received flooding in the past. Several homes and structures are located within the 100 year flood plain. Also the river corridor is part of the county Master Plan to remain as open space/recreation area. Within this corridor are several homes and a business that have already been purchased and removed. The Buyout of additional homes and properties within the area are recommended but would be voluntary through the Hazard Mitigation Grant Program or Clean Ohio Funds.

**Hazard Type:** Flooding

**Hazard Category:** Property Protection, Natural Resource Protection

**Lead:** Concord Township Trustees  
Miami County EMA

**Start Date:** June 2012

**End Date:** June 2015

**Task 1:** Identify the structures subject to flood damage.

**Task 2:** Establish damage and frequency relationship for floods.

- Task 3:** Perform a cost/benefit analysis for each structure.
- Task 4:** Identify the interest in buy-outs.
- Task 5:** Secure possible funding sources (Hazard Mitigation Grant Program funds, local County and township funds).
- Task 6:** Make offers on the structures.
- Task 7:** Close on the structures.
- Task 8:** Demolish the structures.
- Task 9:** Clean up and maintain the property.

## **Plan Maintenance Process**

4.1 Overview

4.2 Monitoring, Evaluating & Updating the Plan

4.3 Incorporating into Existing Planning Mechanism

## 4.1 Overview

Over the past five years since the initial Miami County Mitigation Plan was approved, the County has followed the plan maintenance process with much success. Over thirty-six mitigation actions have been successfully completed. Under the leadership of Chairman Paul Huelskamp, the Committee held an annual mitigation meeting to report on the successfully completed mitigation activities that occurred throughout the preceding year. In addition, numerous special meetings of the Miami County Hazard Mitigation Committee were held to address funding needs and project coordination.

On numerous occasions special meetings of the Mitigation Committee were called to help collaborate and coordinate activities for funding sources so that mitigation projects could move forward. While not all communities may have implemented separate line items in their budget for mitigation activities, many have found the financial means to accomplish many of the goals and objectives set forth in the Plan. It is the desire of the Miami County Hazard Mitigation Committee to continue to follow the current plan maintenance section as it has allowed the hazard mitigation process to move forward in Miami County with positive results.

It is anticipated over time through good planning efforts and coordination between State and County Emergency Management Agencies and communities that all mitigation plans will become more enhanced and refined. It is the intention of the Miami County Hazard Mitigation Planning Committee to support pre-disaster planning and project activities that can help reduce risk and mitigate future disaster costs for Miami County citizens.

## 4.2 Monitoring, Evaluating and Updating The Plan

Data listed in Miami County Hazard Risk Assessment shows Miami County's population increased from 98,868 persons in 2000 to 102,506 persons in 2010. This mirrors the historic trends of the past and seems to indicate Miami County has been a progressive county and that it will most likely experience future growth and change. As shown over the past five years since the 2006 plan approval, completed hazard mitigation activities can have a positive impact on future hazard events. It is important to continue to update the Plan periodically and maintain a monitoring system to aid in this process. This current monitoring system will also keep the Plan activities on schedule. Adjustments and revisions are an important part of any Plan since events, contingencies, and unforeseen circumstances cannot always be predicted. Community needs will change and there will be advances in technology and mitigation techniques. All these factors considered will require the Plan to be periodically updated and revised.

An annual progress meeting will also be a way to effectively monitor the Plan's success and to assure goals and objectives are met. The Miami County Hazard Mitigation Committee shall meet annually to review and revise the Plan's goals and objectives and to share progress of the Hazard Mitigation Action Plan. The Miami County Hazard Mitigation Committee shall make recommended changes and updates to activities as conditions may warrant.

