City of Bloomington
Common Council

Legislative Packet

Special Session

immediately followed by

Committee of the Whole Discussion

15 September 2010

Office of the Common Council
P.O. Box 100
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Bloomington, Indiana 47402

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City of Bloomington Indiana

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To: Council Members
From: Council Office
Re: Weekly Packet Memo
Date: September 10, 2010

Packet Related Material

Memo
Agenda
Calendar
Notices and Agendas:
None

Legislation for Final Action at the Special Session on September 15th Including Budget and Budget-Related Legislation Introduced at the Regular Session and Discussed at the Committee of the Whole on September 1st:

Please see the 2011 Budget Packet for the two appropriation ordinances, the three salary ordinances, an ordinance renaming the Employee Services Department, the Transit ordinance, and all the related background material.

For Questions Regarding the:
Civil City Appropriation Ordinance - Please Contact:
Mike Trexler, Controller, at 349-3416 or trexlerm@bloomington.in.gov
(or reach the appropriate department director)
Utility Appropriation Ordinance - Please Contact:
Patrick Murphy, Director, at 349-3650 or murphyp@bloomington.in.gov
Salary Ordinances and Ordinance Changing the Name of the Employee Services Department - Please Contact:
Daniel Grundmann, Director of Employee Services at 349-3578
or grundmad@bloomington.in.gov
Transit Ordinance – Please Contact:
Lew May, Director of Bloomington Transit at 332-5688
or lmay@kiva.net

Legislation and Background Material for Discussion at the Committee of the Whole Immediately Following the Special Session:

- **Res 10-14** Adopting the Monroe County Multi-Hazard Mitigation Plan
  - Memo to the Council from Andrea Roberts, Deputy Director of Public Works; Overview of Plan; Plan (Available in the Electronic Version of this packet and in the Council Office)
  Contact: Jim Comerford, Director, Monroe County Emergency Management Agency at 349-2546 or jcomerford@co.monroe.in.us or Andrea Roberts at 349-3594 or robertsa@bloomington.in.gov

- **Ord 10-14** To Amend Title 2 of the Bloomington Municipal Code Entitled "Administration And Personnel" - Re: Amending BMC 2.04.380 (Order of Business for Regular Sessions)
  - Am 01 – Combining Instructions Regarding Public Comment; Annotated Changes to Ordinance
  Contact: Dan Sherman at 349-3562 or shermand@bloomington.in.gov

  *Please see **1 September 2010** Council Legislative Packet for the ordinance, memo and annotated changes to BMC 2.04.380 (Order of Business)*

Minutes from Regular Session:

- 4 August 2010
- 1 September 2010

Memo

There are Two Meetings on Wednesday, 15 September - a Special Session with 2011 Budget Legislation Ready for Final Action Immediately Followed by a Committee of the Whole with Two Pieces of Legislation Ready for Discussion

There are two meetings next Wednesday. The first is a Special Session to take action on the budget legislation for 2011. Information related to that legislation can be found in the Budget Packet. *(See* the Table of Contents for a link to that material*)*. The second meeting is a Committee of the Whole to discuss two items that are included in this packet and are scheduled for final action on September 22nd.

Special Session

Budget Package

The Council met last week to introduce and discuss the package of budget and budget-related legislation and is scheduled next Wednesday to take final action on it. As you know from last week, the Mayor announced that he intends to give non-union employees a 1.5% raise next year. This is different from what was proposed in July and from the legislation introduced on September 1st. Changes will need to be made to some, but not all, of the budget legislation and that could occur now or in the future. Here is a list of the legislation and what still needs to be done. (Please pay special attention to the last item regarding alternatives for handling the salaries for elected officials.)

App Ord 10-02 (Civil City Budget for 2011) – Since it's too late to re-advertise our budget, the increase will need to be handled as an additional appropriation in 2011.

Ord 10-09 (Salary Ordinance for Police and Fire) - This ordinance will need to be changed for reasons independent of the Mayor's announcement. As you may remember, these two groups of employees are covered by collective bargaining agreements which, in part, set their compensation during the term of the agreement. The FOP and City are currently negotiating a new agreement and, in the event the negotiations are successful, the Council will need to consider the agreement and, if called for, an amendment to this ordinance later this year.

Ord 10-10 (Salary Ordinance for Non-Safety Related Civil City Employees) - This ordinance covers non-union and AFSCME employees and provides a range of amounts for each position and will not need to be changed.

Ord 10-11 (Salary for Elected Officials) - For many years, the increase for elected officials has been tied to the average increase for non-union employees. The ordinance currently does not include that increase which would amount to less than $4,000 in total for all 11 of the City's elected officials. That would need to be changed before the end of the year if the Council decides elected officials should receive a raise in 2011. There are three alternatives here: 1) amend the ordinance next week to include whereas clauses explaining the change (non-union employees will get raises next year) and increasing compensation by 1.5%; 2) wait until later in the year to amend the ordinance (perhaps when the amendment to the Police and Fire salaries is ready); or 3) not make any changes and not taking any increase. Although no Council member has requested me to do so at this point, I have prepared an

amendment to the ordinance that will be available for introduction next week if there is any interest in that regard.

Committee of the Whole

Item One – Res 10-14
(Adopting the Monroe County Multi-Hazard Mitigation Plan)

Res 10-14 adopts the Monroe County Multi-Hazard Mitigation Plan which is required by the Disaster Mitigation Act of 2000 before localities are eligible to receive federal funds for mitigation projects.[1] With the help of a federal grant, the Mitigation Division of the Indiana Department of Homeland Security arranged for the Polis Center of Indiana University-Purdue University Indianapolis to assist counties and their incorporated cities and towns develop and adopt these plans.

Mitigation Plans are intended to identify vulnerabilities and prioritize measures to "reduce or eliminate long-term risk to human life and property from hazards." They use a FEMA-created, "geographic information system (GIS) - based disaster risk assessment tool" known as Hazards USA Multi Hazard (HAZUS-MH) "to predict the estimated losses from floods, hurricanes, earthquakes and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses."

Locally, Jim Comerford as Director of the Monroe County Emergency Management Agency, in coordination with Polis, assembled a planning team consisting of members representing: Monroe County, Bloomington (Kevin Robling, Lynne Darland and Andrea Roberts), Ellettsville, Stinesville, Monroe County Community Schools, and Indiana University. The planning team met five times over the latter of half of 2009 to develop the Plan.[2]

Briefly, this is what occurred at each meeting:

- First Meeting: Polis explained the process and arranged for members of the planning team to assemble information necessary to create a base map of critical infrastructure in the county. This information, with the help of HAZUS-

[1] This summary is based upon a review of the legislation, memo to the Council, overview provided by Polis, and the Plan.

[2] The time spent by the local planning team and a small portion of the value of creating and maintaining the County's GIS satisfy the 25% local match requirement for the federal grant.

MH and GIS, made it possible to produce much more accurate damage assessment reports (as was done for the third meeting).

- Second Meeting: The planning team reviewed information about past hazards to identify those that threaten the County and to prioritize them according to degree of risk. It also discussed disaster scenarios that would be modeled for the plan.
- Third Meeting: Polis presented a draft risk assessment of disasters identified by the team.
- Fourth Meeting: The planning team worked toward prioritizing strategies for mitigating each hazard identified in each jurisdiction.
- Fifth Meeting: The planning team reviewed, revised, and accepted a draft plan, which was then forwarded to the State and then FEMA for review and conditional approval.

<u>Highlights of the Mitigation Plan – Risk Assessment and Mitigation Strategy</u>

The core of the Mitigation Plan is the Risk Assessment (Section 4), Mitigation Strategy (Section 5) and data on the community (Appendixes E - H).

Risk Assessment (*Pages 15 – 93*)

The Risk Assessment attempts to quantify the potential loss from a disaster and does so by:

1) identifying the potential hazard,
2) analyzing the risk to buildings, infrastructure and people, and
3) assessing the overall risk associated with each identified hazard.

1. This plan identifies nine hazards (which are listed later in this summary along with their ranking of risk).

2. The plan then uses information gathered by Polis and the planning team to identify, locate (via GIS) and, where known and relevant, estimate the (rough) replacement value for structures in the community. It highlights essential and critical facilities which are generally community "assets," but also includes sites of potential hazards. They are listed in Appendix F and include:

- Buildings characterized by their use (i.e. agricultural, commercial, educational, governmental, industrial, non-profit, and residential);
- Essential facilities (including schools, medical care facilities, fire and police stations, and centers for emergency operations);

- Transportation and communication facilities (i.e. airport, bus stations, radio and TV stations, and cell towers);
- Utilities (i.e. power, water and waste water facilities);
- Other infrastructure (e.g. dams); and
- Sites where hazardous materials are stored.

Examples of the harms resulting from these hazards include:

- Loss of, or damage to, structures;
- Loss of, or damage to, power, water and sanitary, and communication lines (including those to critical facilities);
- Broken, failed or impassable roadways and bridges; and
- Loss of human life, relocation of people, and the interruption of business.

3. Next the plan attempts to rank the risk of hazards based upon the following formula:

Probability a particular hazard will occur here (divided into low, medium, and high)
x Impact if it occurs (divided into minimal, moderate and significant)
= Hazard Risk (divided into low, elevated, and severe)

Please note that the combination of the HAZUS-MH, other such software, and GIS information allow planners to estimate potential losses area-wide or based upon site-specific scenarios (as was done for a possible tornado through Ellettsville and a possible hazardous materials release on West 3rd Street). Here is a summary of the analysis for the nine identified hazards:

Hazard (Injuries or Damages from):	**Analysis of Risk**		
	Probability	**Impact**	**Risk**
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levy Break	Low	Significant	Elevated
Earthquake	Low	Significant	Elevated
Hazardous Materials Release	Medium	Significant	Elevated
Thunderstorm (hail, lightning or wind)	High	Minimal	Low
Winter Weather (ice, snow or cold)	Medium	Minimal	Low
Drought or Extreme Heat	Low	Minimal	Low
Ground Subsidence	Medium	Minimal	Low
Fire (tires, structures and in the wild)	High	Minimal	Low

Lastly, the plan looks at the vulnerability of future assets and infrastructure and proposes some mitigation measures (under what it refers to as "Analysis of Community Development Trends").

Mitigation Strategy (*Pages 94 – 105*)

The goal of mitigation is to use the aforementioned risk assessment "to build disaster-resistant communities" by "reduc(ing) the future impacts of (identified) hazard(s) including property damage, disruption of the local and regional economies, and the amount of public funds spent to assist with recovery."

The mitigation strategy includes:

1) Assessment of community capabilities;
2) Development of goals and objectives;
3) Proposal of projects, which are broken into six categories and weighed against seven local factors; and
4) An annual review and a five year update.

1. The assessment of community capabilities "identifies the policies, regulations, procedures, programs and projects that (mitigate) disaster damages" and evaluates them for possible improvement. Here, the plan reviewed the National Flood Insurance Program (NFIP), the County's stormwater management, erosion control and building codes, local zoning ordinances, and local fire ratings.

2. The goals and objectives included the following:

- Goal 1: Lessen the impact of hazards to new and existing infrastructure with the objective of:
    - Retrofitting facilities and structures to withstand natural disasters;
    - Equipping public facilities and communities to guard against the secondary effects of these disasters;
    - Minimizing exposure of infrastructure to these disasters;
    - Evaluating and strengthening the ability of local emergency services to communicate and be mobile during disasters; and
    - Improving emergency shelter capabilities
- Goal 2: Create new or revise existing plans/maps for Monroe County with the objective of:
    - Supporting each jurisdiction's compliance with the NFIP;
    - Mitigating the identified hazards; and
    - Continuing to "profile" and develop strategies to mitigate hazards;

- Goal 3: Develop long-term strategies to educate Monroe County residents on hazards affecting their county with the objective of:
    - Raising public awareness; and
    - Improving the education and training of emergency personnel and public officials.

3. Proposals for projects fell into six mitigation categories and were judged by seven factors of efficacy:

- The six categories of mitigation measures included:
    - Prevention;
    - Protection of property;
    - Public education and awareness;
    - Protection of natural resources;
    - Emergency services (including warning systems and protecting critical facilities); and
    - Structural projects (including hardening infrastructure and constructing "safe rooms").

- The seven factors used to determine the efficacy of each project included concerns about:
    - Disruption of the community's social fabric;
    - Technical difficulties;
    - Administrative capabilities (i.e. staffing and funding);
    - Political leadership;
    - Legal authority to implement and enforce the action;
    - Economic (budget) constraints; and
    - Ill effects on the environment.

4. Examples of Mitigation Measures that affect the City of Bloomington along with their level of priority (see Table 5-6 on pages 100-103) include:

Mitigation Item	**Hazard**	**Priority**
• Conduct a county-wide stormwater study and create a stormwater utility	Flood	High
• Institute a voluntary "buy-out" plan for 25 homes or critical infrastructure	Flood	High
• Educate residents on local hazards	Tornado, Flood, Earthquake,	High

	Thunderstorm, Winter Storm and Hazardous Materials Release	
• Construct "safe houses" at mobile home parks and shelters at County recreational parks (Listed under Monroe County)	Tornado; Thunderstorm	High
• Install inertial valves at critical facilities	Earthquake	Medium
• Explore alternate means of emergency notification	Almost all	High
• Develop a program to distribute weather radios to all critical facilities and large businesses	Flood, Tornado, Thunderstorm, Winter Storm	Low
• Develop a program to distribute fans to the elderly population	Drought	Low

Item Two – Ord 10-14
(Amending the Agenda for Council Regular Sessions) – Proposed Amendment

The second item for discussion at the Committee of the Whole next week is **Ord 10-14**. It was introduced on September 1st and would amend to BMC 2.04.380, regarding the order of the business at Council Regular Sessions. The ordinance and related information can be found in the ***1 September 2010*** Council Legislative Packet. This packet contains a proposed amendment which is intended to make it easier for the public to understand the instructions regarding their comment during the reports from the public. It does so by combining those instructions at the bottom of the agenda with help of two asterisks.

NOTICE AND AGENDA
BLOOMINGTON COMMON COUNCIL
SPECIAL SESSION & COMMITTEE OF THE WHOLE
7:30 P.M., WEDNESDAY, SEPTEMBER 15, 2010
COUNCIL CHAMBERS
SHOWERS BUILDING, 401 N. MORTON ST.

I. ROLL CALL

II. AGENDA SUMMATION

III. APPROVAL OF MINUTES FOR: August 04, 2010 (Regular Session)
September 01, 2010 (Regular Session)

IV. LEGISLATION FOR SECOND READING AND RESOLUTIONS

Overview of Proposed 2011 Budget

1. Ordinance 10-09 An Ordinance Fixing the Salaries of Officers of the Police and Fire Departments for the City of Bloomington, Indiana, for the Year 2011

Committee Recommendation: Do Pass 8 – 0 – 0

2. Ordinance 10-13 To Amend Title 2 Entitled "Administration and Personnel" (Changing the Name of Chapter 2.22 from "Employee Services Department" to "Human Resources Department" and Reflecting this Change in Various Other Sections of that Title)

Committee Recommendation: Do Pass 7 – 0 – 1

3. Ordinance 10-10 An Ordinance Fixing the Salaries of Appointed Officers, Non-Union and A.F.S.C.M.E. Employees for All the Departments of the City of Bloomington, Monroe County, Indiana, for the Year 2011

Committee Recommendation: Do Pass 6 – 0 – 2

4. Ordinance 10-11 To Fix the Salaries of All Elected City Officials for the City of Bloomington for the Year 2011

Committee Recommendation: Do Pass 6 – 0 – 2

5. Appropriation Ordinance 10-02 An Ordinance for Appropriations and Tax Rates (Establishing 2011 Civil City Budget for the City of Bloomington)

Committee Recommendation: Do Pass 6 – 0 – 2

6. Appropriation Ordinance 10-03 An Ordinance Adopting a Budget for the Operation, Maintenance, Debt Service and Capital Improvements for the Water and Wastewater Utility Departments of the City of Bloomington, Indiana for the Year 2011

Committee Recommendation: Do Pass 8 – 0 – 0

7. Ordinance 10-12 An Ordinance Reviewing and Adopting the Budget of the Bloomington Public Transportation Corporation for the Year 2011

Committee Recommendation: Do Pass 8 – 0 – 0

V. ADJOURNMENT

(and immediately reconvene for)

(Over)

Posted & Distributed: Friday, September 10, 2010

COMMITTEE OF THE WHOLE

Chair: Andy Ruff

1. Resolution 10-14 Adopting the Monroe County Multi-Hazard Mitigation Plan

    Asked to Attend: Jim Comerford, Director, Monroe County EMA
    Kevin Robling, Corporation Counsel
    Andrea Roberts, Deputy Directory, Public Works

2. Ordinance 10-14 To Amend Title 2 of the Bloomington Municipal Code Entitled "Administration and Personnel" Re: Amending BMC 2.04.380 (Order of Business for Regular Sessions)

    Asked to Attend: Tim Mayer, Chair of Rules Committee
    Dan Sherman, Council Administrator/Attorney

Posted & Distributed: Friday, September 10, 2010

City of Bloomington
Office of the Common Council

To: Council Members
From: Council Office
Re: Calendar for the Week of 13-18 September 2010

Monday, 13 September 2010

1:30 pm Economic Development Commission, Hooker Room
4:30 pm Plat Committee, Hooker Room
5:00 pm Redevelopment Commission, McCloskey
5:30 pm Plan Commission, Council Chambers

Tuesday, 14 September 2010

8:00 am Community Development Block Grant Informational Meeting, McCloskey
2:00 pm Commission on Aging Planning Retreat, Hooker Room
4:00 pm Council for Community Accessibility Workshop – Addressing Individuals with Mental Disabilities, Monroe County Library, 303 E Kirkwood Ave Room 1C
4:00 pm Bloomington Community Farmers' Market, Madison St; between 6th & 7th St
5:00 pm Utilities Service Board, Board Room, 600 E Miller Dr
5:30 pm Bloomington Public Transportation Corporation, Public Transportation Center, 130 W Grimes Lane
5:30 pm Board of Public Works, Council Chambers
6:00 pm City of Bloomington Commission on Sustainability, McCloskey
6:30 pm Sister Cities International, Dunlap

Wednesday, 15 September 2010

9:30 am Tree Commission, Rose Hill Cemetery Office, 930 W 4th St
5:30 pm Bloomington Community Arts Commission, McCloskey
7:00 pm Council of Neighborhood Associations, Hooker Room
7:30 pm Common Council Special Session *immediately followed by a* Committee of the Whole, Council Chambers

Thursday, 16 September 2010

8:00 am Bloomington Housing Authority, Housing Authority, 1007 N Summit, Community Room

Friday, 17 September 2010

12:00 noon Domestic Violence Taskforce, McCloskey
12:00 noon Indiana Arts Commission Quarterly Meeting, Council Chambers

Saturday, 18 September 2010

8:00 am Bloomington Community Farmers' Market, Showers Common, 401 N. Morton

Posted and Distributed: Friday, 10 September 2010

RESOLUTION 10-14

ADOPTING THE MONROE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the City of Bloomington recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and will save taxpayer dollars; and

WHEREAS, an adopted Multi-Hazard Mitigation Plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Bloomington participated jointly in the planning process with other local units of government within Monroe County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE CITY OF BLOOMINGTON, MONROE COUNTY, INDIANA, THAT:

SECTION 1. The City of Bloomington hereby adopts the Monroe County Multi-Hazard Mitigation Plan as an official plan.

SECTION 2. On behalf of the City of Bloomington, the Monroe County Emergency Management Agency will submit the adopted Multi-Hazard Mitigation Plan to the Indiana Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

SECTION 3. This resolution shall be in full force and effect upon its adoption by the Common Council and execution by the Mayor of the City.

PASSED AND ADOPTED by the Common Council of the City of Bloomington, Monroe County, Indiana, upon this _____ day of _____, 2010.

_____
ISABEL PIEDMONT-SMITH, President
Bloomington Common Council

ATTEST:

_____
REGINA MOORE, Clerk
City of Bloomington

PRESENTED by me to the Mayor of the City of Bloomington, Monroe County, Indiana, upon this _____ day of _____, 2010.

_____
REGINA MOORE, Clerk
City of Bloomington

SIGNED and APPROVED by me upon this _____ day of _____, 2010.

_____
MARK KRUZAN, Mayor
City of Bloomington

Synopsis

This resolution adopts the Monroe County Multi-Hazard Mitigation Plan, which is required by the Disaster Mitigation Act of 2000 before localities may receive federal funds for mitigation projects. Mitigation Plans are intended to identify vulnerabilities and prioritize measures to reduce or eliminate long-term risk to human life and property from acknowledged hazards to the community.

Department of Public Works

Multi-Hazard Mitigation Plan

Memorandum

To: Members of the City of Bloomington Common Council

From: Andrea Roberts, Deputy Director, Department of Public Works

Date: September 7, 2010

The City of Bloomington Indiana along with Monroe County, Ellettsville, Stinesville, Indiana University and the Polis Center of Indiana University-Purdue University Indianapolis have come together to develop a Multi-Hazard Mitigation Plan that is a requirement of the Federal Disaster Mitigation Act of 2000. The Plan is a prerequisite for the county in order to become eligible for federal assistance and hazard mitigation funding programs.

In order to receive formal approval of this plan each participating jurisdiction must adopt this plan. Once the plan is adopted we will continue to work with the Polis Center to implement mitigation initiatives that were developed as part of this plan.

The Plan was created to identify and prioritize the risks in the county and to develop mitigation plans that will minimize both the risk and the consequences of the defined vulnerabilities.

The plan will be updated on an annual basis and a re-write will take place in 2015 as specified in the plan.

Pre-Disaster Mitigation Planning Process

The Polis Center (Polis) of Indiana University-Purdue University Indianapolis (IUPUI), at the request of the Mitigation Division of The Indiana Department of Homeland Security, has developed a process to assist counties and incorporated cities and towns in creation of mitigation plans that comply with the Disaster Mitigation Act of 2000 (DMA 2000). This process has proven very effective and efficient in producing plans for more than sixty counties in Indiana. Polis is also currently implementing the process in eighteen counties in Illinois.

The purpose of this process is to develop a DMA 2000 compliant "Mitigation Plan" for individual counties, which are ineligible for federal assistance with mitigation projects until the plan is developed. The mitigation plan is based on a risk assessment that maximizes the value of Geographic Information System (GIS) technology and HAZUS-MH—a disaster modeling/damage assessment tool developed by FEMA. Each county participating in this process is the beneficiary of a state-awarded grant that allows the county to develop its plan without any "out of pocket" expenses. The 25% match for this federal grant is achieved in two ways: 1) by monitoring and assigning a dollar value to the time donated by the volunteers on the county planning team, and 2) by attributing to the match a small portion of the creation and maintenance costs of the county's GIS data.

It is the county's responsibility to assemble and provide leadership for a planning team. Polis assumes the responsibility of overseeing the overall process and producing a risk assessment for the county using HAZUS-MH and various GIS tools. Additionally, Polis provides local assistance to the county in coordinating meetings and assembling the components of the plan once they have been created.

The process unfolds over a period of six (6) to eight (8) months and requires a series of six (6) meetings for the county planning team. It is the task of the Emergency Management Director to assemble a planning team consisting of eight to fifteen members. These team members must represent each of the incorporated jurisdictions within the county, respectively, in order to comply with FEMA and DMA 2000 requirements. Other appropriate members include, but are not limited to, first responders and representatives of the school corporations, health care industry, and business community. Any interested citizen of the county is welcome and encouraged to participate. Once the planning team is established, the county begins the process.

- Meeting 1: The purpose of this meeting is to assemble all of the data necessary to create a highly accurate base map of the critical infrastructure of the county. The advantage of gathering this local data is that it allows HAZUS-MH to produce much more accurate damage assessment reports. The local knowledge of the planning team will validate the base map.

- Meeting 2: Based on historical information assembled by Polis, the planning team identifies the actual natural hazards that threaten the county and prioritizes them according to degree of risk. The team also determines the disaster scenarios that are to be modeled for the county plan.

- Meeting 3: At this meeting, Polis presents the draft risk assessment, derived from the HAZUS-MH and GIS modeling of the identified disasters, to the planning team. The general public is also invited to this meeting through a series of newspaper articles and radio spots. At the end of the meeting, the general public is encouraged to ask questions and provide input to the planning process, fulfilling one of FEMA's requirements for public input.

- Meeting 4: This meeting consists of a "brainstorming session." The planning team lends local knowledge to identify and prioritize mitigation strategies and projects that can address the threats identified in the risk assessment. It is required that the plan contain strategies specific to each hazard and for each incorporated area within the county. At this point a draft of the complete plan can be assembled.

- Meeting 5: At this meeting, the planning team reviews the draft plan, proposes revisions, and accepts the plan after the necessary changes are incorporated. The plan is forwarded to the mitigation staff at the State Emergency Management Agency for review prior to submitting to FEMA.

- Meeting 6: Once FEMA grants conditional approval of the plan, the plan is returned to the county for formal adoption by the appropriate commissions and town boards. This sequence of events ensures that the county will not adopt a plan that could later be rejected by FEMA.

Multi-Hazard Mitigation Plan

Monroe County

Monroe County Emergency
Management Agency
2800 S Kirby RD
Bloomington, Indiana 47403

The Polis Center
IUPUI
1200 Waterway Boulevard
Suite 100
Indianapolis, IN 46202

Hazard Mitigation Plan

Monroe County, Indiana

Adoption Date: -- _____ --

Primary Point of Contact

Jim Comerford
Director
Monroe County Emergency Management Agency
2800 S Kirby Rd
Bloomington, Indiana 47403
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F: 812-349-2052
jcomerford@co.monroe.in.us

Secondary Point of Contact

Jessica Renn
P: 812-349-2533
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Monroe County Emergency Management Agency
jrenn@co.monroe.in.us

Prepared by:

The Polis Center
1200 Waterway Boulevard, Suite 100
Indianapolis, IN 46202
317-274-2455

Table of Contents

Section 1 - Public Planning Process

1.1 Narrative Description

Hazard Mitigation is defined as any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals; hazard mitigation planning and the subsequent implementation of resulting projects, measures, and policies is a primary mechanism in achieving FEMA's goal.

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). The development of a local government plan is a requirement in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for the National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt an MHMP.

The Monroe County Emergency Management Agency was established to define and prioritize the risks in the county and to develop this mitigation plan to minimize both the risks and the consequences of the defined hazards. The Polis Center and Monroe County have joined efforts to develop this mitigation plan, realizing that the recognition of and the protection from hazards impacting the county and its residents contribute to future community and economic development. The team will continue to work together to develop and implement mitigation initiatives developed as part of this plan.

In recognition of the importance of planning in mitigation activities, FEMA created Hazards USA Multi-Hazard (HAZUS-MH), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict the estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. The Indiana Department of Homeland Security has determined that HAZUS-MH should play a critical role in Indiana's risk assessments. The Polis Center (Polis) at Indiana University Purdue University Indianapolis (IUPUI) and the Indiana Geological Survey at Indiana University are assisting Monroe County planning staff with performing the hazard risk assessment.

1.2 Planning Team Information

The Monroe County Multi-Hazard Mitigation Planning Team is headed by Jim Comerford, who is also the primary point of contact. Members of the planning team include representatives from various Monroe County, Bloomington, Ellettsville, and Stinesville departments, schools, and Indiana University. Table 1-1 identifies the planning team individuals and the organizations they represent.

Table 1-1: Multi-Hazard Mitigation Planning Team Members

Name	Title	Organization	Jurisdiction
Jim Comerford	Director	Monroe County EMA	Monroe County
Jessica Renn	Administrative Assistant	Monroe County EMA	Monroe County
Jim Davis	Fire Chief	Ellettsville Fire Department	Town of Ellettsville
Kevin Robling	City Attorney	City of Bloomington	City of Bloomington
Randy Carter	Town Council Vice President	Bean Blossom/Stinesville Fire Department	Town of Stinesville
Richard Carter	Assistant Fire Chief	Bean Blossom/Stinesville Fire Department	Town of Stinesville
Bill Williams	Highway Engineer	Monroe County Highway	Monroe County
Lisa Ridge		Monroe County Highway	Monroe County
Gregg Zody	Director	Monroe County Zoning	Monroe County
Lynne Darland	Representative	City of Blooming Planning	City of Bloomington
Dave Cable		Army Corps of Engineers	Army Corp of Engineers
Vickie Vandeventer	Infection Control Practitioner	Bloomington Hospital	Bloomington Hospital
Ken Long	Emergency Manager	Indiana University Risk Management	Indiana University
John Carter	Director of Planning	Monroe County Community Schools	Monroe Count Schools
Andrea Roberts	Deputy Director of Public Works	City of Bloomington Public Works	City of Bloomington

The Disaster Mitigation Act (DMA) planning regulations and guidance stress that planning team members must be active participants. The Monroe County MHMP committee members were actively involved on the following components:

- Attending the MHMP meetings
- Providing available GIS data and historical hazard information
- Reviewing and providing comments on the draft plans
- Coordinating and participating in the public input process
- Coordinating the formal adoption of the plan by the county

An MHMP kickoff meeting was held in Bloomington, Indiana on May 4, 2009. Representatives from The Polis Center explained the rationale behind the MHMP program and answered questions from the participants. The Polis Center also provided an overview of HAZUS-MH, described the timeline and the process of the mitigation planning project, and presented Monroe County with a Memorandum of Understanding (MOU) for sharing data and information.

The Monroe County Multi-Hazard Mitigation Planning Committee met on May 4, 2009, June 15, 2009, August 11, 2009, September 22, 2009, and December 1, 2009. These meetings were held in the city hall. Each meeting was approximately two hours in length. The meeting agendas, minutes, and attendance sheets are included in Appendix A. During these meetings, the planning team successfully identified critical facilities, reviewed hazard data and maps, identified and assessed the effectiveness of existing mitigation measures, established mitigation projects, and assisted with preparation of the public participation information.

1.3 Public Involvement in Planning Process

An effort was made to solicit public input during the planning process and a public meeting was held during the formation of the plan on August 11, 2009. Appendix A contains the agendas and minutes from the public meeting. Appendix B contains articles published by the local newspaper throughout the public input process.

1.4 Neighboring Community Involvement

The Monroe County planning team invited participation from various representatives of county government, local city and town governments, community groups, local businesses, and universities. The team also invited participation from adjacent counties to obtain their involvement in the planning process. Details of neighboring stakeholders' involvement are summarized in Table 1-2.

Table 1-2: Neighboring Community Participation

Person Participating	Neighboring Jurisdiction	Organization	Participation Description
Jack White	Owen County	Owen County Emergency Management Agency	Neighboring county EMA–review plan and offer comments
Roger Axe	Greene County	Greene County Emergency Management Agency	Neighboring county EMA-review plan and offer comments
Valerie Luchauer	Lawrence County	Lawrence County Emergency Management Agency	Neighboring county EMA-review plan and offer comments
Dallas Kelp	Brown County	Brown County Emergency Management Agency	Neighboring county EMA-review plan and offer comments
Jeff Neal	Morgan County	Morgan County Emergency Management Agency	Neighboring county EMA-review plan and offer comments

1.5 Review of Technical and Fiscal Resources

The MHMP planning team has identified representatives from key agencies to assist in the planning process. Technical data, reports, and studies were obtained from these agencies. The organizations and their contributions are summarized in Table 1-3.

Table 1-3: Key Agency Resources Provided

Agency Name	Resources Provided
Indiana Department of Homeland Security	Provided repetitive loss information
Indiana Department of Natural Resources, Division of Water	Digital Flood maps and levee information
Indiana Geological Survey	GIS data, digital elevation models

1.6 Review of Existing Plans

Monroe County and its associated local communities utilized a variety of planning documents to direct community development. These documents include land use plans, master plans, emergency response plans, municipal ordinances, and building codes. The MHMP planning process incorporated the existing natural hazard mitigation elements from previous planning

efforts. Table 1-4 lists the plans, studies, reports, and ordinances used in the development of the plan.

Table 1-4: Planning Documents Used for MHMP Planning Process

Author(s)	Year	Title	Description	Where Used
Monroe County	2004	Hazard Analysis	Describes the hazards affecting Monroe County	Sections 3 and 4
Monroe County	2008	Comprehensive Land Use Plan	Describes Monroe County's land use and provides land use map	Section 3
Monroe County	2008	Zoning Ordinance	Describes zoning restrictions	Section 5
Monroe County	2007	Subdivision Control Ordinance	Describes ordinance	Section 5
Monroe County	2003	Emergency Management Plan	Describes Monroe County's response to disaster situations	Sections 4 and 5
Monroe County	2003	Emergency Response Plan	Compilation of historical data to create a list of possible and probable hazards in Monroe County	Sections 3, 4, and 5

Section 2 - Jurisdiction Participation Information

The jurisdictions included in this multi-jurisdictional plan are listed in Table 2-1.

Table 2-1: Participating Jurisdictions

Jurisdiction Name
City of Bloomington
Town of Ellettsville
Town of Stinesville
County of Monroe

2.1 Adoption by Local Governing Body

The draft plan was made available on December 1, 2009 to the planning team for review. Comments were then accepted. The Monroe County hazard mitigation planning team presented and recommended the plan to the County Commissioners, who adopted it on *<date adopted>*. Resolution adoptions are included in Appendix C of this plan.

2.2 Jurisdiction Participation

It is required that each jurisdiction participates in the planning process. Table 2-2 lists each jurisdiction and describes its participation in the construction of this plan.

Table 2-2: Jurisdiction Participation

Jurisdiction Name	Participating Member	Participation Description
Monroe County	Jim Comerford	Member, MHMP planning committee
City of Bloomington	Andrea Roberts	Member, MHMP planning committee
Town of Ellettsville	Jim Davis	Member, MHMP planning committee
Town of Stinesville	Richard Carter	Member, MFMP planning committee

All members of the MHMP planning committee were actively involved in attending the MHMP meetings, providing available Geographic Information Systems (GIS) data and historical hazard information, reviewing and providing comments on the draft plans, coordinating and participating in the public input process, and coordinating the county's formal adoption of the plan.

Section 3 - Jurisdiction Information

Monroe County was organized in April 1818 and named for President James Monroe. It is bounded by Morgan County to the north, Brown and Jackson Counties to the east, Lawrence County to the south, and Greene and Owen Counties to the west. Bloomington is the county seat.

Sources: http://www.stats.indiana.edu/profiles/pr18105.html;
http://www.countyhistory.com/monroe/start.html

3.1 Topography

Monroe County is located in south central Indiana and is composed of three topographical units—the Norman Upland, the Mitchell Plain, and the Crawford Upland. The county is characterized by uplands: slopes range from nearly level to steep. The areas on bottom land along Bean Blossom Creek, Salt Creek, Clear Creek, and White River often flood. Terraces making up the large area along Bean Blossom Creek are strongly sloping.

Source: Indiana Online Soil Survey, 1981

3.2 Climate

In Monroe County, mid-summer temperatures can be excessively hot and the winter snowfall can vary greatly from one year to the next. Humidity averages 63% for the mid-afternoon and rises during the evening with dawn humidity around 83%. The possibility for sunshine is 65% during the summer and 40% during the winter. Rainfall is moderately heavy and averages 44 inches annually, falling mostly during the spring and summer months. The average seasonal snowfall is 12 inches. The prevailing wind is from the south-southwest at an average speed of 10 miles per hour.

Sources: http://www.city-data.com/city/Bloomington-Indiana.html

3.3 Demographics

Monroe County has a population of 128,992. According to STATS Indiana, from 1990–2000, Monroe County experienced a population increase of 10.6%. The population is spread through 11 townships including Bean Blossom, Benton, Bloomington, Clear Creek, Indian Creek, Perry, Polk, Richland, Salt Creek, Van Buren and Washington. The largest community in Monroe County is Bloomington which has a population of approximately 71,819. The breakdown of population by incorporated areas is included in Table 3-1.

Table 3-1: Population by Community

Community	2008 Population	% of County
Bloomington	71,819	55.7%
Ellettsville	6,017	4.7%
Stinesville	197	0.2%

Source: STATS Indiana, 2008

3.4 Economy

STATS Indiana reported for 2007 that 73.7% of the workforce in Monroe County was employed in the private sector. The breakdown is included in Table 3-2. Government and public administration represents the largest sector, employing approximately 25.7% of the workforce and generating approximately 30.5% of the earnings. The 2007 annual per capita income in Monroe County is $29,522 compared to an Indiana average of $33,215.

Table 3-2: Industrial Employment by Sector

Industrial Sector	% of County Workforce (2007)
Agriculture, forestry, fishing, hunting, and mining	0.6%
Construction	5.1%
Manufacturing	8.9%
Wholesale trade	2.3%
Retail trade	10.4%
Transportation, warehousing and utilities	1.3%
Information	Data Not Available
Educational, health, and social services	10.6%
Arts, entertainment, recreation, accommodation and food services	10.0%
Other services(except public administration)	19.0%
Public administration	25.7%

Source: STATS Indiana, 2007

3.5 Industry

Monroe County's major employers and number of employees are listed in Table 3-3. The largest employer is Indiana University, which was established in 1820 and has nearly 6,987 employees. Bloomington Hospital is the second largest, with 3,500 full-time employees. Higher Education is the largest industry in the county.

Table 3-3: Major Employers

Company Name	Location	Established	Employees	Type of Business
Manufacturing				
Cook Incorporated	Bloomington	1963	2,200	Medical Devices
Baxter	Bloomington	2001	1,043	Pharmaceuticals
Carlisle Industrial Brake & Friction	Bloomington		200	Braking Systems
Hall Signs	Bloomington	1949	80	Traffic Signs
Education				
Indiana University	Bloomington	1820	6,987	University
Monroe County Community Schools	Bloomington	1965	1,726	Schools
Other				
PTS Electronics	Bloomington	1967	800	Electronics
Bloomington Hospital	Bloomington	1905	3,500	Hospital
Monroe County Government	Bloomington		729	Government
City of Bloomington	Bloomington		689	Government

Source: Monroe County Chamber of Commerce, 2007

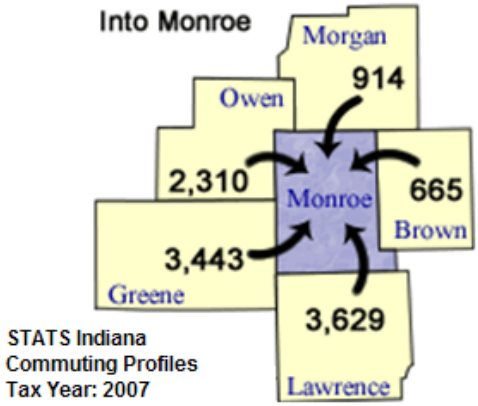
Commuter Patterns

According to STATS Indiana information from 2007, Monroe County has approximately 74,561 residents who are in the work force. Of these, approximately 68,609 work in the county. Roughly 5,952 residents commute outside the county for work and 15,859 non-residents commute into the county to work. Figure 3-1 depicts the commuting patterns into and out of the top five surrounding jurisdictions.

Figure 3-1: Commuter patterns into and out of Monroe County

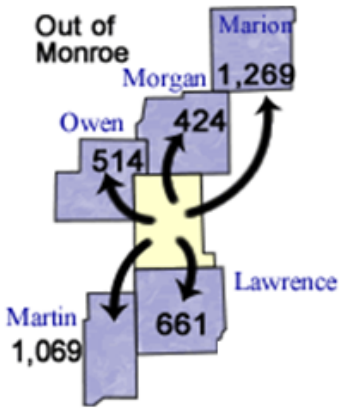
Top five counties sending workers INTO Monroe County:

Lawrence County	3,629
Greene County	3,443
Owen County	2,310
Morgan County	914
Brown County	665
Total of above	10,961 workers
(13.0% of Monroe County work force)	



Top five counties receiving workers FROM Monroe County:

Marion County	1,269
Martin County	1,069
Lawrence County	661
Owen County	514
Morgan County	424
Total of above	3,937 workers
(5.3% of Monroe County labor force)	



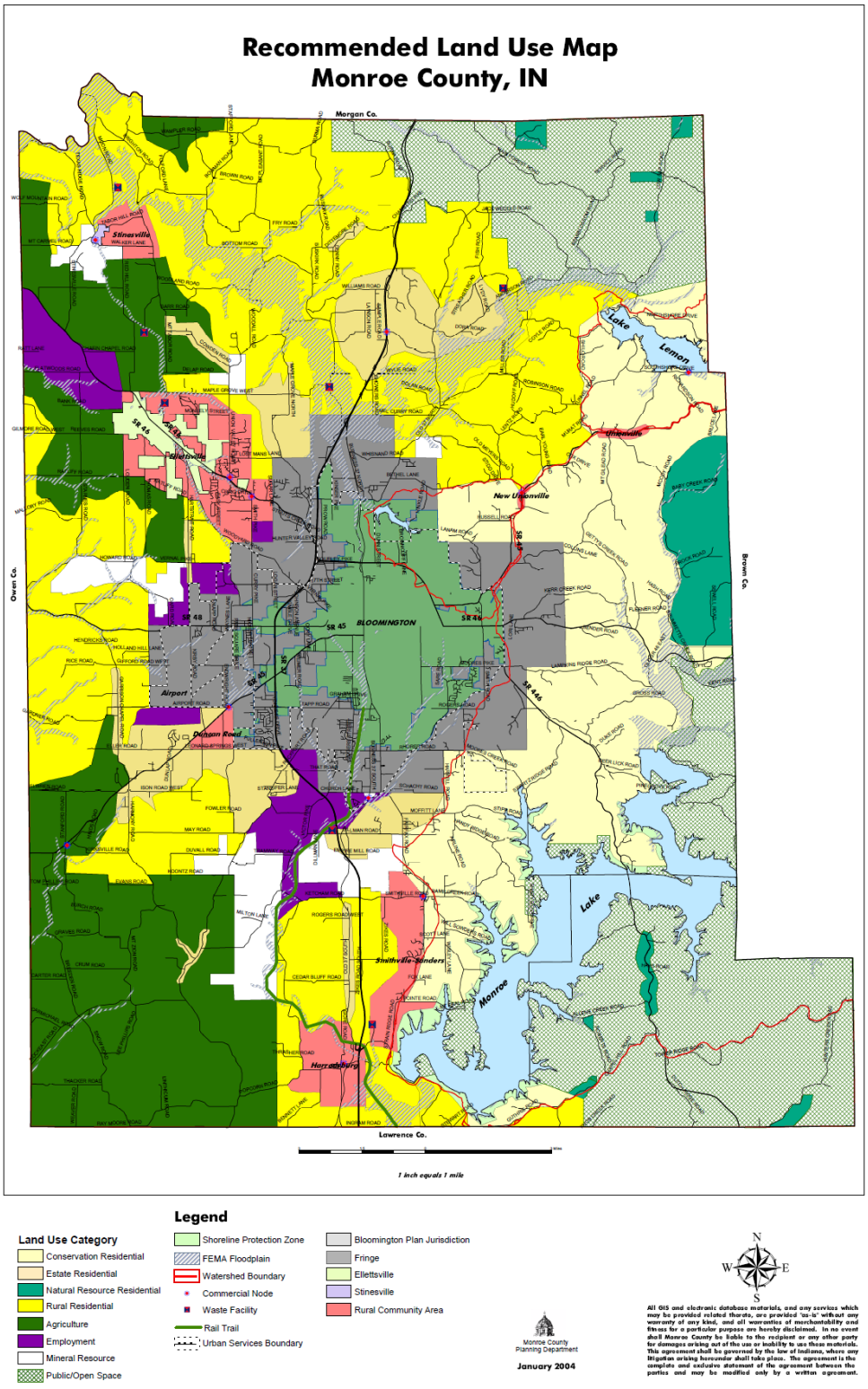
3.6 Land Use and Development Trends

Monroe County is host to the Indiana dimension limestone industry and the major recreation areas of Monroe Reservoir, Lake Lemon, Hoosier National Forest, including the Charles Dean Wilderness Area, and the Morgan-Monroe State Forest. Brown County State Park, Yellowwood State Forest, and McCormick's Creek State Park are also nearby.

Because Monroe County is such a rapidly growing area, the county has paid particular attention to developing a land use plan with the express desire to maintain the environment, and rural and residential character within the county, and to protect the quality of life for its residents.

Figure 3-2 depicts Monroe County's recommended land use map.

Figure 3-2: Monroe County Recommended Land Use Map



Source: Monroe County Land Use Plan

3.7 Major Lakes, Rivers, and Watersheds

Monroe County has several lakes including Lake Monroe and Lake Lemon, which are both artificial reservoirs. Lake Monroe, located in Bloomington, is fed by Salt Creek; Lake Lemon is also in Bloomington and is sourced by Bean Blossom Creek. A list of 14-digit Hydrologic Unit Code (HUC) watersheds is included in Table 3-4.

Table 3-4: Watersheds

Watershed Name	HUC Code
Indian Creek-Robertson Creek	05120201170060
Little Indian Creek-Jordan Creek	05120201180010
Bryant Creek (Morgan)	05120201180040
White River-Pocket Hollow	05120201180060
Indian Creek (Owen)	05120201180080
White River-Gosport	05120201180090
Bean Blossom Creek-Lake Lemon	05120202010040
Bean Blossom Creek-Honey Creek	05120202010050
Bean Blossom Creek-Buck Cr/Muddy Fork	05120202010060
Griffy Creek-Griffy Reservoir	05120202010070
Bean Blossom Creek-Stout Creek	05120202010080
Bean Blossom Creek-Indian Creek	05120202010090
Bean Blossom Creek-Jacks Defeat Creek	05120202010100
White River-Big Creek/Limestone Creek	05120202020010
White River-Fall Creek/McCormicks Creek	05120202020030
Raccoon Creek-Little Raccoon Creek	05120202020070
Richland Creek-Little Richland Creek	05120202040010
Richland Creek-Blakeman Hollow	05120202040020
Beech Creek	05120202040040
North Fork Salt Creek-Lower Schooner Creek	05120208050070
Brummett Creek	05120208050080
Stephens Creek	05120208050090
South Fork Salt Creek-Negro Creek	05120208060050
Lake Monroe-Saddle Cr.	05120208080020
Lake Monroe-Jacobs Creek	05120208080030
Lake Monroe-Moore Creek	05120208080040
Lake Monroe-Ramp Creek	05120208080050
Lake Monroe-Siscoe/Allen/Sugar Creeks	05120208080060
Clear Creek-Jackson Creek	05120208090010
Clear Creek-May Creek	05120208090020
Clear Creek-Little Clear Creek	05120208090030
Salt Creek-Wolf Creek	05120208090040
Little Salt Creek-Hunter Creek	05120208090050
Little Salt Creek-Brewer Branch	05120208090070
Little Salt Creek-Knob Creek	05120208090080
Indian Creek-Headwaters (Monroe)	05120208110010
Indian Creek-Little Indian Creek	05120208110020
Popcorn Creek	05120208110030

Source: U.S. Geological Survey HUC14 Watersheds, 2006

Section 4 - Risk Assessment

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation must be based on sound risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. This assessment identifies the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components—hazard identification, vulnerability analysis, and risk analysis.