Continuance of the countywide Hazard Mitigation Committee will include a representative from the following organizations:

- Miami County Emergency Management representative
- Miami County Board of Commissioners representative
- Emergency Responder representative
- County Mayor representative
- County Trustee representative
- Miami County Planning Commission representative
- Miami County Economic Development representative
- Miami County Engineer representative
- Miami Conservancy District representative
- North Miami Valley Red Cross Chapter representative
- Miami County Health Department representative
- Miami County Park District representative
- Miami County Soil & Water District representative
- Miami County Citizen-at-Large representative

The Miami County Emergency Management Agency, under the direction of the Miami County Board of Commissioners, will be responsible for contacting committee members and organizing the annual meeting. The Miami County Emergency Management Agency shall be responsible for issuing an annual report on the progress of all mitigation activities. In addition, the Miami County Emergency Management Agency shall prepare an agenda and distribute to the committee members. The meeting shall be publicly advertised and open to the public. The meeting will be held the last Wednesday in

February of each year at an announced time and location and committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies of the Plan. In addition to the annual meeting, members are also encouraged to bring forth at any time any concerns or ideas relative to changes in goals or strategies for discussion. The special meetings may be held on call of the Hazard Mitigation Chairperson. The Miami County Emergency Management Director shall provide quarterly updates on mitigation projects and activities through the Agency's newsletter and/or website. By providing updates, the Agency will be able to keep the public entities and general public informed as to the progress being made.

At the annual meeting the Miami County Hazard Mitigation Committee will review each goal and objective to determine their relevance to changing situations in the county, as well as changes in state or federal policy, and to ensure that they are addressing current and expected conditions. The activities will be ranked as ongoing, completed, deleted, or no change. The Committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified. The parties responsible for the implementation of the various action items will report on the status of their projects and will include which implementation process worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised. The following questions shall be asked:

- Are current resources appropriate, and in order, to implement the projects outlined in the Plan?
- Is the progress on track and are the outcomes as anticipated?
- Are there implementation problems? If so, what are they?
- Are all involved agencies participating or are there legal, technical, or political coordination issues? If so, how can they be addressed?
- What are additional funding sources that may be available?

The Miami County Emergency Management Agency under the direction of the Miami County Board of Commissioners will then have three months to update, make modifications to the Plan, and submit it to the committee members for approval.

The Miami County Emergency Management under the direction of the Miami County Board of Commissioners shall be the responsible party to monitor the Plan. The Miami County EMA shall at the end of each year collect and update reports from each coordinating organization indicating the status and progress on each action item or activities that occurred during the preceding year.

The Miami County EMA shall obtain information on each project activity as to whether the activity is completed, deleted, ongoing, or unchanged. If the activity is deleted or unchanged, the County EMA should report the reasoning as to why the action item was deleted or unchanged. The Miami County EMA shall also request consideration for new activities. This information will be requested from the coordinating organizations at the beginning of each year so that the Miami County EMA can prepare a report to be provided to the Miami County Hazard Mitigation Committee (MCHMC) and distributed

to MCHMC members along with the yearly meeting agenda at the annual Hazard Mitigation Committee meeting to be held the last Wednesday in February of each year.

The Miami County Hazard Mitigation Committee shall then utilize the report to assist in evaluating the Plan each year.

<b>Plan Monitoring Schedule</b>		
<b>Timeline</b>	<b>Action</b>	<b>Responsible Party</b>
December 31st	Year's activity reporting, cycle ends	Coordinating organizations
January 15th	Coordinating organizations prior years status reports due to Miami County EMA	Coordinating organizations
February 1st	Miami County EMA yearly reports due to Chairman of Miami County Hazard Mitigation Committee (MCHMC)	Miami County EMA
February 15th	Chairperson of MCHMC distributes agenda and reports to MCHMC and stakeholders	Chairperson of MCHMC
Last Wednesday of February	MCHMC holds annual mitigation meeting	MCHMC
March 15th	Minutes of annual meeting distributed to MCHMC members and stakeholders	Chairperson and Secretary of MCHMC
April 15th	Plan amendments/updates shall be added to Plan	Miami County EMA

### 4.3 Incorporating into Existing Planning Mechanism

The Miami County Hazard Mitigation Committee (MCHMC) in collaboration with the Miami County Emergency Management Agency continues to put forth a dedicated effort to promote hazard mitigation activities in Miami County. It is the Committee's goal to promote projects and plans which reduce the exposure of the citizens and their property to natural and manmade hazards. The Miami County Hazard Mitigation Committee has met on an annual and on-call basis since 2004 to help guide and spearhead the mitigation process.