4.1 Hazard Identification/Profile

4.1.1 Existing Plans

To facilitate the planning process, pre-existing plans were used for this risk assessment section. These existing plans included Monroe County Comprehensive Plan and Hazard Analysis and Indiana digital flood maps.

4.1.2 National Hazard Records

4.1.2.1 National Climatic Data Center (NCDC) Records

To assist the planning team, historical storm event data was compiled from the National Climatic Data Center (NCDC). NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather events.

The NCDC data included 233 reported events in Monroe County between January 1, 1950 and March 31, 2009. A summary table of events related to each hazard type is included in the hazard profile sections that follow. A table listing all events, including additional details, is included as Appendix D. In addition to NCDC data, Storm Prediction Center (SPC) data associated with tornadoes, strong winds, and hail were plotted using SPC recorded latitude and longitude. These events are plotted and included as Appendix E. A list of NCDC hazards is included in Table 4-1.

Table 4-1: Climatic Data Center Historical Hazards

Hazard
Tornadoes
Severe Thunderstorms
Drought/Extreme Heat
Winter Storms
Flood/Flash flood

4.1.2.2 FEMA Disaster Information

In the past decade, FEMA has declared a number of emergencies and disasters for the state of Indiana. Emergency declarations allow states access to FEMA funds for Public Assistance (PA); disaster declarations allow for even more PA funding including Individual Assistance (IA) and the Hazard Mitigation Grant Program (HMGP). Monroe County has received federal aid for both PA and IA funding for seven declared disasters since 1998. Figure 4-1 depicts the disasters and emergencies that have been declared for Monroe County within the past decade. Table 4-2 lists more specific information for each declaration.

Figure 4-1: FEMA-Declared Emergencies and Disasters in Monroe County (1998-2009)

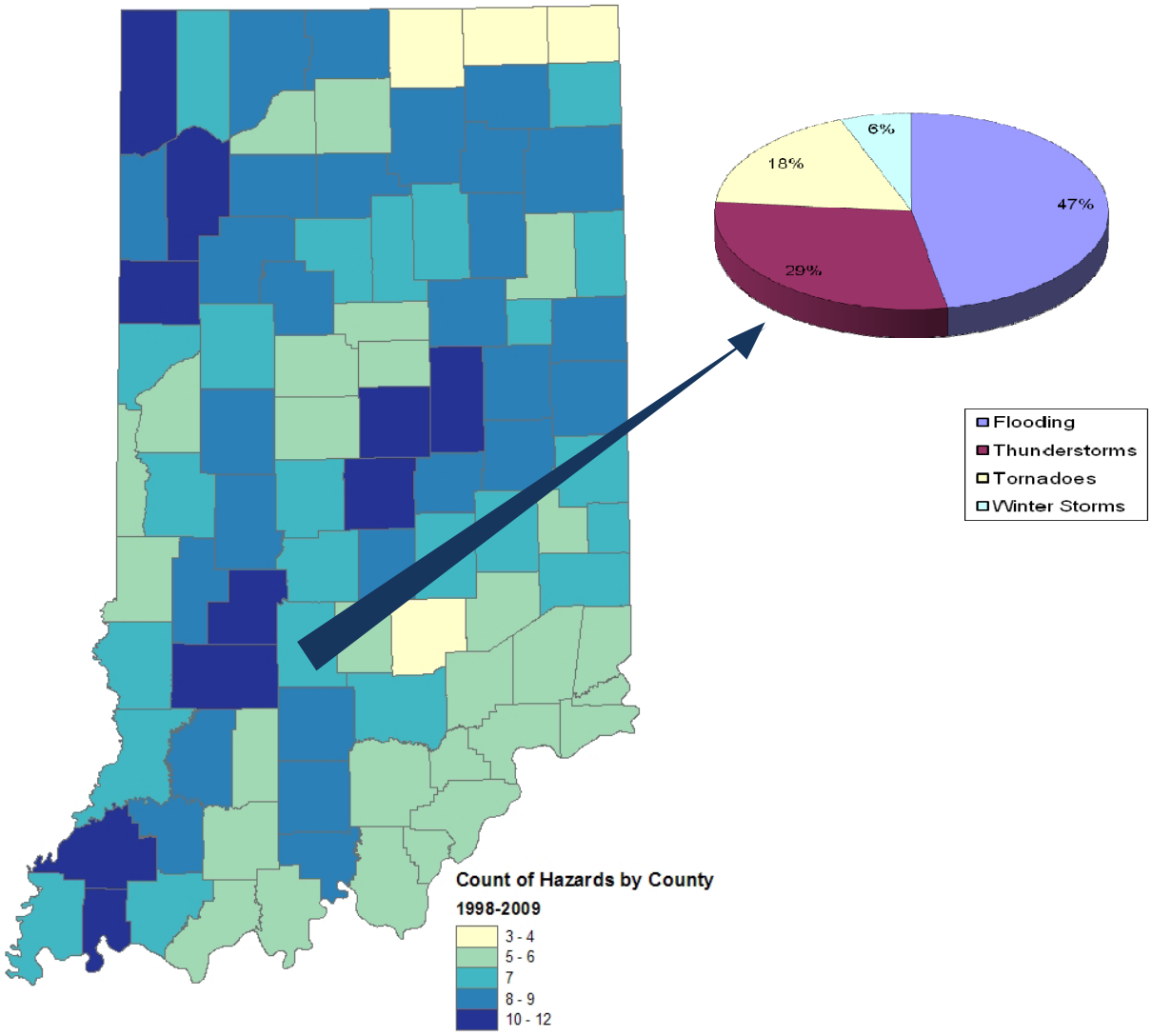


Table 4-2: FEMA-Declared Emergencies in Monroe County (1998-2009)

Date of Incident	Date of Declaration	Disaster Description	Type of Assistance
6/11/98 - 7/07/98	7/22/98	Severe Storms, Tornadoes, and Flooding	Public
9/20/02	9/25/02	Severe Storms and Tornadoes	Individual and Public
8/26/03 - 9/15/03	9/05/03	Severe Storms, Tornadoes, and Flooding	Individual
5/25/04 - 6/25/04	6/3/2004	Severe Storms, Tornadoes, and Flooding	Individual
12/21/04 - 12/23/04	1/11/2005	Severe Winter Storms	Public
1/01/05 - 2/11/05	1/21/2005	Severe Winter Storms and Flooding	Individual
6/06/08 - 6/27/08	6/8/2008	Severe Storms and Flooding	Individual and Public

4.1.3 Hazard Ranking Methodology

During Meeting #2, held on June 15, 2009, the planning team reviewed historical hazards information and participated in a risk analysis using a projector and Excel spreadsheet. The spreadsheet listed the compiled NCDC data for each community.

The spreadsheet calculated the probability rating (Low, Medium, High) of each hazard based on the number of events that have occurred in the county within the past 50 years. Throughout the planning process, the MHMP team had the opportunity to update the NCDC data with more accurate local information. For example, the NCDC records often list the locations of hazards such as floods under the county, not accounting for how the individual communities were affected. In such situations, the probability rating assigned to the county was applied to all jurisdictions within the county.

Team consensus was also important in determining the probability of hazards not recorded by NCDC, e.g. dam and levee failure and hazardous materials spills. The probabilities for these hazardous events were determined by the planning team's estimation, derived from local experience and records, of the number of historical events that have occurred within the past 50 years. The probability ratings are based on the following guidelines:

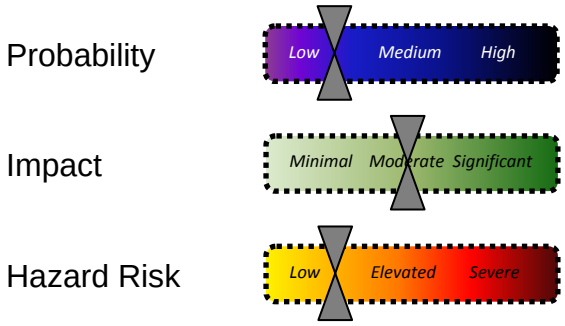
- Low = 0-5 events
- Medium = 6-15 events
- High = 16+ events

After improving the NCDC data with additional local data, the team determined each hazard's potential impact on the communities. The impact rating (Minimal, Moderate, Significant) was based on the following guidelines.

- Minimal = Few injuries
Critical facilities shut down for 24 hours
Less than 15% of property damage
- Moderate = Multiple injuries
Critical facilities shut down for 1-2 weeks
At least 30% of property damaged
- Significant = Multiple deaths
Critical facilities shut down for more than 1 month
More than 50% of property damaged

Finally, the overall hazard risk was determined by multiplying probability and impact. It is important to consider both probability and impact when determining risk. For example, if an asteroid were to collide with Earth, the impact would be extreme; but the probability of an asteroid strike (has not happened in billions of years) is so negligibly small that the overall risk is extremely low. There has never been a situation in human history in which a person was killed by a meteor. In contrast, other potentially damaging events like thunderstorms and floods are relatively less severe, but have occurred regularly in many places.

Each hazard addressed within the plan will use sliding scales to represent the probability, impact, and overall risk ratings. The scales will be depicted as follows:



The planning team identified flooding, tornadoes, and hazardous materials releases as the three most significant hazards affecting Monroe County. The hazard rankings are listed in Table 4-3.

Table 4-3: Monroe County Hazards

HAZARD CATEGORIES	HAZARD PROBABILITY Probability Rating	HAZARD IMPACT	HAZARD RISK
	(Low, Medium, High	(Minimal, Moderate, Significant)	(Low, Elevated, Severe)
MONROE COUNTY (ALL)			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Significant	Elevated
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Minimal	Low
Winter Weather (snow & ice)	Medium	Minimal	Low
Drought/Extreme Heat	Low	Minimal	Low
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	High	Minimal	Low
Subsidence	Medium	Minimal	Low
BLOOMINGTON			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Significant	Elevated
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Minimal	Low
Winter Weather (snow & ice)	Medium	Minimal	Low

HAZARD CATEGORIES	HAZARD PROBABILITY Probability Rating	HAZARD IMPACT	HAZARD RISK
Drought/Extreme Heat	Low	Minimal	Low
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	High	Minimal	Low
Subsidence	Medium	Minimal	Low
ELLETTSVILLE			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Significant	Elevated
Earthquake	Low	Significant	Elevated
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Minimal	Low
Winter Weather (snow & ice)	Medium	Minimal	Low
Drought/Extreme Heat	Low	Minimal	Low
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	High	Minimal	Low
Subsidence	Medium	Minimal	Low
STINESVILLE			
Tornado	High	Significant	Severe
Flood	High	Moderate	Severe
Dam/Levee Failure	Low	Minimal	Low
Earthquake	Low	Significant	Elevated
Severe Thunderstorm/Hail/ Lightning/High Wind	High	Minimal	Low
Winter Weather (snow & ice)	Medium	Minimal	Low
Drought/Extreme Heat	Low	Minimal	Low
Hazardous Materials Release	Medium	Significant	Elevated
Structural Failure & Fires	High	Minimal	Low
Subsidence	Medium	Minimal	Low

4.1.4 GIS and HAZUS-MH

The third step in this assessment is the risk analysis which quantifies the risk to the population, infrastructure, and economy of the community. Where possible, the hazards were quantified using GIS analyses and HAZUS-MH. This process reflects a level two approach to analyzing hazards as defined for HAZUS-MH. The approach includes substitution of selected default data with local data. This process improved the accuracy of the model predictions.

HAZUS-MH generates a combination of site-specific and aggregated loss estimates depending upon the analysis options that are selected and upon the input that is provided by the user. Aggregate inventory loss estimates, which include building stock analysis, are based upon the assumption that building stock is evenly distributed across census blocks/tracts. Therefore, it is possible that overestimates of damage will occur in some areas while underestimates will occur in other areas. With this in mind, total losses tend to be more reliable over larger geographic areas than for individual census blocks/tracts. It is important to note that HAZUS-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risk to flood-, earthquake-, and

hurricane-related hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project. It is only intended to highlight the major steps that were followed during the project.

Site-specific analysis is based upon loss estimations for individual structures. For flooding, analysis of site-specific structures takes into account the depth of water in relation to the structure. HAZUS-MH also takes into account the actual dollar exposure to the structure for the costs of building reconstruction, content, and inventory. However, damages are based upon the assumption that each structure will fall into a structural class, and structures in each class will respond in a similar fashion to a specific depth of flooding or ground shaking. Site-specific analysis is also based upon a point location rather than a polygon, therefore the model does not account for the percentage of a building that is inundated. These assumptions suggest that the loss estimates for site-specific structures as well as for aggregate structural losses need to be viewed as approximations of losses that are subject to considerable variability rather than as exact engineering estimates of losses to individual structures.

The following events were analyzed. The parameters for these scenarios were created though GIS, HAZUS-MH, and historical information to predict which communities would be at risk.

Using HAZUS-MH

1. 100-year overbank flooding
2. Earthquake scenarios

Using GIS

1. Tornado
2. Hazardous material release

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

4.2.1.1 Processes and Sources for Identifying Assets

The HAZUS-MH data is based on best available national data sources. The initial step involved updating the default HAZUS-MH data using State of Indiana data sources. At Meeting #1 the planning team members were provided with a plot and report of all HAZUS-MH critical facilities. The planning team took GIS data provided by The Polis Center; verified the datasets using local knowledge, and allowed The Polis Center to use their local GIS data for additional verification. Polis GIS analysts made these updates and corrections to the HAZUS-MH data tables prior to performing the risk assessment. These changes to the HAZUS-MH inventory reflect a level two analysis. This update process improved the accuracy of the model predictions.

The default HAZUS-MH data has been updated as follows:

- The HAZUS-MH defaults, critical facilities, and essential facilities have been updated based on the most recent available data sources. Critical and essential point facilities have been reviewed, revised, and approved by local subject matter experts at each county.

- The essential facility updates (schools, medical care facilities, fire stations, police stations, and EOCs) have been applied to the HAZUS-MH model data. HAZUS-MH reports of essential facility losses reflect updated data.

The default aggregate building inventory tables have been replaced with the most recent Assessor records. Monroe County provided the parcel boundaries to The Polis Center, and Indiana Department of Local Government and Finance provided the Monroe County Assessor records. Records without improvements were deleted. The parcel boundaries were converted to parcel points located in the centroids of each parcel boundary. Each parcel point was linked to an Assessor record based upon matching parcel numbers. The generated building inventory points represent the approximate locations (within a parcel) of building exposure. The parcel points were aggregated by census block. Table 4-4 lists Monroe County's parcel-matching results.

Table 4-4: Parcel-Matching for Monroe County

Data Source	Count
Assessor Records	55,517
County Provided Parcels	57,416
Assessor Records with Improvements	36,970
Matched Parcel Points	36,953

The following assumptions were made during the analysis:

- The building exposure is determined from the Assessor records. It is assumed that the population and the buildings are located at the centroid of the parcel.
- The algorithm used to match county-provided parcel point locations with the Assessor records is not perfect. The results in this analysis reflect matched parcel records only. Table 4-4 lists Monroe County's parcel-matching results.
- Population counts are based upon 2.5 persons per household. Only residential occupancy classes are used to determine the impact on the local population. If the event were to occur at night, it would be assumed that people are at home (not school, work, or church).
- The analysis is restricted to the county boundaries. Events that occur near the county boundaries do not contain damage assessments from adjacent counties.

4.2.1.2 Essential Facilities List

Table 4-5 identifies the essential facilities that were added or updated for the analysis. Essential facilities are a subset of critical facilities. A complete list of critical facilities is included as Appendix F. A map of all critical facilities is included as Appendix G.

Table 4-5: Essential Facilities List

Facility	Number of Facilities
Care Facilities	15
Emergency Operations Centers	1
Fire Stations	16
Police Stations	8
Schools	39 (excluding Indiana University)

4.2.1.3 Facility Replacement Costs

Facility replacement costs and total building exposure are identified in Table 4-6. The replacement costs have been updated by local data. Table 4-6 also includes the estimated number of buildings within each occupancy class.

The Assessor records often do not distinguish parcels by occupancy class when the parcels are not taxable; therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Table 4-6: Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure (X 1000)
Agricultural	2547	$299,379
Commercial	1,736	$982,976
Education	186	$96,514
Government	60	$0
Industrial	273	$438,047
Religious/Non-Profit	729	$358,977
Residential	31,422	$4,521,330
Total	**36,953**	**$6,697,223**

4.3 Future Development

As the county's population grows, the residential and urban areas will extend, placing more pressure on existing transportation and utility infrastructure while increasing the rate of farmland conversion; the county will address mitigation strategies in Section 5 to alleviate such issues.

Because Monroe County is vulnerable to a variety of natural and technological threats, the county government must make a commitment to prepare for the management of these types of events. Monroe County is committed to ensuring that county elected and appointed officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and county response.

4.4 Hazard Profiles

4.4.1 Tornado Hazard

Hazard Definition for Tornado Hazard

Tornadoes pose a great risk to the State of Indiana and its citizens. Tornadoes can occur at any time during the day or night. They can also happen during any month of the year. The unpredictability of tornadoes makes them one of Indiana's most dangerous hazards. Their extreme winds are violently destructive when they touch down in the region's developed and populated areas. Current estimates place the maximum velocity at about 300 mph, but higher and lower values can occur. A wind velocity of 200 mph will result in a wind pressure of 102.4 pounds per square foot of surface area—a load that exceeds the tolerance limits of most buildings. Considering these factors, it is easy to understand why tornadoes can be so devastating for the communities they hit.

Tornadoes are defined as violently-rotating columns of air extending from thunderstorms to the ground. Funnel clouds are rotating columns of air not in contact with the ground; however, the violently-rotating column of air can reach the ground very quickly and become a tornado. If the funnel cloud picks up and blows debris, it has reached the ground and is a tornado.

Tornadoes are classified according to the Fujita tornado intensity scale. The tornado scale ranges from low intensity F0 with effective wind speeds of 40 to 70 mph to F5 tornadoes with effective wind speeds of over 260 mph. The Fujita intensity scale is included in Table 4-7.

Table 4-7: Fujita Tornado Rating

Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
0 *Gale*	40-72 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, sign boards damaged, shallow-rooted trees blown over.
1 *Moderate*	73-112 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes pushed off foundations, attached garages damaged.
2 *Significant*	113-157 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from frame houses, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted.
3 *Severe*	158-206 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
4 *Devastating*	207-260 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
5 *Incredible*	261-318 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Source: NOAA Storm Prediction Center

Previous Occurrences for Tornado Hazard

There have been several occurrences of tornadoes within Monroe County during the past few decades. The NCDC database reported 16 tornadoes/funnel clouds in Monroe County since 1950.

The most recent event occurred in 2004 when a very small and brief tornado touched down from a thunderstorm near Bloomington, causing damage to several trees in the backyard of a residence. No one was injured, and no other significant damage was reported. A few strong thunderstorms moved through central Indiana on the morning of 4 August, 2004. A brief tornado was the only severe event reported from these thunderstorms; however lightning strikes caused some damage as well.

The Monroe County NCDC recorded tornadoes are identified in Table 4-8. Additional details for NCDC events are included in Appendix D.

Table 4-8: Monroe County Tornadoes*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	6/13/1958	Tornado	F1	0	0	25K	0
Monroe Co	6/13/1958	Tornado	F1	0	0	250K	0
Monroe Co	4/19/1970	Tornado	F1	0	0	250K	0
Monroe Co	4/19/1970	Tornado	F2	0	6	250K	0
Monroe Co	5/27/1973	Tornado	F2	0	0	250K	0
Monroe Co	5/27/1973	Tornado	F2	0	0	250K	0
Monroe Co	6/24/1973	Tornado	F1	0	0	25K	0
Monroe Co	6/26/1973	Tornado	F2	0	0	250K	0
Monroe Co	5/2/1974	Tornado	F1	0	0	0K	0
Monroe Co	4/18/1975	Tornado	F2	0	1	250K	0
Monroe Co	6/1/1978	Tornado	F1	0	0	0K	0
Monroe Co	11/22/1992	Tornado	F3	0	3	250K	0
Ellettsville	9/20/2002	Tornado	F3	0	0	10.0M	20K
Ellettsville	5/30/2004	Tornado	F1	0	0	250K	0
Bloomington	5/30/2004	Tornado	F0	0	0	150K	0
Bloomington	8/4/2004	Tornado	F0	0	0	1K	0

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Tornado Hazard

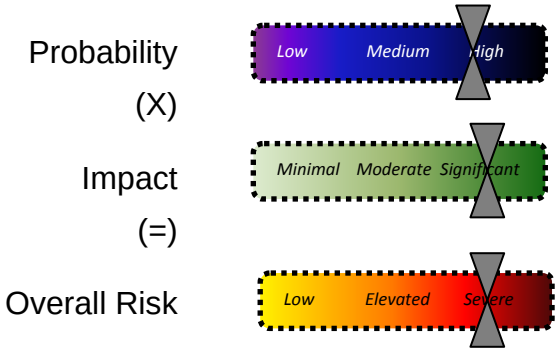
The entire county has the same risk for occurrence of tornadoes. They can occur at any location within the county.

Hazard Extent for Tornado Hazard

The historical tornadoes generally move from southwest to northeast across the county. The extent of the hazard varies both in terms of the extent of the path and the wind speed.

Risk Identification for Tornado Hazard

Based on historical information, the probability of a tornado is high. Tornadoes with varying magnitudes are expected to happen. In Meeting #2, the planning team determined that the potential impact of a tornado is significant; therefore, the overall risk of a tornado hazard for Monroe County is severe.



Vulnerability Analysis for Tornado Hazard

Tornadoes can occur within any area in the county; therefore, the entire county population and all buildings are vulnerable to tornadoes. To accommodate this risk, this plan will consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Monroe County are discussed in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to tornadoes. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts will vary based on the magnitude of the tornado, but can include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). Table 4-5 lists the types and numbers of all of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

The building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, and loss of building function (e.g. damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a tornado the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a tornado. The impacts to these items include broken, failed, or impassable roadways, broken or failed utility lines (e.g. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

An example scenario is described as follows to gauge the anticipated impacts of tornadoes in the county, in terms of numbers and types of buildings and infrastructure.

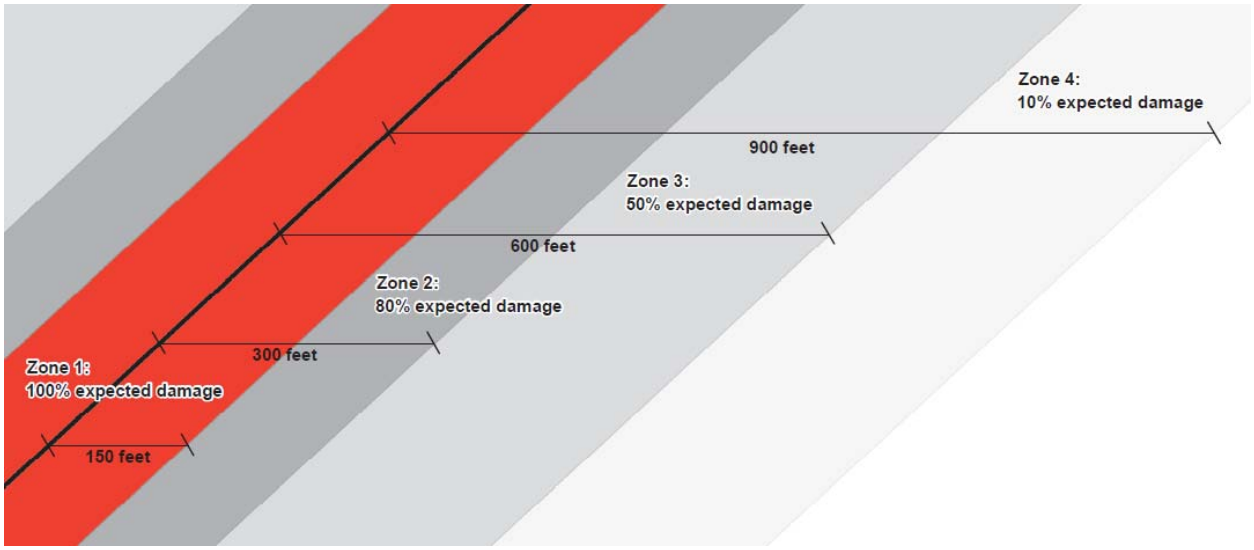
GIS overlay modeling was used to determine the potential impacts of an F4 tornado. The analysis used a hypothetical tornado path that ran for 3.18 miles northeast through the center of Ellettsville. The selected widths were modeled after a recreation of the Fujita-Scale guidelines based on conceptual wind speeds, path widths, and path lengths. There is no guarantee that every tornado will fit exactly into one of these six categories. Table 4-9 depicts tornado damage curves as well as path widths.

Table 4-9: Tornado Path Widths and Damage Curves

Fujita Scale	Path Width (feet)	Maximum Expected Damage
5	2,400	100%
4	1,800	100%
3	1,200	80%
2	600	50%
1	300	10%
0	150	0%

Within any given tornado path there are degrees of damage. The most intense damage occurs within the center of the damage path with decreasing amounts of damage away from the center. After the hypothetical path is digitized on a map the process is modeled in GIS by adding buffers (damage zones) around the tornado path. Figure 4-2 and Table 4-10 describe the zone analysis. The selected hypothetical tornado path is depicted in Figure 4-3, and the damage curve buffers are shown in Figure 4-4.

Figure 4-2: F4 Tornado Analysis Using GIS Buffers



An F4 tornado has four damage zones, depicted in Table 4-10. Total devastation is estimated within 150 feet of the tornado path. The outer buffer is 900 feet from the tornado path, within which buildings will experience 10% damage.

Table 4-10: F4 Tornado Zones and Damage Curves

Zone	Buffer (feet)	Damage Curve
1	0-150	100%
2	150-300	80%
3	300-600	50%
4	600-900	10%

Figure 4-3: Hypothetical F4 Tornado Path in Monroe County

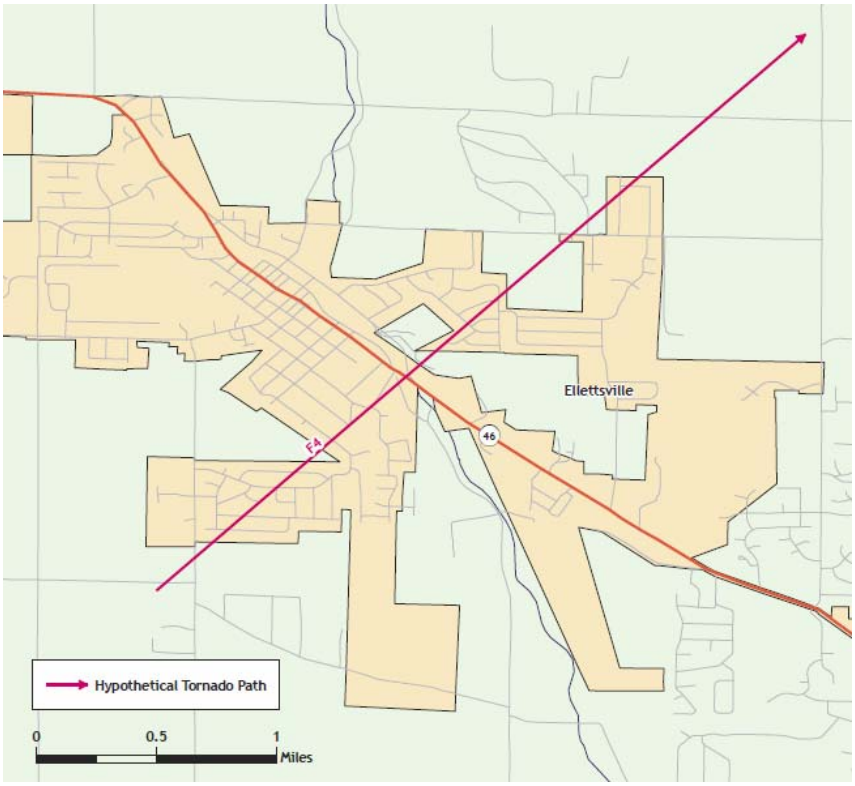
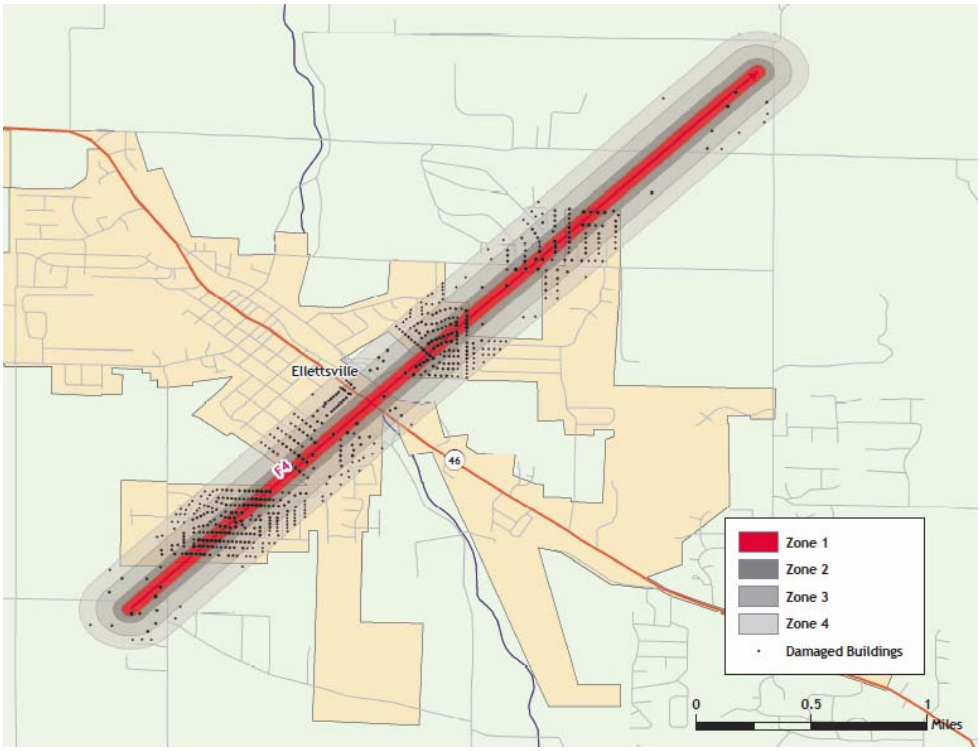


Figure 4-4: Modeled F4 Tornado Damage Buffers in Monroe County



The results of the analysis are depicted in Tables 4-11 and 4-12. The GIS analysis estimates that 618 buildings will be damaged. The estimated building losses were $32.4 million. The building losses are an estimate of building replacement costs multiplied by the percentages of damage. The overlay was performed against parcels provided by Monroe County that were joined with Assessor records showing property improvement.

The Assessor records often do not distinguish parcels by occupancy class when the parcels are not taxable; therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Table 4-11: Estimated Numbers of Buildings Damaged by Occupancy Type

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	113	98	212	170
Commercial	1	0	6	5
Industrial	0	0	0	0
Agriculture	1	0	5	2
Religious	0	0	0	4
Government	1	0	0	0
Education	0	0	0	0
Total	**116**	**98**	**223**	**181**

Table 4-12: Estimated Building Losses by Occupancy Type (X 1000)

Occupancy	Zone 1	Zone 2	Zone 3	Zone 4
Residential	$10,317	$7,418	$10,520	$1,627
Commercial	$338	$0	$1,115	$548
Industrial	$0	$0	$0	$0
Agriculture	$1	$0	$305	$14
Religious	$0	$0	$0	$248
Government	$0	$0	$0	$0
Education	$0	$0	$0	$0
Total	**$10,656**	**$7,418**	**$11,940**	**$2,436**

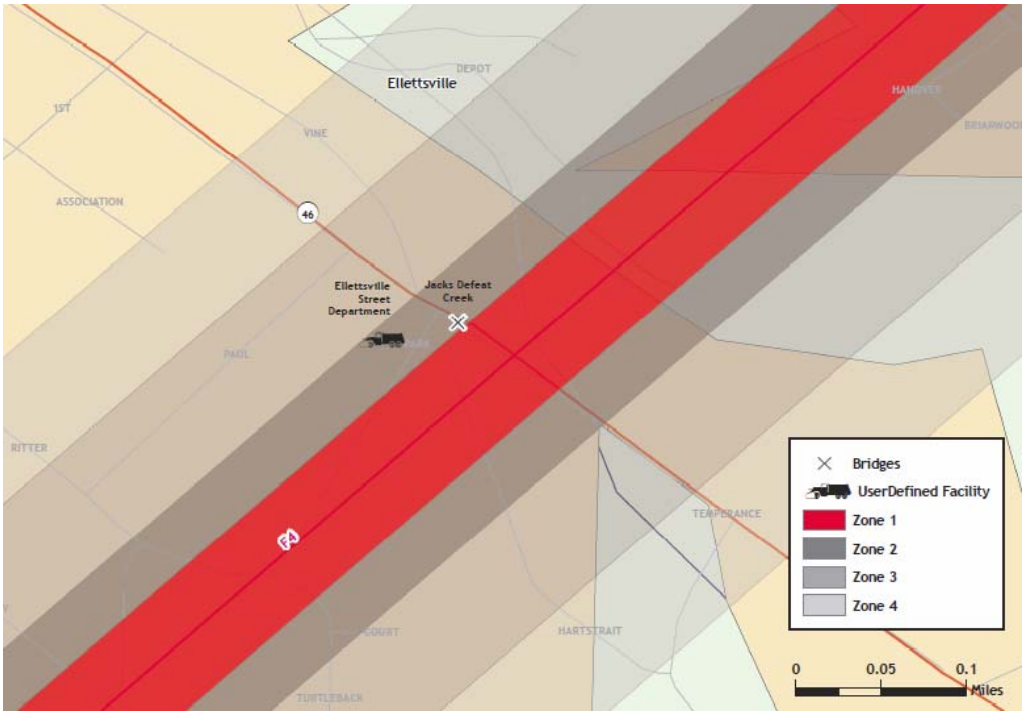
Critical Facility Damage

There are two critical facilities located within 900 feet of the hypothetical tornado path. The affected facilities are identified in Table 4-13, and Figure 4-5 shows the geographic location of some facilities.

Table 4-13: Estimated Critical Facilities Affected

Name
Jacks Defeat Creek Bridge
Ellettsville Street Department

Figure 4-5: Critical Facilities within Tornado Path



Vulnerability to Future Assets/Infrastructure for Tornado Hazard

The entire population and buildings have been identified as at risk because tornadoes can occur anywhere within the State of Indiana, at any time of the day, and during any month of the year. Furthermore, any future development in terms of new construction within the county will be at risk. The building exposure for Monroe County is included in Table 4-6.

All critical facilities in the county and communities within the county are at risk. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warnings of approaching storms are also vital to preventing the loss of property and ensuring the safety of Monroe County residents.

4.4.2 Flood Hazard

Hazard Definition for Flooding

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates into the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Floods can be classified as one of two types: upstream floods or downstream floods. Both types of floods are common in Indiana. Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to the high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe in the local areas where they occur. Urban flooding is a type of upstream flood. Urban flooding involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at anytime of the year in Indiana, but they are most common in the spring and summer months.

Downstream floods, sometimes called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and time of the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage. Riverine flooding on the large rivers of Indiana generally occurs during either the spring or summer.

Hazard Definition for Dam and Levee Failure

Dams are structures that retain or detain water behind a large barrier. When full or partially full, the difference in elevation between the water above the dam and below creates large amounts of potential energy, creating the potential for failure. The same potential exists for levees when they serve their purpose, which is to confine flood waters within the channel area of a river and exclude that water from land or communities land-ward of the levee. Dams and levees can fail due to either: 1) water heights or flows above the capacity for which the structure was designed; or 2) deficiencies in the structure such that it cannot hold back the potential energy of the water. If a dam or levee fails, issues of primary concern include loss of human life/injury, downstream property damage, lifeline disruption (of concern would be transportation routes and utility lines required to maintain or protect life), and environmental damage.

Many communities view both dams and levees as permanent and infinitely safe structures. This sense of security may well be false, leading to significantly increased risks. Both downstream of dams and on floodplains protected by levees, security leads to new construction, added infrastructure, and increased population over time. Levees in particular are built to hold back flood waters only up to some maximum level, often the 100-year (1% annual probability) flood

event. When that maximum is exceeded by more than the design safety margin, then the levee will be overtopped or otherwise fail, inundating communities in the land previously protected by that levee. It has been suggested that climate change, land-use shifts, and some forms of river engineering may be increasing the magnitude of large floods and the frequency of levee-failure situations.

In addition to failure that results from extreme floods above the design capacity, levees and dams can fail due to structural deficiencies. Both dams and levees require constant monitoring and regular maintenance to assure their integrity. Many structures across the U.S. have been under-funded or otherwise neglected, leading to an eventual day of reckoning in the form either of realization that the structure is unsafe or, sometimes, an actual failure. The threat of dam or levee failure may require substantial commitment of time, personnel, and resources. Since dams and levees deteriorate with age, minor issues become larger compounding problems, and the risk of failure increases.

Previous Occurrences for Flooding

The NCDC database reported 31 flood events in Monroe County since 1950. The most recent event occurred in 2008. Flooding occurred in many locations throughout Monroe County. Heavy rain caused high water, which closed several roads. Flooding occurred across central Indiana due to heavy rain of five to eight inches causing many areas of southern Indiana to be paralyzed for two or more days.

The Monroe County NCDC recorded floods are identified in Table 4-14. Additional details for NCDC events are included in Appendix D. In addition, USGS stream gauge data of historical crests are listed in Appendix H.

Table 4-14: Monroe County Previous Occurrences of Flooding*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	8/17/1993	Flash Flood	N/A	0	0	50K	5K
Monroe Co	11/14/1993	Flood	N/A	0	0	5.0M	500K
Monroe Co	3/7/1995	Flood	N/A	0	0	0	0
Monroe Co	5/4/1996	Flood	N/A	0	0	0	0
Monroe Co	4/15/1998	Flash Flood	N/A	0	0	10K	0
Monroe Co	6/22/1998	Urban/sml Stream Fld	N/A	0	0	0	0
Monroe Co	1/21/1999	Flood	N/A	0	0	19.0M	0
Monroe Co	2/1/1999	Flood	N/A	0	0	0	0
Bloomington	10/5/2000	Flash Flood	N/A	1	0	0	0
Monroe Co	10/5/2000	Flood	N/A	0	0	0	0
Monroe Co	4/12/2002	Flash Flood	N/A	0	0	0	0
Monroe Co	5/7/2002	Flash Flood	N/A	0	0	100K	0
Monroe Co	5/12/2002	Flash Flood	N/A	0	0	50K	0
Monroe Co	9/1/2003	Flood	N/A	0	0	22.0M	0
Monroe Co	1/3/2004	Flood	N/A	0	0	0	0
Monroe Co	1/4/2004	Flood	N/A	3	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Stanford	5/17/2004	Flash Flood	N/A	0	0	0	0
Monroe Co	5/28/2004	Flood	N/A	0	0	0	0
Monroe Co	6/14/2004	Flood	N/A	0	0	0	0
Monroe Co	1/3/2005	Flood	N/A	0	0	0	0
Monroe Co	5/19/2005	Flash Flood	N/A	0	0	0	0
Monroe Co	8/30/2005	Flood	N/A	0	0	0	0
Monroe Co	3/9/2006	Flood	N/A	0	0	0	0
Bloomington	3/12/2006	Flood	N/A	0	0	0	0
Unionville	1/28/2007	Flood	N/A	1	0	10K	0K
Stinesville	1/8/2008	Flash Flood	N/A	0	0	5K	0K
Stinesville	3/18/2008	Flood	N/A	0	0	50K	0K
Arlington	6/4/2008	Flash Flood	N/A	0	0	30K	0K
Stinesville	6/7/2008	Flash Flood	N/A	0	0	1.0M	250K
Bloomington	6/9/2008	Flash Flood	N/A	0	0	5K	5K
Ellettsville	6/14/2008	Flash Flood	N/A	0	0	5K	0K

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Previous Occurrences for Dam and Levee Failure

According to the Monroe County CEMP, there are no records of any dam or certified levee failure in the county; however, in 2002, an overtop of Lake Monroe caused significant damage.

Repetitive Loss Properties

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the NFIP, which has suffered flood loss damage on two occasions during a 10-year period that ends on the date of the second loss, in which the cost to repair the flood damage is 25% of the market value of the structure at the time of each flood loss.

Indiana Department of Natural Resources (IDNR) and the Indiana Department of Homeland Security (IDHS) were contacted to determine the location of repetitive loss structures. According to the 2006 data supplied, Monroe County has one repetitive loss structure. The total amount paid for building replacement and building contents for damages to these repetitive loss structures is $5,353.15. Table 4-15 describes the loss structures in terms of occupancy and jurisdiction.

Table 4-15: Monroe County Repetitive Loss Structures

Jurisdiction	Occupancy Type	Number of Properties	Number of Losses	Total Paid
Bloomington	Non-Residential	1	2	$5,353.15

Geographic Location for Flooding

Most river flooding occurs in early spring and is the result of excessive rainfall and/or the combination of rainfall and snowmelt. Severe thunderstorms may cause flooding during the summer or fall, but tend to be localized.

According to Monroe County's Hazard Analysis, the primary sources of residential flooding in Monroe County are Jack's Defeat Creek, Sinking Creek, and Cave Creek. Roads that are subject to frequent flooding include Baby Creek Road, Bottom Road, Brummets Creek Road, Dillman Road, Bryants Creek Road, Breeden Road, Friendship Road, Anderson Road, Shiloh Road, Gore Road, Kerr Creek Road, Fluck Mill Road, Fleener Road, Old State Road 48, Tom Phillips Road, South Rogers Street, Woodland Road, Woodall Road, and Mt. Pleasant Road.

Flash floods, brief heavy flows in small streams or normally dry creek beds, also occur within the county. Flash flooding is typically characterized by high-velocity water, often carrying large amounts of debris. Urban flooding involves the overflow of storm drain systems and is typically the result of inadequate drainage following heavy rainfall or rapid snowmelt.

The state of Indiana is in the process of completing the modernization of the Flood Insurance Rate Maps (FIRMs) for Monroe County. These preliminary digital files (DFIRMs) were used to identify specific stream reaches for analysis. The areas of riverine flooding are depicted on the map in Appendix E. Flash flooding may occur countywide.

The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service provides information from gauge locations at points along various rivers across the United States. For Monroe County, data is provided for one point: Monroe Lake. Appendix H lists information pulled from the NOAA website, which includes flood categories, historical crests, and details about anticipated impacts to agricultural lands, dams, levees, and other built structures at significant flood crest levels.

Geographic Location for Dam and Levee Failure

The National Inventory of Dams identified 15 dams in Monroe County. The map in Appendix G illustrates the location of Monroe County dams. Table 4-16 summarizes the National Inventory of Dams information.

Table 4-16: National Inventory of Dams

Dam Name	River	Hazard	EAP
LAKE LEMON DAM	Beanblossom Creek	H	N
EGENOLF LAKE DAM	Wolf Creek	H	N
GRIFFY RESERVOIR DAM	Griffy Creek	H	N
WEIMER LAKE DAM	Unnamed Tributary Clear Creek	L	N
BEAN BLOSSOM DAM	Greasy Creek	L	N
BRYANTS CREEK DAM	Bryant Creek	S	N
BUGHER LAKE DAM	Unnamed Tributary Beanblossom Creek	L	N
CHERRY LAKE DAM	Little Indian Creek	S	N
LAZY LAKE DAM	Lazy Creek	L	N

Dam Name	River	Hazard	EAP
BETHAL LAKE DAM	Unnamed Tributary Muddy Fork	L	N
SCHACHT LAKE DAM	Unnamed Tributary Stephens Creek	H	N
UNIVERSITY LAKE DAM	Griffy Creek	L	N
MONROE LAKE DAM	SALT CREEK	H	Y
LEONARD SPRING DAM	Unnamed Tributary Clear Creek	H	N
FIELDSTONE LAKE DAM	Cave Creek	S	N

A review of the Indiana Department of Natural Resource's files identified no levees in Monroe County.

* The dams and levees listed in this multi-hazard mitigation plan are recorded from historical IDNR data. Their physical presences were not confirmed; therefore, new or unrecorded structures may exist. A more complete list of locations is included in Appendix G.

Hazard Extent for Flooding

The HAZUS-MH flood model is designed to generate a flood depth grid and flood boundary polygon by deriving hydrologic and hydraulic information based on user-provided elevation data or by incorporating selected output from other flood models. HAZUS-MH also has the ability to clip a Digital Elevation Model (DEM) with a user-provided flood boundary, thus creating a flood depth grid. For Monroe County HAZUS-MH was used to extract flood depth by clipping the DEM with the IDNR FIRMs Base Flood Elevation (BFE) boundary. The BFE is defined as the area that has a 1% chance of flooding in any given year.

Flood hazard scenarios were modeled using GIS analysis and HAZUS-MH. The flood hazard modeling was based on historical occurrences and current threats. Existing IDNR flood maps were used to identify the areas of study. These digital files, although not official FIRMs, provided the boundary which was the basis for this analysis. Planning team input and a review of historical information provided additional information on specific flood events.

Hazard Extent for Dam and Levee Failure

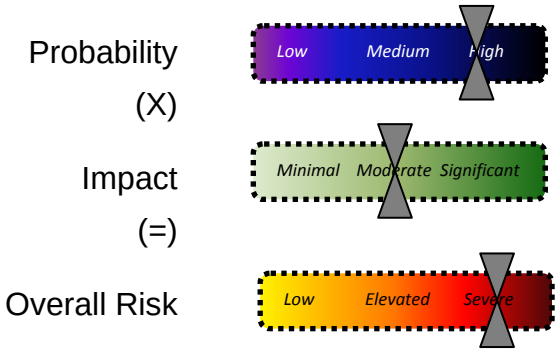
When dams are assigned the low (L) hazard potential classification, it means that failure or incorrect operation of the dam will result in zero human life losses and no low economic and/or environmental losses. Losses are principally limited to the owner's property. Dams assigned the significant (S) hazard classification are those dams in which failure or incorrect operation results in no probable loss of human life; however it can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Dams classified as significant hazard potential dams are often located in predominantly rural or agricultural areas, but could be located in populated areas with a significant amount of infrastructure. Dams assigned the high (H) hazard potential classification are those dams in which failure or incorrect operation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure.

According to the IDNR and the National Inventory of Dams, six dams are classified as high hazard dams. One dam has an Emergency Action Plan (EAP). An EAP is not required by the State of Indiana but is recommended in the 2003 Indiana Dam Safety & Inspection Manual.

Accurate mapping of the risks of flooding behind levees depends on knowing the condition and level of protection the levees actually provide. FEMA and the U.S. Army Corps of Engineers are working together to make sure that flood hazard maps clearly reflect the flood protection capabilities of levees, and that the maps accurately represent the flood risks posed to areas situated behind them. Levee owners—usually states, communities, or in some cases private individuals—are responsible for ensuring that the levees they own are maintained according to their design. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation, and maintenance standards for protection against the one-percent-annual chance flood.