Miami County is subjected to natural and manmade hazards that threaten life and health as well as causing extensive property damage. The Disaster Mitigation Act of 2000 (DMA2K, 24 USC S16S) requires that an approved mitigation plan must be prepared and approved by FEMA in order to receive federal mitigation funding. The Miami County Multi-jurisdictional Mitigation Plan was approved in 2006 and has been updated in 2011 to serve as a comprehensive guide for ongoing and future mitigation projects throughout the County.

The County and all of its incorporated municipalities have participated in the Miami County planning efforts. Since the initial 2006 Miami County Hazard Mitigation Plan approval, the County and its communities have completed numerous mitigation activities and are proud of its progress.

The Miami County Mitigation Planning Committee will oversee and regularly monitor the progress of the Plan. The Miami County Hazard Mitigation Committee will strive to create sustainable communities that are resistant to human and economic costs and disasters. The local planning collaborative invited to participate includes:

- Elected officials and local administrators including:
  - County Board of Commissioners
  - Mayors, Village Administrators, and Council Members
  - Township trustees, City and Village council members
- Planning expertise:
  - Miami County Area Planning
  - County Engineer
  - City Engineers
- Local Boards and Services
  - Miami County Health District
  - Miami County Park District
  - Miami Conservancy District
  - Miami County Economic Development
  - Miami County Grants
  - Troy Development Council
  - Area Chamber of Commerce
- Non-Profit Partners and Business Organizations
  - North Miami Valley Red Cross Chapter
  - Miami County Foundation

- Citizens
  - Local volunteers
- State Agencies
  - Ohio Emergency Management Agency
  - Ohio Department of Natural Resources
  - Ohio Department of Development
  - Ohio Environmental Protection Agency
  - Academic Institutes

The Miami County Hazard Mitigation Committee will collaborate with the above referenced administrative officials. They will work to integrate the goals of the Miami County Hazard Mitigation Committee into the countywide general operations. By working within these established community leaders, this Plan will more efficiently implement and finance the hazard mitigation projects and programs. The goal is to update the work plans, policies, and procedures to include sound mitigation concepts into the daily operations of all administrative programs.

Instead of relying solely on funding from hazard mitigation programs or external sources, the Miami County Hazard Mitigation Committee recommends that all Miami County communities including the County, Cities, Villages, Townships, and independent Boards and Agencies consider including the addition of a line item and budget solely for mitigation type projects.

The County, Cities, Villages and Townships will include directives to require its departments and agencies to evaluate and carry out mitigation activities and initiatives. The Miami County Area Planning will continue to provide, as a part of its latest Plan, revised, effective up-to-date mechanisms for integrating mitigation practices into its comprehensive planning. A primary benefit of combining these processes is that they both influence the location, type and characteristics of physical growth, specifically buildings and infrastructure.

The Miami County Hazard Mitigation Committee further recommends that incentive programs be developed to stimulate momentum to undertake mitigation initiatives. Public/private partnerships and the use of community volunteers and community public awareness are ways to help further the County's mitigation goals.

The Miami County Hazard Mitigation Committee and its represented County Agencies have developed a successful program to identify and implement numerous mitigation actions. The Miami County Hazard Mitigation Committee has developed a collaborative effort of mutual agreement with various agencies and organizations to:

- To help define the duties and specific responsibilities among the different agencies and organizations.
- To provide a clear statement of values, principles and community hazard mitigation goals and establishes an organization structure to assist in measuring and evaluating the Plan process.

The collaborative effort includes a clear vision between various entities and partners and generally includes:

- The vision or goal statement.
- The organization lead.
- The timeline.
- How the mutual agreement statement process is to be reviewed or revised.
- A statement on how decisions will be made.
- A statement on describing the circumstances under which each partner should consult each other.
- A statement requiring each partner or organization to submit periodic or annual reports on the progress or program.
- A statement on responsibility for actions.
- A statement on how each partner or organization with staff, provide technical resources and funding that the department, agency or organization is expected to provide.

Upon commitment from all partners and organizations involved for each mitigation activity or process, the partner or organization shall provide yearly reports to the Miami County Hazard Mitigation Committee through the Miami County Emergency Management Agency which will detail the following information:

- The hazard mitigation action's objectives.
- Who the lead and supporting agencies responsible for implementation are.
- How long the project should take, including a delineation of the various stages of work along with timelines (milestones should be included).
- Whether the resources needed for implementation, funding, staff time, and technical assistance are available, or if other arrangements must be made to obtain them.
- The types of permits or approvals necessary to implement the action.
- Details on the ways the actions will be accomplished within the organization, and whether the duties will be assigned to agency staff or contracted out.
- Current status of the project, identifying any issues that may hinder implementation.