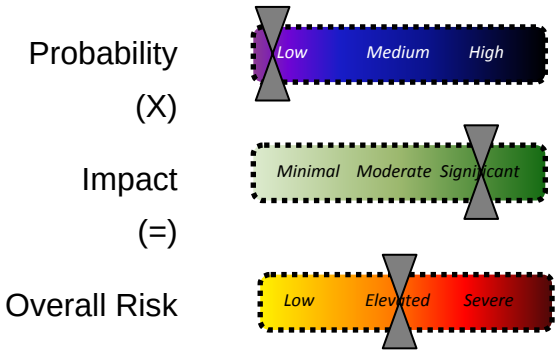
Risk Identification for Flood Hazard

Based on historical information, the probability of a flood is high. In Meeting #2, the planning team determined that the potential impact of a flood is moderate; therefore, the overall risk of a flood hazard for Monroe County is severe.



Risk Identification for Dam/Levee Failure

Based on historical information, the probability of dam/levee failure is low. In Meeting #2, the planning team determined that the potential impact of dam/levee failure is significant; therefore, the overall risk of dam/levee failure for Monroe County is elevated.



HAZUS-MH Analysis Using 100-Year Preliminary DFIRM Boundary and County Parcels

HAZUS-MH generated the flood depth grid for a 100-year return period by clipping the IGS 1/3 ArcSecond (approximately 10 meters) Digital Elevation Model (DEM) to the Monroe County preliminary DFIRM boundary. Next, HAZUS-MH utilized a user-defined analysis of Monroe County with site-specific parcel data provided by the county.

HAZUS-MH estimates the 100-year flood would damage 691 buildings at a replacement cost of $26.7 million. The total estimated numbers of damaged buildings are given in Table 4-17. Figure 4-6 depicts the Monroe County parcel points that fall within the 100-year floodplain. Figures 4-7 and 4-8 highlight damaged buildings within the floodplain areas in Bloomington and Ellettsville.

Table 4-17: Monroe County HAZUS-MH Building Damage

General Occupancy	Number of Buildings Damaged	Total Building Damage (x1000)
Residential	434	$15,857
Commercial	111	$4,426
Industrial	11	$3,949
Agricultural	105	$1,746
Religious	25	$499
Government	4	$0
Education	1	$187
Total	**691**	**$26,664**

Figure 4-6: Monroe County Buildings in Floodplain (100-Year Flood)

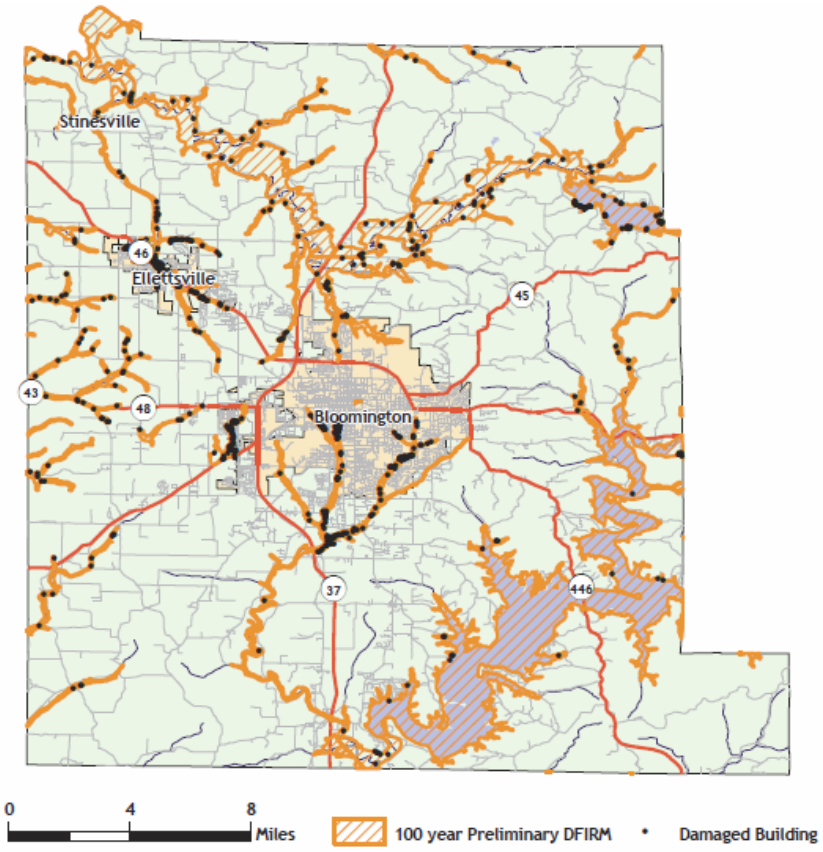


Figure 4-7: Monroe County Urban Areas (Bloomington) Flood-Prone Areas (100-Year Flood)

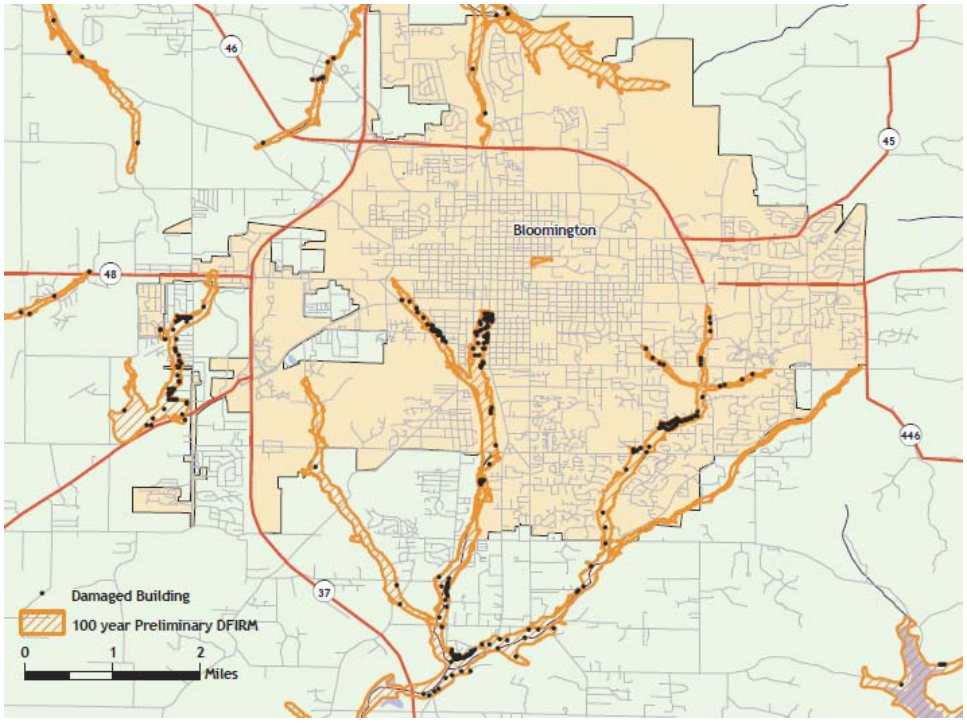
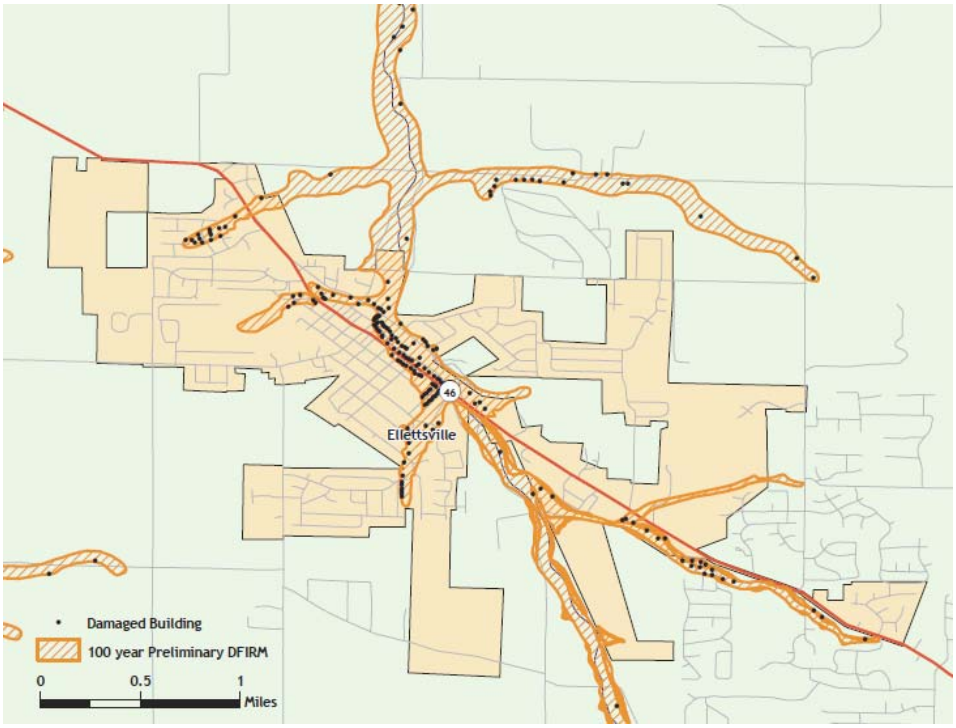


Figure 4-8: Monroe County Urban Areas (Ellettsville) Flood-Prone Areas (100-Year Flood)



Critical Facilities

A critical facility will encounter many of the same impacts as other buildings within the flood boundary. These impacts can include structural failure, extensive water damage to the facility and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). A complete list of all the critical facilities, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

The analysis identified one airport facility, one medical care facility, one communication structure, three hazardous material sites, five user defined sites, and one wastewater treatment facility that may be subject to flooding. A list of the critical facilities potentially at risk to flooding within Monroe County is given in Table 4-18. A map of critical facilities potentially at risk to flooding is shown in Figures 4-9, 4-10, and 4-11.

Table 4-18: Monroe County Damaged Critical Facilities

Facility Type	Facility Name
Airport	Lake Monroe SeaPlane Base
Medical Care	Hospitality House Care Center
Communication	Cell Tower
Hazardous Material	Baxter Pharmaceutical Solutions, LLC
Hazardous Material	Blucher Poole WWTP
Hazardous Material	COOK Inc.
User Defined	Ellettsville Journal
User Defined	Perry Township Trustee
User Defined	Ellettsville Town Hall
User Defined	Richland Township Trustee
User Defined	Ellettsville Street Department
Wastewater Treatment	Bloomington, Blucher Poole STP

Figure 4-9: Boundary of 100-Year Flood Overlaid with Critical Facilities in Monroe County

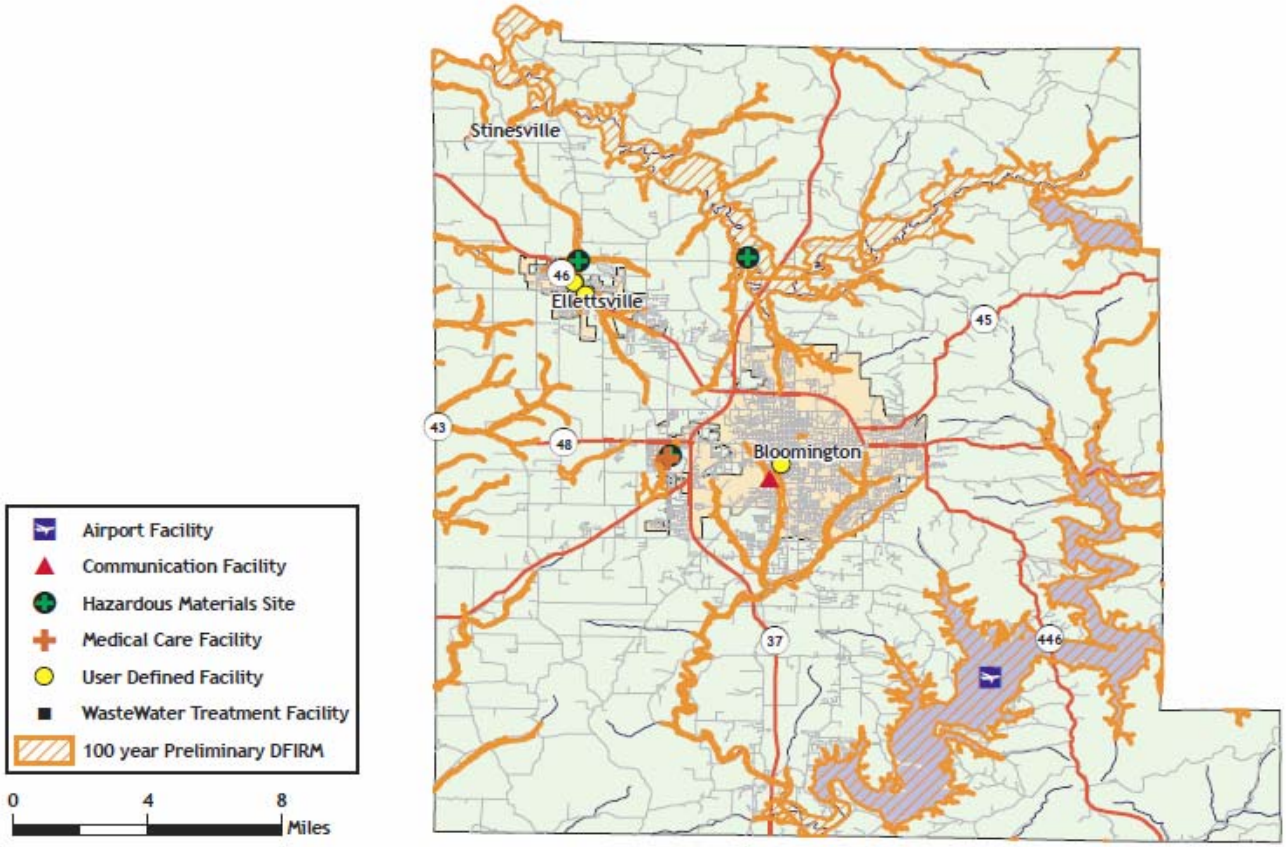


Figure 4-10: Boundary of 100-Year Flood Overlaid with Critical Facilities in Bloomington Area

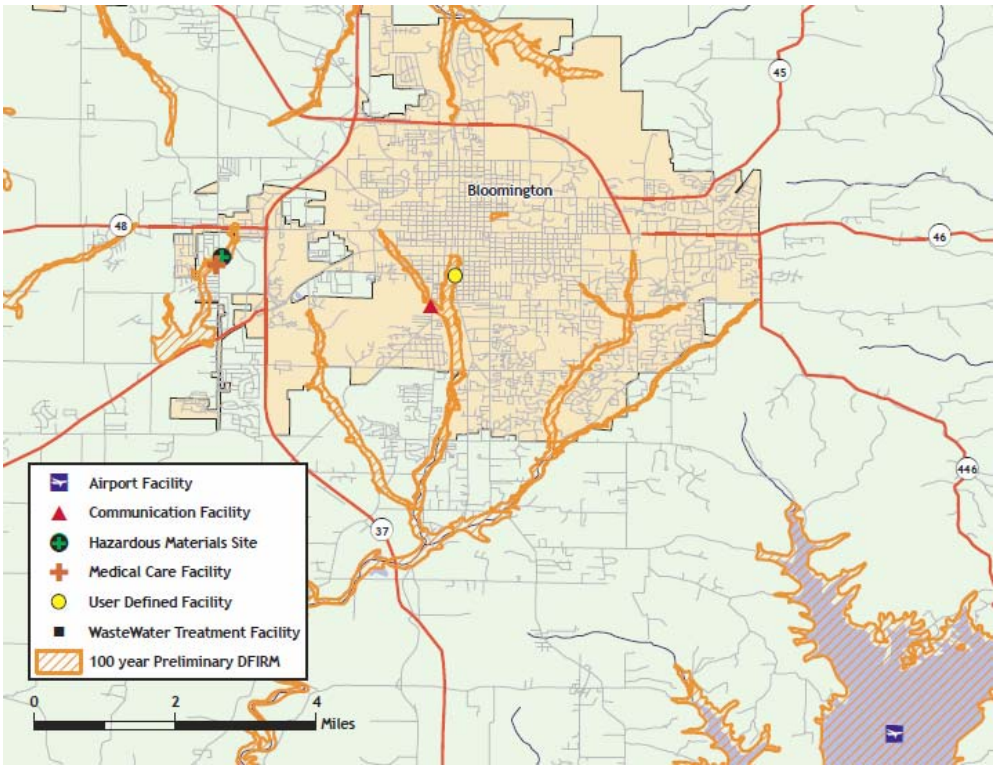
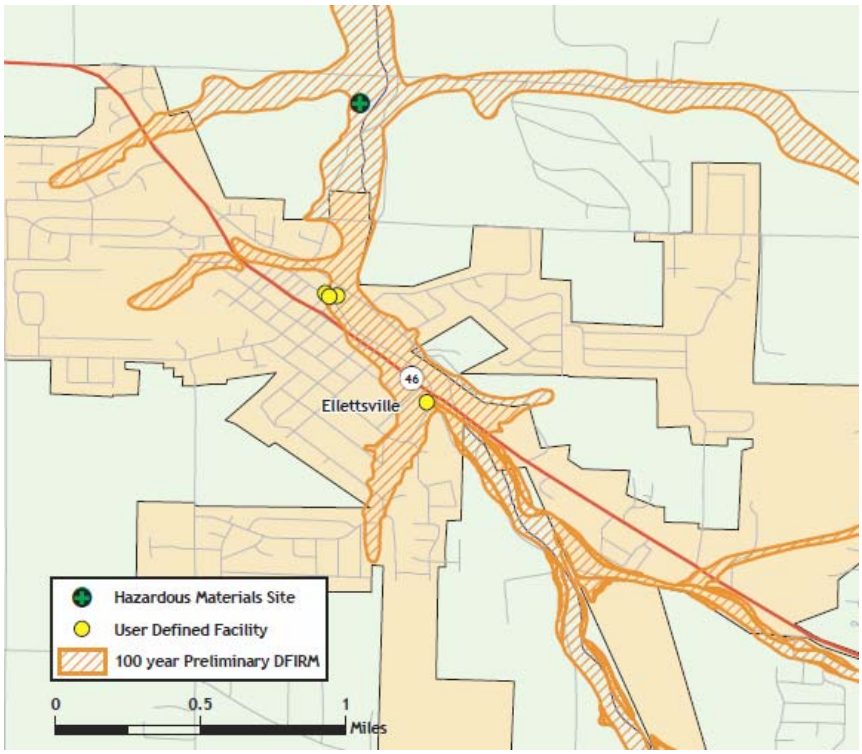


Figure 4-11: Boundary of 100-Year Flood Overlaid with Critical Facilities in Ellettsville Area



Infrastructure

The types of infrastructure that could be impacted by a flood include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available for this plan, it is important to emphasize that any number of these items could become damaged in the event of a flood. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable, causing a traffic risk.

Vulnerability Analysis for Flash Flooding

Flash flooding could affect any location within this jurisdiction; therefore, the entire county's population and buildings are vulnerable to a flash flood. These structures can expect the same impacts as discussed in a riverine flood.

Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Vulnerability Analysis for Dam and Levee Failure

An EAP is required to assess the effect of dam failure on these communities. In order to be considered creditable flood protection structures on FEMA's flood maps, levee owners must provide documentation to prove the levee meets design, operation and maintenance standards for protection against the "one-percent-annual chance" flood.

Vulnerability to Future Assets/Infrastructure for Flooding

Flash flooding may affect nearly every location within the county; therefore all buildings and infrastructure are vulnerable to flash flooding. Currently, the Monroe County planning commission reviews new development for compliance with the local zoning ordinance. At this time no construction is planned within the area of the 100-year floodplain. Therefore, there is no new construction which will be vulnerable to a 100-year flood.

Vulnerability to Future Assets/Infrastructure for Dam and Levee Failure

The Monroe County planning commission reviews new development for compliance with the local zoning ordinance. If the Lake Monroe Dam were to fail, all communities except Stinesville would experience significant damage.

Analysis of Community Development Trends

Controlling floodplain development is the key to reducing flood-related damages. Areas with recent development within the county may be more vulnerable to drainage issues. Storm drains and sewer systems are usually most susceptible. Damage to these can cause the back up of water, sewage, and debris into homes and basements, causing structural and mechanical damage as well as creating public health hazards and unsanitary conditions.

4.4.3 Earthquake Hazard

Hazard Definition for Earthquake Hazard

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together unable to release the accumulating energy. When the accumulated energy grows strong enough the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern United States. The most seismically active area is referred to as the New Madrid Seismic Zone. Scientists have learned that the New Madrid fault system may not be the only fault system in the Central U.S. capable of producing damaging earthquakes. The Wabash Valley fault system in Illinois and Indiana shows evidence of large earthquakes in its geologic history, and there may be other, as yet unidentified, faults that could produce strong earthquakes.

Ground shaking from strong earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area it may cause deaths, injuries, and extensive property damage.

The possibility of the occurrence of a catastrophic earthquake in the central and eastern United States is real as evidenced by history and described throughout this section. The impacts of significant earthquakes affect large areas, terminating public services and systems needed to aid the suffering and displaced. These impaired systems are interrelated in the hardest struck zones. Power lines, water and sanitary lines, and public communication may be lost; and highways, railways, rivers, and ports may not allow transportation to the affected region. Furthermore, essential facilities, such as fire and police departments and hospitals, may be disrupted if not previously improved to resist earthquakes.

As with hurricanes, mass relocation may be necessary, but the residents who are suffering from the earthquake can neither leave the heavily impacted areas nor receive aid or even communication in the aftermath of a significant event.

Magnitude, which is determined from measurements on seismographs, measures the energy released at the source of the earthquake. Intensity measures the strength of shaking produced by the earthquake at a certain location and is determined from effects on people, human structures, and the natural environment. Tables 4-19 and 4-20 list earthquake magnitudes and their corresponding intensities.

http://earthquake.usgs.gov/learning/topics/mag_vs_int.php

Table 4-19: Abbreviated Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Table 4-20: Earthquake Magnitude vs. Modified Mercalli Intensity Scale

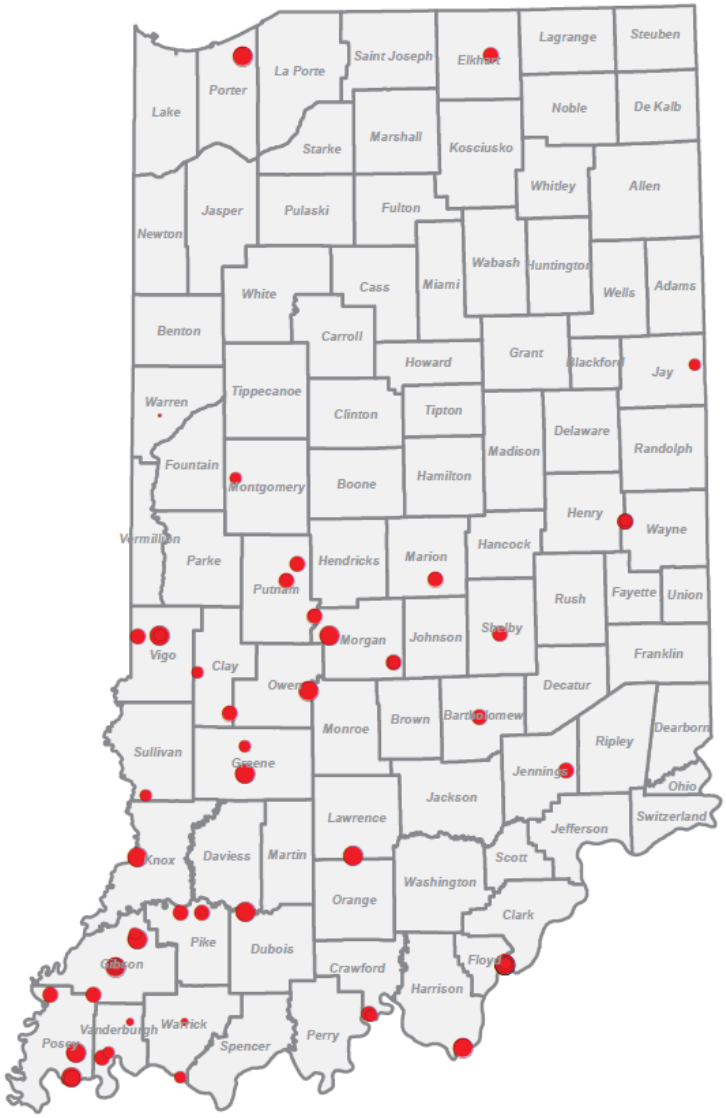
Earthquake Magnitude	Typical Maximum Modified Mercalli Intensity
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VIII or higher

Previous Occurrences for Earthquake Hazard

Approximately 40 earthquakes have occurred in Indiana for which reasonably accurate records exist. They vary in Moment Magnitude from a low of approximately M=2.0 to a high of M=5.2. The consensus of opinion among seismologists working in the Midwest is that a magnitude 5.0 to 5.5 event could occur virtually anywhere at any time throughout the region. The last earthquake to occur in Indiana—as of the date of this report—occurred on September 12, 2004 just north of Shelbyville and measured 3.6 in magnitude. The largest prehistoric earthquake documented in the state occurred at Vincennes 6,100 years ago and is known by the size and physical character of sandblows formed during the quake to have had a magnitude of 7.4.

According to the Indiana Geological Survey (IGS), no earthquakes have been recorded with epicenters in Monroe County. Statewide historical epicenters outside of Monroe County are included in Figure 4-12, although information related to the impacts to Monroe County from these events is limited.

Figure 4-12: Historical Earthquake Epicenters



The most damaging Indiana earthquake originating within the state occurred on September 27, 1909 near the Indiana border between Vincennes and Terre Haute. Some chimneys fell, several building walls cracked, light connections severed, and pictures shook from the walls. It was felt throughout Indiana and parts of Iowa, Kentucky, Missouri, Arkansas, and probably in parts of Kansas, covering an area of 30,000 square miles.

Another damaging earthquake originating in Indiana occurred on April 29, 1899; it rated intensity VI to VII on the Modified Mercalli Scale. It was strongest in Jeffersonville and Shelbyville, and in Vincennes, chimneys crumbled and walls cracked. It was felt over an area of 40,000 square miles.

In 1876, twin shocks 15 minutes apart were felt over an area of 60,000 square miles. A shock in 1887 centered near Vincennes was felt over 75,000 square miles; an 1891 shock damaged property and frightened people in a church in Evansville.

Indiana has also suffered from damage caused by earthquakes originating in neighboring states. The worst occurred on November 9, 1968, and centered near Dale in southern Illinois. The shock, a magnitude of 5.3, was felt over 580,000 square miles and 23 states including all of Indiana. Intensity VII was reported from Cynthiana, where chimneys cracked, twisted, and toppled; at Fort Branch, where groceries fell from shelves and a loud roaring noise was heard; and in Mount Vernon, New Harmony, Petersburg, Princeton, and Stewartsville, all of which had similar effects. At Poseyville, "Fish jumped out of the rivers, ponds, and lakes."

Almost exactly 10 years earlier on November 7, 1958, an earthquake originating near Mt. Carmel, Illinois causing plaster to fall at Fort Branch. Roaring and whistling noises were heard at Central City, and the residents of Evansville thought there had been in an explosion or plane crash. It was felt over 33,000 square miles of Indiana, Illinois, Missouri, and Kentucky.

On March 2, 1937, a shock centering near Anna, Ohio threw objects from shelves at Fort Wayne and some plaster fell. Six days later, another shock originating at Anna brought pictures crashing down and cracked plaster in Fort Wayne and was strongly felt in Lafayette.

The great New Madrid earthquakes of 1811 and 1812 must have strongly affected the state, particularly the southwestern part, but there is little information available from these frontier times.

[The above history was abridged from Earthquake Information Bulletin, Volume 4, Number 4, July-August 1972.]

1827 Jul 5 11:30 4.8M Intensity VI
Near New Harmony, Indiana (38.0N 87.5W)
The earthquake cracked a brick store at New Harmony, Indiana, and greatly alarmed some people. It was described as violent at New Madrid, Missouri, and severe in St. Louis. It also alarmed many in Cincinnati, Ohio, and Frankfort, Kentucky.

1827 Aug 7 04:30 4.8M Intensity V
Southern Illinois (38.0N 88.0W)

1827 Aug 7 07:00 4.7M Intensity V
Southern Illinois (38.0N 88.0W)

1887 Feb 6 22:15 4.6M Intensity VI
Near Vincennes, Indiana (38.7N 87.5W)
This shock was strongest in southwest Indiana and southeast Illinois. Plaster was shaken from walls in Vincennes, west of Terre Haute, and in Martinsville; a cornice reportedly fell from a building in Huntington, Indiana. It was felt distinctly in Evansville, Indiana, but only slightly in the outskirts of St. Louis, Missouri. The shockwave was also reported in Louisville, Kentucky.

1891 Jul 27 02:28 4.1M Intensity VI
Evansville, Indiana (37.9N 87.5W)
A strong local earthquake damaged a wall on a hotel, broke dishes, and overturned furniture in Evansville. The shock also was strong near Evansville in Mount Vernon, and Newburgh Indiana; and at Hawesville, Henderson, and Owensboro, Kentucky.

1921 Mar 14 12:15 4.4M Intensity VI
Near Terre Haute, Indiana (39.5N 87.5W)
This earthquake broke windows in many buildings and sent residents rushing into the streets in Terre Haute. Small articles were overturned in Paris, Illinois, about 35 km northwest of Terre Haute.

1925 Apr 27 04:05 4.8M Intensity VI
Wabash River valley, near Princeton, Indiana (38.2N 87.8W)
Chimneys were downed in Princeton and in Carmi, Indiana; 100 km southwest chimneys were broken in Louisville, Kentucky. Crowds fled from the theaters in Evansville, Indiana. The affected area included parts of Indiana, Illinois, Kentucky, Missouri, and Ohio.

The above text was taken from http://earthquake.usgs.gov/regional/states/indiana/history.php

Geographic Location for Earthquake Hazard

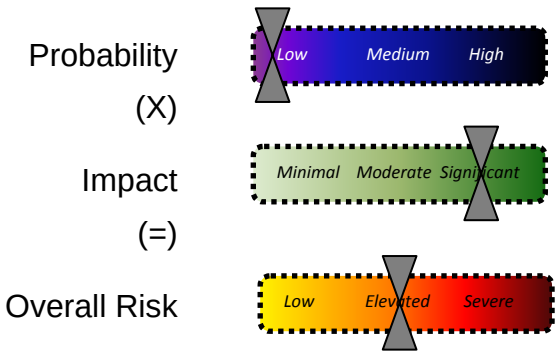
Monroe County occupies a region susceptible to the threat of an earthquake along the Wabash Valley Fault System. Return periods for large earthquakes within the New Madrid System are estimated to be 500 years; moderate quakes between magnitude 5.5 and 6.0 can recur within approximately 150 years or less. The Wabash Valley Fault System is a sleeper that threatens the southwest quadrant of the state and may generate an earthquake large enough to cause damage as far north and east as Indianapolis.

Hazard Extent for Earthquake Hazard

The extent of the earthquake is countywide. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. A National Earthquake Hazards Reduction Program (NEHRP) compliant soils map was used for the analysis which was provided by IGS. The map identifies the soils most susceptible to failure.

Risk Identification for Earthquake Hazard

Based on historical information, the probability of an earthquake is low; however, USGS and IGS research and studies attest that future earthquakes in Monroe County are possible. In Meeting #2, the planning team determined that the potential impact of an earthquake is significant; therefore, the overall risk of an earthquake hazard for Monroe County is elevated.



Vulnerability Analysis for Earthquake Hazard

This hazard could impact the entire jurisdiction equally; therefore, the entire county's population and all buildings are vulnerable to an earthquake and can expect the same impacts within the affected area. To accommodate this risk this plan will consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities are vulnerable to earthquakes. A critical facility would encounter many of the same impacts as any other building within the county. These impacts include structural failure and loss of facility functionality (e.g. a damaged police station will no longer be able to serve the community). A complete list of all of the critical facilities, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure and loss of building function which could result in indirect impacts (e.g. damaged homes will no longer be habitable causing residents to seek shelter).

Infrastructure

During an earthquake the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan it is important to emphasize that any number of these items could become damaged in the event of an earthquake. The impacts to these items include broken, failed or impassable roadways, broken or failed utility lines (e.g. loss of power or gas to community), and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic. Typical scenarios are described to gauge the anticipated impacts of earthquakes in the county in terms of numbers and types of buildings and infrastructure.

The Polis team contacted IGS to obtain existing geological information. Four earthquake scenarios—two based on deterministic scenarios and two based on probabilistic scenarios—were developed to provide a reasonable basis for earthquake planning in Monroe County.

The first deterministic scenario was a 7.1 magnitude epicenter along the Wabash Valley fault zone. Shake maps provided by FEMA were used in HAZUS-MH to estimate losses for Monroe County based on this event. The second deterministic scenario was a Moment Magnitude of 5.5 with the epicenter located in Monroe County. This scenario was selected based upon the opinion of the IGS that an earthquake could occur in the selected location and that it would therefore represent a realistic scenario for planning purposes.

Additionally, the analysis included two different types of probabilistic scenarios. These types of scenarios are based on ground shaking parameters derived from U.S. Geological Survey probabilistic seismic hazard curves. The first probabilistic scenario was a 500-year return period

scenario. This scenario evaluates the average impacts of a multitude of possible earthquake epicenters with a magnitude that would be typical of that expected for a 500-year return period. The second probabilistic scenario allowed calculation of annualized loss. The annualized loss analysis in HAZUS-MH provides a means for averaging potential losses from future scenarios while considering their probabilities of occurrence. The HAZUS-MH earthquake model evaluates eight different return period scenarios including those for the 100-, 250-, 500-, 750-, 1000-, 1500-, 2000-, and 2500-year return period earthquake events. HAZUS-MH then calculates the probabilities of these events as well as the interim events, calculates their associated losses, and sums these losses to calculate an annualized loss. These analysis options were chosen because they are useful for prioritization of seismic reduction measures and for simulating mitigation strategies.

The following earthquake hazard modeling scenarios were performed:

- 7.1 magnitude Wabash Valley earthquake
- 5.5 magnitude earthquake local epicenter
- 500-year return period event
- Annualized earthquake loss

Modeling a deterministic scenario requires user input for a variety of parameters. One of the most critical sources of information that is required for accurate assessment of earthquake risk is soils data. Fortunately, a National Earthquake Hazards Reduction Program (NEHRP) soil classification map exists for Indiana. NEHRP soil classifications portray the degree of shear-wave amplification that can occur during ground shaking. The IGS supplied soils map was used for the analysis. FEMA provided a map for liquefaction potential that was used by HAZUS-MH.

An earthquake depth of 10.0 kilometers was selected based on input from IGS. HAZUS-MH also requires the user to define an attenuation function unless ground motion maps are supplied. Because Monroe County has experienced smaller earthquakes, the decision was made to use the Central Eastern United States (CEUS) attenuation function. The probabilistic return period analysis and the annualized loss analysis do not require user input.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

Results for 7.1 Magnitude Earthquake Wabash Valley Scenario

The results of the 7.1 Wabash Valley earthquake are depicted in Table 4-21, Table 4-22, and Figure 4-13. HAZUS-MH estimates that approximately 17 buildings will be at least moderately damaged. It is estimated that no buildings will be damaged beyond repair.

The total building related losses totaled $19.7 million; 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up more than 50% of the total loss.

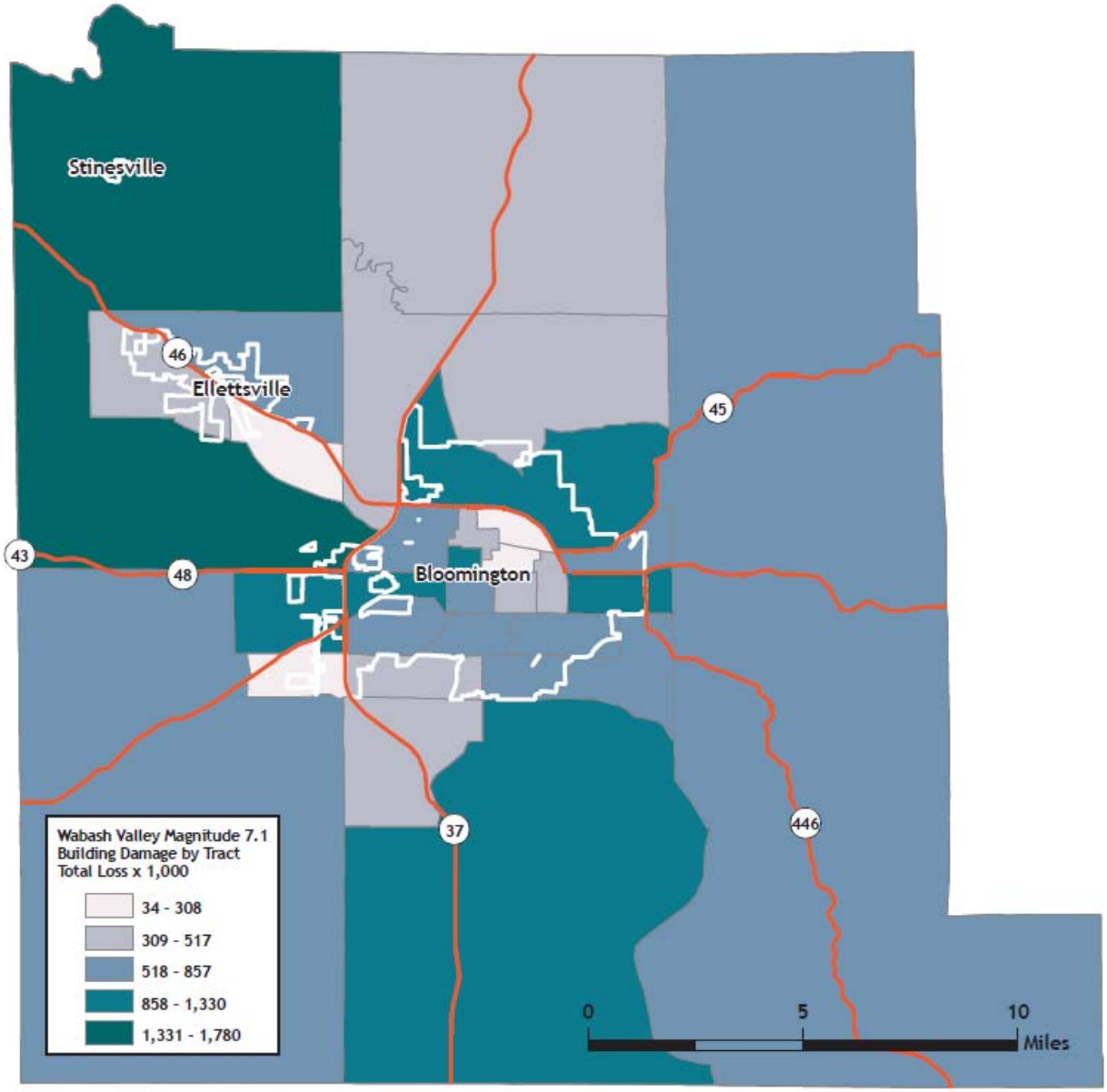
Table 4-21: Wabash Valley Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	2,518	6.86	27	10.89	2	13.46	0	0.00	0	0.00
Commercial	1,720	4.69	15	6.19	1	7.13	0	0.00	0	0.00
Education	184	0.50	2	0.84	0	0.87	0	0.00	0	0.00
Government	59	0.16	1	0.25	0	0.27	0	0.00	0	0.00
Industrial	270	0.74	3	1.10	0	1.37	0	0.00	0	0.00
Other Residential	3,304	9.00	52	21.18	3	19.78	0	0.00	0	0.00
Religion	720	1.96	8	3.41	1	3.84	0	0.00	0	0.00
Single Family	27,916	76.09	138	56.14	9	53.29	0	0.00	0	0.00
Total	**36,690**		**246**		**17**		**0**		**0**	

Table 4-22: Wabash Valley Scenario-Building Economic losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.00	0.03	0.00	0.01	0.04
	Capital-Related	0.00	0.00	0.03	0.00	0.00	0.03
	Rental	0.02	0.01	0.05	0.00	0.00	0.08
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.02**	**0.02**	**0.11**	**0.01**	**0.02**	**0.17**
Capital Stock Loses							
	Structural	0.11	0.03	0.06	0.02	0.06	0.28
	Non_Structural	4.11	1.87	2.12	1.48	1.58	11.16
	Content	2.85	0.86	1.78	0.80	1.41	7.71
	Inventory	0.00	0.00	0.09	0.20	0.10	0.39
	Subtotal	**7.07**	**2.76**	**4.05**	**2.51**	**3.14**	**19.53**
	Total	**7.09**	**2.78**	**4.15**	**2.52**	**3.16**	**19.70**

Figure 4-13: Wabash Valley Scenario-Building Economic Losses in Thousands of Dollars



Wabash Valley Scenario—Essential Facility Losses

Before the earthquake, the region had 1,365 care beds available for use. On the day of the earthquake, the model estimates that only 682 care beds (50%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 97% of the beds will be back in service. By day 30, 100% will be operational.

Results for 5.5 Magnitude Earthquake in Monroe County

The results of the initial analysis, the 5.5 magnitude earthquake with an epicenter in the center of Monroe County, are depicted in Tables 4-23 and 4-24 and Figure 4-14. HAZUS-MH estimates that approximately 509 buildings will be at least moderately damaged. This is more than 1% of the total number of buildings in the region. It is estimated that 6 buildings will be damaged beyond repair.

The total building related losses totaled $84.25 million; 5% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which comprised more than 12% of the total loss.

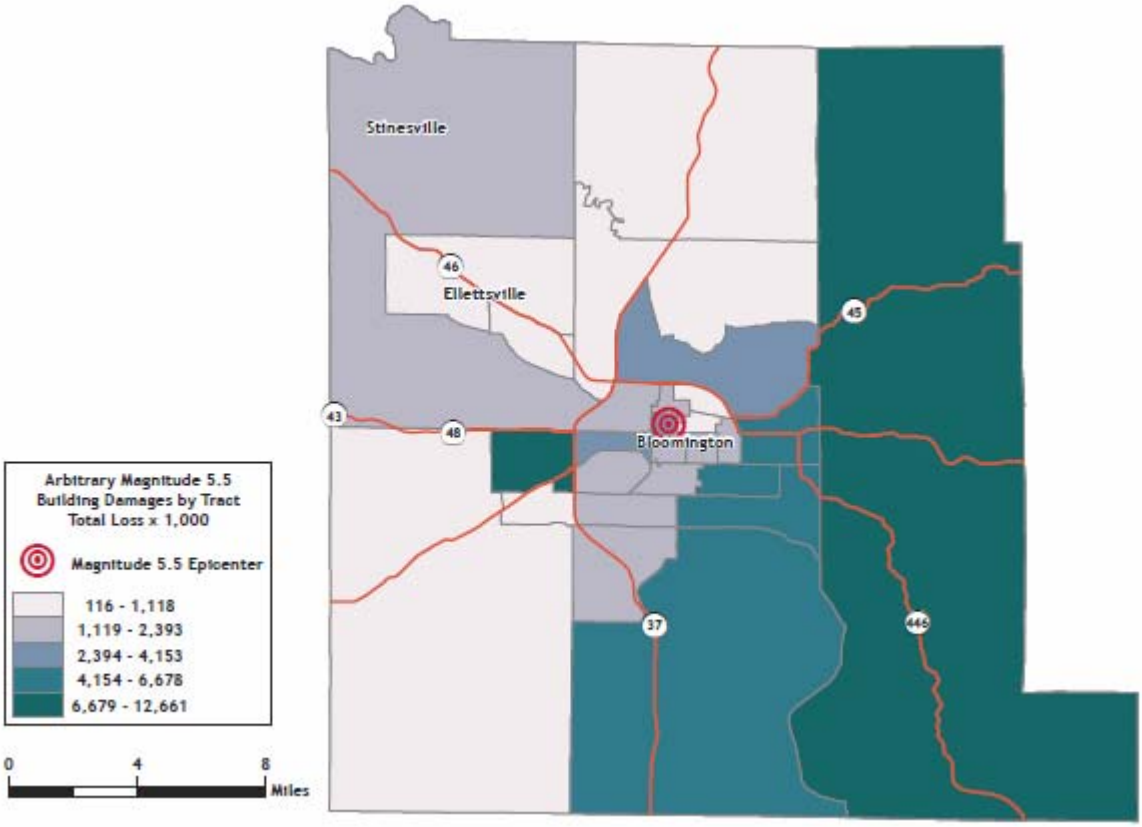
Table 4-23: Monroe County 5.5M Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	2,346	6.70	127	9.13	61	13.89	11	17.51	1	13.06
Commercial	1,614	4.61	83	5.98	33	7.52	5	8.11	0	5.32
Education	174	0.50	9	0.62	3	0.74	0	0.70	0	0.63
Government	57	0.16	2	0.17	1	0.21	0	0.22	0	0.25
Industrial	254	0.72	13	0.91	6	1.30	1	1.52	0	0.99
Other Residential	3,104	8.86	178	12.74	71	16.09	6	9.79	0	7.18
Religion	673	1.92	37	2.65	16	3.58	3	4.29	0	4.36
Single Family	26,826	76.54	947	67.81	248	56.67	38	57.86	4	68.20
Total	**35,048**		**1,396**		**438**		**65**		**6**	

Table 4-24: Monroe County 5.5M Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.02	0.81	0.10	0.14	1.07
	Capital-Related	0.00	0.01	0.78	0.06	0.06	0.91
	Rental	0.47	0.37	0.85	0.09	0.07	1.86
	Relocation	0.05	0.01	0.04	0.01	0.02	0.14
	Subtotal	**0.53**	**0.41**	**2.49**	**0.26**	**0.30**	**3.98**
Capital Stock Losses							
	Structural	2.02	0.43	1.14	0.51	1.23	5.33
	Non_Structural	20.13	7.96	7.11	3.79	5.75	44.74
	Content	12.63	3.47	5.70	2.08	5.06	28.94
	Inventory	0.00	0.00	0.30	0.55	0.41	1.26
	Subtotal	**34.78**	**11.85**	**14.25**	**6.93**	**12.46**	**80.27**
	Total	**35.30**	**12.25**	**16.73**	**7.19**	**12.76**	**84.25**

Figure 4-14: Arbitrary Scenario Building Economic Losses in Thousands of Dollars



Monroe County Arbitrary 5.5M Scenario—Essential Facility Losses

Before the earthquake, the region had 1,365 care beds available for use. On the day of the earthquake, the model estimates that only 727 care beds (53%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 96% of the beds will be back in service. By day 30, 99% will be operational.

Results 5.0 Magnitude 500-Year Probabilistic Scenario

The results of the 500-year probabilistic analysis are depicted in Tables 4-25 and 4-26. HAZUS-MH estimates that approximately 501 buildings will be at least moderately damaged. This is approximately 1% of the total number of buildings in the region. It is estimated that 5 buildings will be damaged beyond repair. The building-related losses totaled $21.08 million; 20% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up more than 46% of the total loss.