The Miami County Hazard Mitigation Committee has been successful in breaking down the mitigation projects into smaller, more manageable tasks. This way the responsible agency, department or organization can determine the particular details in order to incorporate these additional considerations into the routine of their daily operations.

Since the 1913 flood left a legacy of flood control claims along the Great Miami River running north and south through the County. The flood control measures taken after the 1913 flood have helped limit development and preserve many scenic recreational resources along the County's river corridors.

Miami County has been progressive with incorporating mitigation actions into many of their existing planning mechanisms and programs. Some of these mitigation incorporations include the following:

### **Early Planning Documents of Miami County**

Since the early 1960's the Route 25 – I-75 corridor has been driving residential, commercial, and industrial development along the County's central axis. The three communities of Piqua, Tipp City, and Troy are the urban areas of the County. Those early developments created a need for a County thoroughfare plan which was adopted in 1974. Shortly thereafter, in the mid 1970's, two planning studies were conducted on the high growth areas of the County including Camp Troy (the area between Troy and Tipp City) and the Piqua East area. In 1991, the County adopted an open space plan which provided invaluable guidance to a variety of agencies charged with the mission of protecting open space and recreational sites.

### **Miami County Comprehensive Planning Documents**

Miami County has several Comprehensive Planning Documents which provide a vision for Miami County and guides future land development. All of these planning documents are sensitive to the protection of floodplain areas and restricting development in the County's floodplains.

Comprehensive Planning Documents include:

- Bethel Township Strategic Development Plan (adopted March 2, 2005)
- City of Piqua Comprehensive Plan (adopted January 22, 2008)
- City of Tipp City Comprehensive Plan (updated January 6, 2003)
- City of Troy Comprehensive Plan (adopted February 1, 2005)
- Miami County Comprehensive Plan (updated 2006)
- Miami Valley Regional Planning Commission Planning Documents
- Village of West Milton-Union Township Comprehensive Plan (adopted 2004)

### **Countywide Zoning & Planning Documents**

In 1972 a referendum vote supported the adoption of countywide zoning for eight of 12 townships in Miami County. (The eastern four townships have township zoning). Zoning and planning regulations have been updated numerous times over the years. They all promote floodplain overlay districts, green space, and preservation of open land.

### **Open Space Preservation**

Miami County has abundant parks and preserves located throughout the County. The Miami County Park District has many open space lands and easements to help provide for flood flow, drainage, and maintenance.

### **Farmland Preservation Measures**

Bethel Township promotes preservation of agricultural lands as an integral part of keeping Bethel Township "A model rural community" through Section 5301.691 of the Ohio Revised Code to purchase, hold, enforce agriculture, and conservation events through the Agriculture & Conservation Easement Program.

### **County & Community Subdivision Regulations**

Subdivision regulations have been adopted for quite some time and have had numerous updates over the years. The County subdivision regulations govern how land will be divided. These regulations set forth design standards to be adhered to by land developers.

### **Miami County Engineer Subdivision Design & Construction Standards**

The County Engineer has established design criteria to supplement the only subdivision regulations of the Miami County Zoning Commission. The plans include addressing technical specifications and construction standards for storm drainage, culverts, pavements, and roadway design.

### **Miami Conservancy District Stormwater Management Program**

The Miami Conservancy District is a river management agency operating in Southwest Ohio to control flooding of the Great Miami River and its tributaries. It was organized in 1914 following the catastrophic Great Dayton Flood of the Great Miami River in March 1913, which hit Dayton, Ohio particularly hard. Designed by Arthur Ernest Morgan, the Miami Conservancy built levees, straightened the river channel throughout the Miami Valley, and built five dry dams on various tributaries to control flooding. The district and its projects are unusual in that they were funded almost entirely by local tax initiatives, unlike similar projects elsewhere which were funded by the federal government and coordinated by the U.S. Army Corps of Engineers.

The Miami Conservancy District has a stormwater management plan as required by Ohio law. The purpose is to reduce discharge pollutants to the maximum extent possible and to protect appropriate requirements of the Clean Water Act.

### **Countywide Building Codes**

The Miami County Building Regulations oversees commercial and residential buildings with many of the cities, villages, and townships within Miami County. Potsdam is the only non-participating village, and Ludlow Falls and Laura have commercial permitting only through the Miami County Building Department. The Miami County Building Department enforces the current Ohio Building Code regulations.

Several natural resource protection plans are available to Miami County residents. Those include:

- Urban forestry and tree ordinances which reduce the damage potential of trees and alleviate the extent of fallen trees and limbs caused by wind and ice build up.
- Watershed planning efforts associated with the Great Miami & Stillwater Rivers and Honeycreek Watershed Association. Habitat restoration programs use vegetative and other natural materials to achieve stream management objectives and control erosion.
- The Great Miami and Stillwater Rivers were designated as “State Water Trails” in 2010.
- City and Village well fields protection plans.

**Miami County's Floodplain Management Program**

This program requires floodplain development permits for improvements within the designation 100-year flood hazard areas as established by the Federal Emergency Management Agency (FEMA). The goal of the program is to ensure minimal flooding effects and damage prevention.

In regulated areas, construction and fill activity is prohibited unless a floodplain development permit has been issued. All incorporated villages also now participate in the Flood Insurance Program. In addition, the Miami Conservancy District has flood control easements along the Great Miami and Stillwater Rivers and their tributaries.

**Miami County Stormwater Management Control Regulations**

The purpose of this resolution is to establish standards, principles, and procedures by which Miami County can regulate construction-oriented, earth-disturbing site development activities which cause or may cause erosion, and sediment deposition, and thereby prevent an increase in existing off-site impact potentials at lower elevations for sedimentation of lands and drainage ways, siltation of drainage waters, and the flooding of watercourses. The ordinance was adopted on February 28, 1987.

**Conservation Reserve Program (CRP)**

The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners. Through CRP, you can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland. The CRP program reduces soil erosion, the ability to protect food and fiber; reduces the sedimentation in streams and waterways; and improves wildlife habitat.

**Farmable Wetlands Program (FWP)**

The Farmable Wetlands Program (FWP) is a voluntary program to restore up to one million acres of farmable wetlands and associated buffers by improving the land's hydrology and vegetation. Eligible producers in all states can enroll eligible land in the FWP through the Conservation Reserve Program.

Producers plant long-term, resource-conserving covers to improve the quality of water, control soil erosion and enhance wildlife habitat on land enrolled in CRP. In return, FSA (Farm Service Agency) provides participants with rental payments and cost-share assistance. Contract duration is between 10 and 15 years. FWP is designed to prevent degradation of wetland areas, increase sediment trapping efficiencies, improve water quality, prevent soil erosion, and provide habitat for waterfowl and other wildlife.

**Wetland Reserve Program (WRP)**

The Wetland Reserve Program (WRP) is a voluntary conservation program that offers landowners the means and opportunity to protect, restore, and enhance wetlands on their property through perpetual easements, 30 year easements or Land Treatment Contracts. The USDA Natural Resources Conservation Service (NRCS) manages the program as well as provides technical and financial support to help landowners who participate in WRP.

**Ohio Environmental Quality Incentives Program (EQIP)**

The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program administered by the USDA Natural Resources Conservation Service (NRCS) reauthorized in the 2008 Farm Bill. It supports production, agriculture, and environmental quality as compatible goals. Through EQIP, agricultural producers may receive financial and technical help with structural and management conservation practices on agricultural land.

EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practice and a maximum term of ten years. Persons who are engaged in livestock or agricultural production on eligible land may participate in the EQIP program. EQIP activities are carried out according to a plan of operation developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to NRCS technical standards adapted for local conditions.

Ohio NRCS supports the locally led conservation effort in the delivery of conservation programs. The USDA local work group (LWG) serves as the starting point for the development and coordination of USDA programs to provide an integrated approach for addressing local natural resource concerns.

## **APPENDIX**

2011 Miami County Risk Assessment	A – 1
2008, 2009, 2010 Yearly Agendas, Minutes & Notices	A – 2
2006 Plan with 2007-2008 Updates	A – 3
2004 Risk Assessment Plan	A – 4