Table 4-25: 500-Year Probabilistic Scenario-Damage Counts by Building Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	2,339	6.67	138	9.97	60	13.82	10	15.73	1	10.03
Commercial	1,603	4.57	91	6.56	36	8.23	6	9.35	0	6.16
Education	174	0.50	8	0.61	3	0.73	0	0.77	0	0.83
Government	56	0.16	3	0.21	1	0.26	0	0.27	0	0.31
Industrial	249	0.71	16	1.14	7	1.65	1	1.97	0	1.22
Other Residential	3,087	8.80	191	13.82	74	17.06	6	9.39	0	6.79
Religion	673	1.92	38	2.72	16	3.57	3	4.19	0	4.12
Single Family	26,885	76.67	900	64.97	238	54.67	36	58.33	4	70.54
Total	**35,066**		**1,386**		**435**		**61**		**5**	

Table 4-26: 500-Year Probabilistic Scenario-Building Economic Losses in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.03	0.89	0.12	0.15	1.19
	Capital-Related	0.00	0.01	0.86	0.07	0.06	1.00
	Rental	0.44	0.36	0.90	0.11	0.08	1.88
	Relocation	0.05	0.01	0.04	0.01	0.02	0.14
	Subtotal	**0.48**	**0.40**	**2.69**	**0.31**	**0.32**	**4.21**
Capital Stock Loses							
	Structural	1.85	0.41	1.19	0.60	1.15	5.20
	Non_Structural	4.08	1.38	1.53	1.01	0.98	8.99
	Content	0.77	0.25	0.62	0.44	0.42	2.50
	Inventory	0.00	0.00	0.03	0.12	0.03	0.18
	Subtotal	**6.70**	**2.04**	**3.37**	**2.18**	**2.57**	**16.87**
	Total	**7.18**	**2.44**	**6.06**	**2.49**	**2.89**	**21.08**

500-Year Probabilistic Scenario—Essential Facility Losses

Before the earthquake, the region had 1,365 care beds available for use. On the day of the earthquake, the model estimates that only 620 care beds (45%) are available for use by patients already in medical care facilities and those injured by the earthquake. After one week, 95% of the beds will be back in service. By day 30, 100% will be operational.

Results Annualized Risk Scenario

HAZUS-MH estimates that approximately 501 buildings will be at least moderately damaged. This is approximately 1% of the total number of buildings in the region. It is estimated that five buildings will be damaged beyond repair.

Vulnerability to Future Assets/Infrastructure for Earthquake Hazard

New construction, especially critical facilities, will accommodate earthquake mitigation design standards.

Analysis of Community Development Trends

Community development will occur outside of the low lying areas in flood plains with a water table within five feet of grade which are susceptible to liquefaction.

In Meeting #4, the MHMP team discussed specific mitigation strategies for potential earthquake hazards. The discussion included strategies to harden and protect future, as well as existing, structures against the possible termination of public services and systems including power lines, water and sanitary lines, and public communication.

4.4.4 Thunderstorm Hazard

Hazard Definition for Thunderstorm Hazard

Severe thunderstorms are defined as thunderstorms with one or more of the following characteristics: strong winds, large damaging hail, or frequent lightning. Severe thunderstorms most frequently occur in Indiana during the spring and summer months, but can occur any month of the year at any time of day. A severe thunderstorm's impacts can be localized or can be widespread in nature. A thunderstorm is classified as severe when it meets one or more of the following criteria.

- Hail of diameter 0.75 inches or higher
- Frequent and dangerous lightning
- Wind speeds equal to or greater than 58 mph

Hail

Hail is a product of a strong thunderstorm. Hail usually falls near the center of a storm, however strong winds occurring at high altitudes in the thunderstorm can blow the hailstones away from the storm center, resulting in damage in other areas near the storm. Hailstones range from pea-sized to baseball-sized, but hailstones larger than softballs have been reported on rare occasion.

Lightning

Lightning is a discharge of electricity from a thunderstorm. Lightning is often perceived as a minor hazard, but in reality lightning causes damage to many structures and kills or severely injures numerous people in the United States each year.

Severe Winds (Straight-Line Winds)

Straight-line winds from thunderstorms are a fairly common occurrence across Indiana. Straight-line winds can cause damage to homes, businesses, power lines, and agricultural areas, and may require temporary sheltering of individuals who are without power for extended periods of time.

Previous Occurrences for Thunderstorm Hazard

The NCDC database reported 57 hailstorms in Monroe County since 1950. Hailstorms occur nearly every year in the late spring and early summer months. During the most recent occurrence, severe thunderstorms moved through central Indiana on the afternoon of April 3, 2007. The storms produced mostly large hail, with isolated damaging wind.

The Monroe County hailstorms are identified in Table 4-27. Additional details for NCDC events are included in Appendix D.

Table 4-27: Monroe County Hailstorms*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	8/2/1978	Hail	1.75 in.	0	0	0	0
Monroe Co	8/6/1979	Hail	1.75 in.	0	0	0	0
Monroe Co	4/10/1981	Hail	2.00 in.	0	0	0	0
Monroe Co	5/27/1982	Hail	0.75 in.	0	0	0	0
Monroe Co	6/20/1982	Hail	1.00 in.	0	0	0	0
Monroe Co	5/13/1986	Hail	0.75 in.	0	0	0	0
Monroe Co	7/14/1986	Hail	0.75 in.	0	0	0	0
Monroe Co	9/26/1986	Hail	1.75 in.	0	0	0	0
Monroe Co	5/20/1987	Hail	1.00 in.	0	0	0	0
Monroe Co	7/11/1992	Hail	1.00 in.	0	0	0	0
Harrodsburg	4/8/1995	Hail	0.75 in.	0	0	0	0
Blmngtn Monroe Co Airpt	5/28/1996	Hail	1.75 in.	0	0	0	0
Unionville	3/28/1997	Hail	1.75 in.	0	0	0	0
Ellettsville	5/23/1998	Hail	1.75 in.	0	0	0	0
Ellettsville	5/17/1999	Hail	0.75 in.	0	0	0	0
Unionville	5/17/1999	Hail	0.75 in.	0	0	0	0
Kirksville	6/19/2001	Hail	0.88 in.	0	0	0	0
Bloomington	6/19/2001	Hail	0.75 in.	0	0	0	0
Ellettsville	9/23/2001	Hail	1.00 in.	0	0	0	0
Ellettsville	4/12/2002	Hail	1.00 in.	0	0	0	0
Bloomington	4/12/2002	Hail	1.75 in.	0	0	0	0
Bloomington	4/12/2002	Hail	1.00 in.	0	0	0	0
Bloomington	4/20/2003	Hail	2.00 in.	0	0	0	0
Bloomington	5/31/2003	Hail	0.75 in.	0	0	0	0
Bloomington	7/8/2003	Hail	0.88 in.	0	0	0	0
Bloomington	5/27/2004	Hail	0.75 in.	0	0	0	0
Bloomington	5/27/2004	Hail	0.75 in.	0	0	0	0
Bloomington	8/18/2004	Hail	0.75 in.	0	0	0	0
Blmngtn Monroe Co Airpt	6/5/2005	Hail	0.75 in.	0	0	0	0
Ellettsville	6/5/2005	Hail	0.75 in.	0	0	0	0
Bloomington	6/5/2005	Hail	1.75 in.	0	0	0	0
Bloomington	6/5/2005	Hail	1.00 in.	0	0	0	0
Bloomington	6/5/2005	Hail	0.75 in.	0	0	0	0
Bloomington	3/31/2006	Hail	0.75 in.	0	0	0	0
Ellettsville	4/7/2006	Hail	1.00 in.	0	0	0	0
Bloomington	4/7/2006	Hail	0.75 in.	0	0	0	0
Bloomington	4/7/2006	Hail	0.75 in.	0	0	0	0
Bloomington	4/7/2006	Hail	2.00 in.	0	0	0	0
Bloomington	4/7/2006	Hail	1.00 in.	0	0	0	0
Bloomington	4/7/2006	Hail	1.00 in.	0	0	0	0
Ellettsville	4/7/2006	Hail	1.75 in.	0	0	0	0
Bloomington	4/7/2006	Hail	1.00 in.	0	0	0	0
Bloomington	4/7/2006	Hail	1.75 in.	0	0	0	0
Bloomington	4/7/2006	Hail	0.75 in.	0	0	0	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Bloomington	4/7/2006	Hail	0.88 in.	0	0	0	0
Kirksville	4/7/2006	Hail	0.75 in.	0	0	0	0
Kirksville	4/7/2006	Hail	1.00 in.	0	0	0	0
Bloomington	5/25/2006	Hail	0.88 in.	0	0	0	0
Bloomington	6/7/2006	Hail	0.75 in.	0	0	0	0
Ellettsville	6/19/2006	Hail	1.25 in.	0	0	0	0
Bloomington	6/19/2006	Hail	0.75 in.	0	0	0	0
Bloomington	4/3/2007	Hail	0.75 in.	0	0	0K	0K
Bloomington	6/4/2008	Hail	0.88 in.	0	0	0K	0K
Bloomington	6/4/2008	Hail	1.00 in.	0	0	0K	0K
Bloomington	6/4/2008	Hail	1.00 in.	0	0	0K	0K
Bloomington	7/22/2008	Hail	0.88 in.	0	0	0K	0K
Broadview	7/22/2008	Hail	1.75 in.	0	0	3K	0K

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

The NCDC database reported three occurrences of significant lightning strikes in Monroe County since 1950. The most recent occurrence, in 1996, caused approximately 150 homes to lose power.

The Monroe County lightning strikes are identified in Table 4-28. Additional details for NCDC events are included in Appendix D. Lightning occurs in Monroe County every year. The following list only represents those events which were recorded by the NCDC.

Table 4-28: Monroe County Lightning Strikes*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	7/15/1995	Lightning	N/A	1	1	0	0
Bloomington	5/3/1996	Lightning	N/A	0	0	0	0
Bloomington	6/4/2008	Lightning	N/A	0	3	0K	0K

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

The NCDC database identified 99 wind/heavy rain events reported since 1950. The most recent event occurred in 2008. The wind gust was measured by ASOS equipment. A squall line moved through central Indiana during the evening hours of January 29. Hail, damaging winds, and a tornado occurred with this storm system in central Indiana. The tornado was rated EF1 and occurred in Marion County.

As shown in Table 4-29, wind storms and heavy rain have historically occurred year-round with the greatest frequency and damage between May and July. The following table includes available top wind speeds for Monroe County.

Table 4-29: Monroe County Wind Storms and Heavy Rain*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	4/1/1959	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	4/19/1970	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	7/8/1970	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/4/1973	Tstorm Winds	50 kts.	0	0	0	0
Monroe Co	1/10/1975	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	4/18/1975	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	5/12/1978	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/25/1978	Tstorm Winds	70 kts.	0	0	0	0
Monroe Co	7/26/1978	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	10/1/1979	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/7/1980	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/28/1980	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	8/2/1980	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/9/1981	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/20/1982	Tstorm Winds	52 kts.	0	0	0	0
Monroe Co	7/31/1983	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/24/1985	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	8/14/1985	Tstorm Winds	65 kts.	0	0	0	0
Monroe Co	7/12/1986	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	7/12/1986	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/2/1987	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/13/1987	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/13/1987	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/13/1987	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	7/5/1987	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	8/3/1988	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	8/3/1988	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	8/6/1989	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	10/16/1989	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	5/16/1990	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	5/16/1990	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	6/2/1991	Tstorm Winds	70 kts.	0	0	0	0
Monroe Co	11/30/1991	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	4/16/1992	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	7/2/1992	Tstorm Winds	0 kts.	0	0	0	0
Monroe Co	8/17/1993	Tstorm Winds	0 kts.	0	0	5K	0
Bloomington	4/27/1994	Tstorm Winds	0 kts.	0	0	5K	0
Monroe Co	11/21/1994	High Wind	0 kts.	0	0	50K	0
Monroe Co	11/27/1994	High Wind	0 kts.	0	0	120K	0
Monroe Co	11/27/1994	Tstorm Wind	0 kts.	0	0	9K	0

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Bloomington	6/20/1995	Tstorm Winds	0 kts.	0	0	2K	0
Bloomington	6/20/1995	Tstorm Winds	0 kts.	0	0	2K	0
Harrodsburg	7/15/1995	Tstorm Winds	0 kts.	0	0	0	0
Bloomington	3/25/1996	Tstorm Winds	0 kts.	0	0	1K	0
Bloomington	5/8/1996	Tstorm Winds	0 kts.	0	0	1K	0
Bloomington	5/24/1996	Tstorm Winds	50 kts.	0	0	0	0
Monroe Co	4/6/1997	High Wind	49 kts.	0	0	0	0
Ellettsville	4/30/1997	Tstorm Winds	0 kts.	0	0	0	0
Ellettsville	6/18/1998	Tstorm Winds	0 kts.	0	0	1K	0
Bloomington	6/22/1998	Tstorm Winds	54 kts.	0	0	0	0
Bloomington	6/22/1998	Tstorm Winds	61 kts.	0	0	60K	0
Monroe Co	6/29/1998	Tstorm Winds	0 kts.	0	0	8K	0
Monroe Co	11/10/1998	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	5/17/1999	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	4/20/2000	Tstorm Winds	60 kts.	0	0	200K	0
Ellettsville	5/12/2000	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	6/24/2000	Tstorm Winds	50 kts.	0	0	0	0
Ellettsville	9/20/2000	Tstorm Winds	50 kts.	0	0	10K	0
Hindustan	6/5/2001	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	7/8/2001	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	8/18/2001	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	10/24/2001	Tstorm Winds	60 kts.	0	0	0	0
Bloomington	5/25/2002	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	5/25/2002	Tstorm Winds	0 kts.	0	0	1K	0
Bloomington	7/29/2002	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	11/10/2002	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	7/9/2003	Tstorm Winds	55 kts.	0	0	0	0
Bloomington	7/9/2003	Tstorm Winds	55 kts.	0	0	0	0
Bloomington	7/21/2003	Tstorm Winds	55 kts.	0	0	0	0
Ellettsville	7/13/2004	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	7/13/2004	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	7/22/2004	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	7/22/2004	Tstorm Winds	50 kts.	0	0	0	0
Ellettsville	8/18/2004	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	8/18/2004	Tstorm Winds	50 kts.	0	0	30K	0
Bloomington	5/13/2005	Tstorm Winds	50 kts.	0	0	0	0
Ellettsville	5/19/2005	Heavy Rain	N/A	0	0	0	0
Bloomington	5/19/2005	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	5/19/2005	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	6/30/2005	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	7/21/2005	Tstorm Winds	50 kts.	0	0	0	0
Ellettsville	11/6/2005	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	11/6/2005	Tstorm Winds	50 kts.	0	0	0	0
Bloomington	4/2/2006	Tstorm Winds	51 kts.	0	0	20K	0
Hindustan	4/3/2007	Tstorm Wind	50 kts.	0	0	0K	0K
Bloomington	4/11/2007	Tstorm Wind	50 kts.	0	0	0K	0K

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Bloomington	1/29/2008	Tstorm Wind	55 kts.	0	0	0K	0K
Smithville	6/3/2008	Tstorm Wind	50 kts.	0	0	0K	0K
Ellettsville	6/6/2008	Heavy Rain	N/A	0	0	0K	0K
Stinesville	6/6/2008	Heavy Rain	N/A	0	0	0K	0K
Ellettsville	7/8/2008	Tstorm Wind	60 kts.	0	0	3K	0K
Bloomington	7/8/2008	Tstorm Wind	60 kts.	0	0	1K	0K
Handy	7/8/2008	Tstorm Wind	60 kts.	0	0	1K	0K
Clear Creek	7/8/2008	Tstorm Wind	60 kts.	0	0	1K	0K
Mt Tabor	7/8/2008	Tstorm Wind	60 kts.	0	0	1K	0K
Hunters	7/8/2008	Tstorm Wind	60 kts.	0	0	1K	0K
Yellowstone	7/20/2008	Tstorm Wind	55 kts.	0	0	0K	0K
Monroe Co	9/14/2008	High Wind	60 kts.	0	0	0K	0K
Monroe Co	2/11/2009	High Wind	60 kts.	0	0	0K	0K

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Thunderstorm Hazard

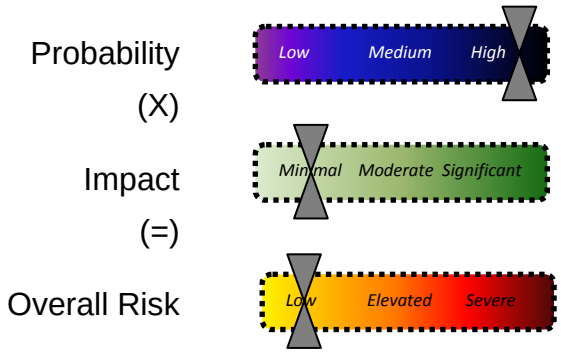
The entire county has the same risk for occurrence of thunderstorms. They can occur at any location within the county.

Hazard Extent for Thunderstorm Hazard

The extent of the historical thunderstorms varies in terms of the extent of the storm, the wind speed, and the size of hail stones. Thunderstorms can occur at any location within the county.

Risk Identification for Thunderstorm Hazard

Based on historical information, the probability of a thunderstorm is high. In Meeting #2, the planning team determined that the potential impact of a thunderstorm is minimal; therefore, the overall risk of a thunderstorm hazard for Monroe County is low.



Vulnerability Analysis for Thunderstorm Hazard

Severe thunderstorms are an equally distributed threat across the entire jurisdiction; therefore, the entire county's population and all buildings are vulnerable to a severe thunderstorm and can expect the same impacts within the affected area. This plan will therefore consider all buildings located within the county as vulnerable. The existing buildings and infrastructure in Monroe County are discussed in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to severe thunderstorms. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, fires caused by lightning and loss of function of the facility (e.g. a damaged police station will no longer be able to serve the community). Table 4-5 lists the types and numbers of all of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-6. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure, debris (trees or limbs) causing damage, roofs blown off or windows broken by hail or high winds, fires caused by lightning, and loss of building functionality (e.g. a damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a severe thunderstorm the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable it is important to emphasize that any number of these items could become damaged during a severe thunderstorm. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

Potential Dollar Losses for Thunderstorm Hazard

A HAZUS-MH analysis was not completed for thunderstorms because the widespread extent of such a hazard makes it difficult to accurately model outcomes.

To determine dollar losses for a thunderstorm hazard, the available NCDC hazard information was condensed to include only thunderstorm hazards that occurred within the past ten years. Monroe County's MHMP team then reviewed the property damages reported to NCDC and made any applicable updates.

It was determined that since 1998, Monroe County has incurred $341,000 in damages relating to thunderstorms, including hail, lightning, and high winds. The resulting information is listed in Table 4-30.

Table 4-30: Monroe County Property Damage (1998–2009)

Location or County	Date	Type	Property Damage
Ellettsville	5/23/1998	Hail	$0
Ellettsville	6/18/1998	Tstm Wind	$1,000
Bloomington	6/22/1998	Tstm Wind	$0
Bloomington	6/22/1998	Tstm Wind	$60,000
Monroe Co	6/29/1998	Tstm Wind	$8,000
Monroe Co	11/10/1998	Tstm Wind	$0
		1998 Subtotal	**$69,000**
Ellettsville	5/17/1999	Hail	$0
Unionville	5/17/1999	Hail	$0
Bloomington	5/17/1999	Tstm Wind	$0
		1999 Subtotal	**$0**
Bloomington	4/20/2000	Tstm Wind	$200,000
Ellettsville	5/12/2000	Tstm Wind	$0
Bloomington	6/24/2000	Tstm Wind	$0
Ellettsville	9/20/2000	Tstm Wind	$10,000
		2000 Subtotal	**$210,000**
Hindustan	6/5/2001	Tstm Wind	$0
Bloomington	6/19/2001	Hail	$0
Kirksville	6/19/2001	Hail	$0
Bloomington	7/8/2001	Tstm Wind	$0
Bloomington	8/18/2001	Tstm Wind	$0
Ellettsville	9/23/2001	Hail	$0
Bloomington	10/24/2001	Tstm Wind	$0
		2001 Subtotal	**$0**
Bloomington	4/12/2002	Hail	$0
Bloomington	4/12/2002	Hail	$0
Ellettsville	4/12/2002	Hail	$0
Bloomington	5/25/2002	Tstm Wind	$1,000
Bloomington	5/25/2002	Tstm Wind	$0
Bloomington	7/29/2002	Tstm Wind	$0
Bloomington	11/10/2002	Tstm Wind	$0
		2002 Subtotal	**$1,000**
Bloomington	4/20/2003	Hail	$0
Bloomington	5/31/2003	Hail	$0
Bloomington	7/8/2003	Hail	$0
Bloomington	7/9/2003	Tstm Wind	$0
Bloomington	7/9/2003	Tstm Wind	$0
Bloomington	7/21/2003	Tstm Wind	$0
		2003 Subtotal	**$0**
Bloomington	5/27/2004	Hail	$0
Bloomington	5/27/2004	Hail	$0

Location or County	Date	Type	Property Damage
Bloomington	7/13/2004	Tstm Wind	$0
Ellettsville	7/13/2004	Tstm Wind	$0
Bloomington	7/22/2004	Tstm Wind	$0
Bloomington	7/22/2004	Tstm Wind	$0
Bloomington	8/18/2004	Hail	$0
Bloomington	8/18/2004	Tstm Wind	$30,000
Ellettsville	8/18/2004	Tstm Wind	$0
		2004 Subtotal	**$30,000**
Bloomington	5/13/2005	Tstm Wind	$0
Ellettsville	5/19/2005	Heavy Rain	$0
Bloomington	5/19/2005	Tstm Wind	$0
Bloomington	5/19/2005	Tstm Wind	$0
Blmngtn Monroe Co Co Ar	6/5/2005	Hail	$0
Bloomington	6/5/2005	Hail	$0
Bloomington	6/5/2005	Hail	$0
Bloomington	6/5/2005	Hail	$0
Ellettsville	6/5/2005	Hail	$0
Bloomington	6/30/2005	Tstm Wind	$0
Bloomington	7/21/2005	Tstm Wind	$0
Bloomington	11/6/2005	Tstm Wind	$0
Ellettsville	11/6/2005	Tstm Wind	$0
		2005 Subtotal	**$0**
Bloomington	3/31/2006	Hail	$0
Bloomington	4/2/2006	Tstm Wind	$20,000
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Bloomington	4/7/2006	Hail	$0
Ellettsville	4/7/2006	Hail	$0
Ellettsville	4/7/2006	Hail	$0
Kirksville	4/7/2006	Hail	$0
Kirksville	4/7/2006	Hail	$0
Bloomington	5/25/2006	Hail	$0
Bloomington	6/7/2006	Hail	$0
Bloomington	6/19/2006	Hail	$0
Ellettsville	6/19/2006	Hail	$0
		2006 Subtotal	**$20,000**
Bloomington	4/3/2007	Hail	$0
Hindustan	4/3/2007	Tstm Wind	$0
Bloomington	4/11/2007	Tstm Wind	$0
		2007 Subtotal	**$0**
Bloomington	1/29/2008	Tstm Wind	$0

Location or County	Date	Type	Property Damage
Smithville	6/3/2008	Tstm Wind	$0
Bloomington	6/4/2008	Hail	$0
Bloomington	6/4/2008	Hail	$0
Bloomington	6/4/2008	Hail	$0
Bloomington	6/4/2008	Lightning	$0
Ellettsville	6/6/2008	Heavy Rain	$0
Stinesville	6/6/2008	Heavy Rain	$0
Bloomington	7/8/2008	Tstm Wind	$1,000
Clear Creek	7/8/2008	Tstm Wind	$1,000
Ellettsville	7/8/2008	Tstm Wind	$3,000
Handy	7/8/2008	Tstm Wind	$1,000
Hunters	7/8/2008	Tstm Wind	$1,000
Mt Tabor	7/8/2008	Tstm Wind	$1,000
Yellowstone	7/20/2008	Tstm Wind	$0
Bloomington	7/22/2008	Hail	$0
Broadview	7/22/2008	Hail	$3,000
Monroe Co	9/14/2008	High Wind	$0
		2008 Subtotal	**$11,000**
Monroe Co	2/11/2009	High Wind	$0
		2009 Subtotal	**$0**
		Total Property Damage	**$341,000**

The historical data is erratic and not wholly documented or confirmed. As a result, potential dollar losses for a future event cannot be precisely calculated; however, based on averages in the last decade, it can be determined that Monroe County incurs an annual risk of approximately $34,100 per year.

Vulnerability to Future Assets/Infrastructure for Thunderstorm Hazard

All future development within the county and all communities will remain vulnerable to these events.

Analysis of Community Development Trends

Preparing for severe storms will be enhanced if officials sponsor a wide range of programs and initiatives to address the overall safety of county residents. New structures need to be built with more sturdy construction, and those structures already in place need to be hardened to lessen the potential impacts of severe weather. Community warning sirens to provide warning of approaching storms are also vital to preventing the loss of property and ensuring the safety of Monroe County residents.

4.4.5 Drought Hazard

Hazard Definition for Drought Hazard

Drought is a climatic phenomenon that occurs in Monroe County. The meteorological condition that creates a drought is below normal rainfall. However, excessive heat can lead to increased evaporation, which will enhance drought conditions. Droughts can occur in any month. Drought differs from normal arid conditions found in low rainfall areas. Drought is the consequence of a reduction in the amount of precipitation over an undetermined length of time (usually a growing season or more).

The severity of a drought depends on location, duration, and geographical extent. Additionally, drought severity depends on the water supply, usage demands made by human activities, vegetation, and agricultural operations. Drought brings several different problems that must be addressed. The quality and quantity of crops, livestock, and other agricultural assets will be affected during a drought. Drought can adversely impact forested areas leading to an increased potential for extremely destructive forest and woodland fires that could threaten residential, commercial, and recreational structures.

Previous Occurrences for Drought Hazard

The NCDC database reported three drought/heat wave events in Monroe County since 1950, the most recent of which occurred in 1997.

NCDC records of droughts/heat waves are identified in Table 4-31. Additional details for NCDC events are included in Appendix D.

Table 4-31: Monroe County Drought/Heat Wave Events*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	7/26/1997	Excessive Heat	N/A	0	0	0	0
Monroe Co	7/13/1995	Heat Wave	N/A	14	0	$1,000,000	0
Monroe Co	8/21/1995	Heat Wave	N/A	1	0	0	0

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Drought Hazard

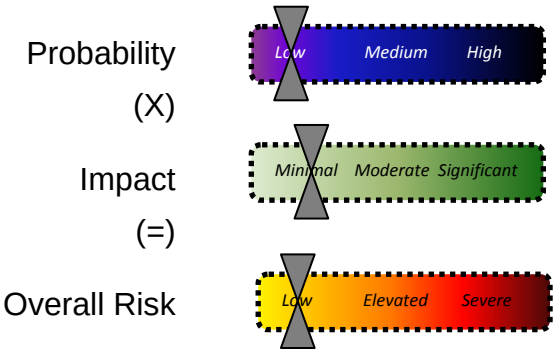
Droughts are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Drought Hazard

Droughts can be widespread or localized events. The extent of the droughts varies both in terms of the extent of the heat and the range of precipitation.

Risk Identification for Drought/Extreme Heat Hazard

Based on historical information, the probability of a drought is low. In Meeting #2, the planning team determined that the potential impact of a drought or an extended period of extreme heat is minimal; therefore, the overall risk of a drought/extreme heat hazard for Monroe County is low.



Vulnerability Analysis for Drought Hazard

Drought impacts are an equally distributed threat across the entire jurisdiction; therefore, the county is vulnerable to a drought and can expect the same impacts within the affected area. The entire population and all buildings have been identified as at risk. The building exposure for Monroe County, as determined from the building inventory is included in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to drought. A critical facility will encounter many of the same impacts as any other building within the jurisdiction, which should involve only minor damage. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather. Table 4-5 lists the types and numbers of all of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within the county can all expect the same impacts similar to those discussed for critical facilities. These impacts include water shortages, fires as a result of drought conditions, and residents in need of medical care from the heat and dry weather.

Infrastructure

During a drought the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with a fire that could result from the hot, dry conditions. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a heat wave. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); or railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

Vulnerability to Future Assets/Infrastructure for Drought Hazard

Future development will remain vulnerable to these events. According to the Monroe County Hazard Analysis, some urban and rural areas are more susceptible than others. For example, urban areas such as the city of Bloomington are subject to water shortages during periods of drought. Excessive demands of the populated area place a limit on water resources. In rural areas, crops and livestock may suffer from extended periods of heat and drought. Dry conditions can lead to the ignition of wildfires that could threaten residential, commercial, and recreational areas.

Analysis of Community Development Trends

Because the droughts are regional in nature future development will be impacted across the county.

4.4.6 Winter Storm Hazard

Hazard Definition for Winter Storm Hazard

Severe winter weather consists of various forms of precipitation and strong weather conditions. This may include one or more of the following: freezing rain, sleet, heavy snow, blizzards, icy roadways, extreme low temperatures, and strong winds. These conditions can cause human health risks such as frostbite, hypothermia, and death.

Ice (glazing) and Sleet Storms

Ice or sleet, even in the smallest quantities, can result in hazardous driving conditions and can be a significant cause of property damage. Sleet can be easily identified as frozen raindrops. Sleet does not stick to trees and wires. The most damaging winter storms in Indiana have been ice storms. Ice storms are the result of cold rain that freezes on contact with objects having a temperature below freezing. Ice storms occur when moisture-laden gulf air converges with the northern jet stream causing strong winds and heavy precipitation. This precipitation takes the form of freezing rain coating power lines, communication lines, and trees with heavy ice. The winds will then cause the overburdened limbs and cables to snap; leaving large sectors of the population without power, heat, or communication. Falling trees and limbs can also cause building damage during an ice storm. In the past few decades numerous ice storm events have occurred in Indiana.

Snowstorms

Significant snowstorms are characterized by the rapid accumulation of snow, often accompanied by high winds, cold temperatures, and low visibility. A blizzard is categorized as a snowstorm with winds of 35 miles per hour or greater and/or visibility of less than ¼ mile for three or more hours. The strong winds during a blizzard blow falling and already existing snow, create poor visibility and impassable roadways. Blizzards have the potential to result in property damage.

Indiana has repeatedly been struck by blizzards. Blizzard conditions can not only cause power outages and loss of communication, but also make transportation difficult. The blowing of snow can make visibility less than ¼ mile, but the resulting disorientation makes even travel by foot dangerous if not deadly.

Severe Cold

Severe cold is characterized by the ambient air temperature dropping to around 0°F or below. These extreme temperatures can increase the likelihood of frostbite and hypothermia. High winds during severe cold events can enhance the air temperature's affects. Fast winds during cold weather events can lower the wind chill factor (how cold the air feels on your skin). As a result, the time it takes for frostbite and hypothermia to affect a person's body will decrease.

Previous Occurrences for Winter Storm Hazard

The NCDC database identified 23 winter storm and extreme cold events for Monroe County since 1950. In 2008, a quarter of an inch of ice accumulated in Vincennes. A winter storm moved

across central Indiana on February 21 and 22. Snow, sleet, and freezing rain accompanied this system as it moved through the state.

The NCDC winter storms are listed in Table 4-32. Additional details for NCDC events are included in Appendix D.

Table 4-32: Winter Storm Events*

Location or County	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Monroe Co	10/29/1993	Snow	N/A	0	0	0	0
Monroe Co	1/14/1994	Extreme Cold	N/A	3	0	5.0M	0
Monroe Co	2/8/1994	Sleet/ice Storm	N/A	0	0	500K	0
Monroe Co	12/8/1995	Winter Storm	N/A	0	0	0	0
Monroe Co	12/18/1995	Winter Storm	N/A	0	0	0	0
Monroe Co	1/2/1996	Winter Storm	N/A	0	0	0	0
Monroe Co	1/6/1996	Winter Storm	N/A	0	0	0	0
Monroe Co	2/2/1996	Extreme Cold	N/A	0	0	0	0
Monroe Co	3/19/1996	Heavy Snow	N/A	0	0	0	0
Monroe Co	12/16/1996	Winter Storm	N/A	0	0	0	0
Monroe Co	1/15/1997	Winter Storm	N/A	0	0	0	0
Monroe Co	2/4/1998	Heavy Snow	N/A	0	0	0	0
Monroe Co	1/1/1999	Winter Storm	N/A	0	0	0	0
Monroe Co	3/8/1999	Winter Storm	N/A	0	0	0	0
Monroe Co	12/13/2000	Heavy Snow	N/A	0	0	0	0
Monroe Co	12/13/2000	Ice Storm	N/A	0	0	0	0
Monroe Co	2/23/2003	Winter Storm	N/A	0	0	0	0
Monroe Co	12/22/2004	Heavy Snow	N/A	0	3	3.0M	0
Monroe Co	12/8/2005	Heavy Snow	N/A	0	0	0	0
Monroe Co	2/12/2007	Winter Storm	N/A	0	0	0K	0K
Monroe Co	2/21/2008	Winter Storm	N/A	0	0	0K	0K
Monroe Co	1/26/2009	Winter Storm	N/A	0	0	0K	0K
Monroe Co	2/3/2009	Winter Weather	N/A	0	0	0K	0K

* NCDC records are estimates of damage compiled by the National Weather Service from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to a given weather event.

Geographic Location for Winter Storm Hazard

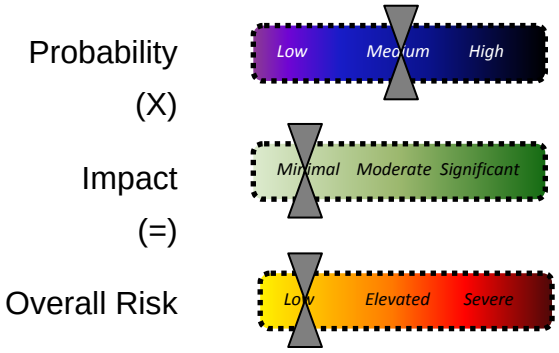
Severe winter storms are regional in nature. Most of the NCDC data is calculated regionally or in some cases statewide.

Hazard Extent for Winter Storm Hazard

The extent of the historical winter storms varies in terms of storm location, temperature, and ice or snowfall. A severe winter storm can occur anywhere in the jurisdiction.

Risk Identification for Winter Storm Hazard

Based on historical information, the probability of a winter storm is medium. In Meeting #2, the planning team determined that the potential impact of a winter storm is minimal; therefore, the overall risk of a winter storm hazard for Monroe County is low.



Vulnerability Analysis for Winter Storm Hazard

Winter storm impacts are equally distributed across the entire jurisdiction; therefore, the entire county is vulnerable to a winter storm and can expect the same impacts within the affected area. The building exposure for Monroe County, as determined from the building inventory, is included in Table 4-6.

Critical Facilities

All critical facilities are vulnerable to a winter storm. A critical facility will encounter many of the same impacts as other buildings within the jurisdiction. These impacts include loss of gas or electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow. Table 4-5 lists the types and numbers of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These include loss of gas of electricity from broken or damaged utility lines, damaged or impassable roads and railways, broken water pipes, and roof collapse from heavy snow.

Infrastructure

During a winter storm the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable it is important to emphasize that any number of these items could become damaged during a winter storm. Potential impacts include broken gas and/or electricity lines or damaged utility lines, damaged or impassable roads and railways, and broken water pipes.

Potential Dollar Losses for Winter Storm Hazard

A HAZUS-MH analysis was not completed for winter storms because the widespread extent of such a hazard makes it difficult to accurately model outcomes. To determine dollar losses for a winter storm hazard, the available NCDC hazard information was condensed to include only winter storm hazards that occurred within the past ten years. Monroe County's MHMP team then reviewed the property damages reported to NCDC and made any applicable updates.

It was determined that since 1998, Monroe County has incurred $3 million in damages relating to winter storms, including sleet/ice and heavy snow. The resulting information is in Table 4-33.

Table 4-33: Monroe County Property Damage (1998–2009)

Location or County	Date	Type	Property Damage
Monroe Co	2/4/1998	Heavy Snow	$ -
		1998 Subtotal	**$ -**
Monroe Co	1/1/1999	Winter Storm	$ -
Monroe Co	3/8/1999	Winter Storm	$ -
		1999 Subtotal	**$ -**
Monroe Co	12/13/2000	Heavy Snow	$ -
Monroe Co	12/13/2000	Ice Storm	$ -
		2000 Subtotal	**$ -**
Monroe Co	2/23/2003	Winter Storm	$ -
		2003 Subtotal	**$ -**
Monroe Co	12/22/2004	Heavy Snow	$3,000,000
		2004 Subtotal	**$3,000,000**
Monroe Co	12/08/2005	Heavy Snow	$ -
		2005 Subtotal	**$ -**
Monroe Co	2/12/2007	Winter Storm	$ -
		2007 Subtotal	**$ -**
Monroe Co	2/21/2008	Winter Storm	$ -
		2008 Subtotal	**$ -**
Monroe Co	1/26/2009	Winter Storm	$ -
Monroe Co	2/3/2009	Winter Storm	$ -
		2009 Subtotal	**$ -**
		Total Property Damage	**$3,000,000**

The historical data is erratic and not wholly documented or confirmed. As a result, potential dollar losses for a future event cannot be precisely calculated; however, based on averages in the last decade, it can be determined that Monroe County incurs an annual risk of approximately $300,000 per year.

Vulnerability to Future Assets/Infrastructure for Winter Storm Hazard

Any new development within the county will remain vulnerable to these events.

Analysis of Community Development Trends

Because the winter storm events are regional in nature future development will be equally impacted across the county.

4.4.7 Hazardous Materials Storage and Transport Hazard

Hazard Definition for Hazardous Materials Storage and Transport Hazard

The State of Indiana has numerous active transportation lines that run through many of the counties in the state. Active railways transport harmful and volatile substances between our borders every day. The transportation of chemicals and substances along interstate routes is commonplace in Indiana. The rural areas of Indiana have considerable agricultural commerce creating a demand for fertilizers, herbicides, and pesticides to be transported along rural roads. Finally, Indiana is bordered by two major rivers and Lake Michigan. Barges transport chemicals and substances along these waterways daily. These factors increase the chance of hazardous material releases and spills throughout the State of Indiana.

The release or spill of certain substances can cause an explosion. Explosions result from the ignition of volatile products such as petroleum products, natural and other flammable gases, hazardous materials/chemicals, dust, and bombs. An explosion can potentially cause death, injury, and property damage. In addition, a fire routinely follows an explosion which may cause further damage and inhibit emergency response. Emergency response may require fire, safety/law enforcement, search and rescue, and hazardous materials units.

Previous Occurrences for Hazardous Materials Storage and Transport Hazard

Monroe County has not experienced a significantly large-scale hazardous material incident at a fixed site or during transport resulting in multiple deaths or serious injuries, although there have been many minor releases that have put local firefighters, hazardous materials teams, emergency management, and local law enforcement into action to try to stabilize these incidents and prevent or lessen harm to Monroe County residents. Table 4-34 lists significant incidents of hazardous materials releases in the county.

Table 4-34: Monroe County Hazardous Materials Releases (1972-2000)

Date	Location	Characteristics of the Event
1995	Bloomington	HazMat spill at the GE Factory took 3-4 days to clean up. The plant had to be closed during clean up. GE changed piping which caused incident to fix the problem.
1997	Bloomington	A release of “heating fuel oil” from BHS North was discovered. A major leak had occurred in a fuel line that was carrying heating oil from an underground tank system into the building heating system underneath a driveway. Bloomington Township Fire Department, HazMat Response Team, and Monroe County Health Department installed spill containment booms in adjacent water way. Approximately 100 gallons of pure product was recovered, and two 10,000 gallon tanks were removed as part of the remediation activities. Water treatment will continue into 1998.
1998	North Matthews Drive	A paint stripping company “paint machine” caught fire and destroyed three vehicles. No human injuries were reported. Minimal property damage was recorded.
2003	Bloomington	A truck carrying ammonium nitrate shut down State Roads 45 and 46 for an entire day. Students were evacuated from IU classes and dormitories. An auto accident caused the death of one person.

Geographic Location for Hazardous Materials Storage and Transport Hazard

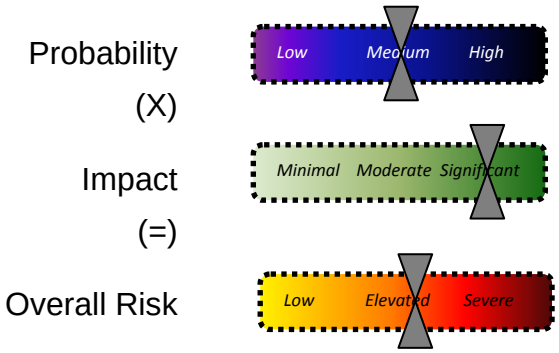
The hazardous material hazards are countywide and are primarily associated with the transport of materials via highway, railroad, and/or river barge.

Hazard Extent for Hazardous Materials Storage and Transport Hazard

The extent of the hazardous material hazard varies both in terms of the quantity of material being transported as well as the specific content of the container.

Risk Identification for Hazardous Materials Release

Based on historical information, the probability of a hazmat hazard is medium. In Meeting #2, the planning team determined that the potential impact of a hazmat release is significant; therefore, the overall risk of a hazmat hazard for Monroe County is elevated.



Vulnerability Analysis for Hazardous Materials Storage and Transport Hazard

Hazardous material impacts are an equally distributed threat across the entire jurisdiction; therefore, the entire county is vulnerable to a hazardous material release and can expect the same impacts within the affected area. The main concern during a release or spill is the populations affected. The building exposure for Monroe County, as determined from building inventory, is included in Table 4-6. This plan will therefore consider all buildings located within the county as vulnerable.

Critical Facilities

All critical facilities and communities within the county are at risk. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural failure due to fire or explosion and loss of function of the facility (e.g. a damaged police station will no longer be able to serve the community). Table 4-5 lists the types and numbers of all essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within the county can all expect the same impacts, similar to those discussed for critical facilities. These impacts include structural failure due to fire or explosion or debris and loss of function of the building (e.g. a damaged home will no longer be habitable causing residents to seek shelter).

Infrastructure

During a hazardous material release the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since an extensive inventory of the infrastructure is not available to this plan it is important to emphasize that any number of these items could become damaged in the event of a hazardous material release. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); and railway failure from broken or impassable railways. Bridges could fail or become impassable causing risk to traffic.

In terms of numbers and types of buildings and infrastructure, typical scenarios are described to gauge the anticipated impacts of hazardous material release events in the county.

The U.S. EPA's ALOHA (Areal Locations of Hazardous Atmospheres) model was utilized to assess the area of impact for a chlorine release at the railroad crossings at State Highway 37 on the west side of Bloomington.

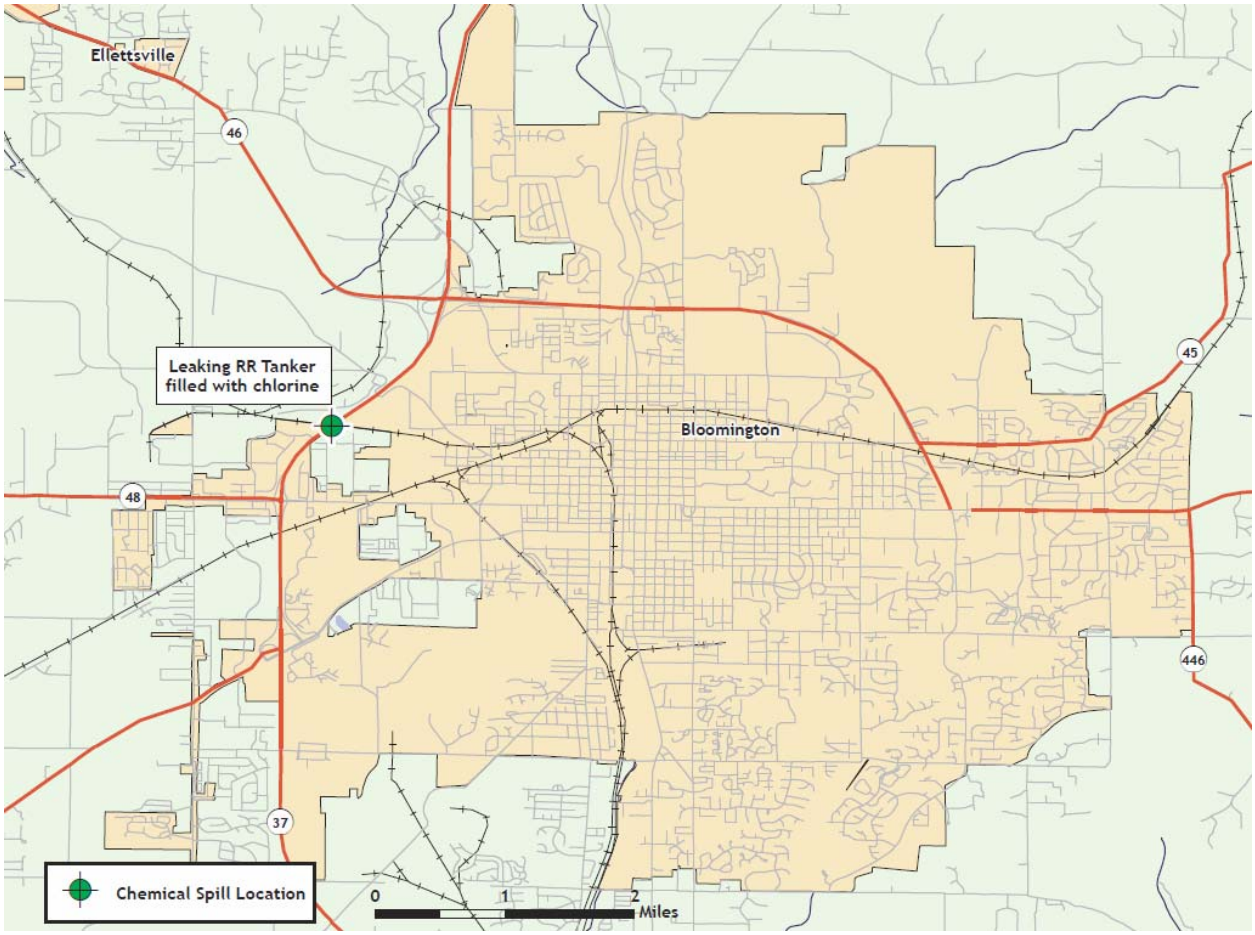
Chlorine is a greenish yellow gas with a pungent suffocating odor. The gas liquefies at -35°C and room pressure or will liquefy from pressure applied at room temperature. Contact with unconfined liquid chlorine can cause frostbite from evaporative cooling. Chlorine does not burn, but, like oxygen, supports combustion. The toxic gas can have adverse health effects from either long-term inhalation of low concentrations of vapors or short-term inhalation of high concentrations. Chlorine vapors are much heavier than air and tend to settle in low areas. Chlorine is commonly used to purify water, bleach wood pulp, and make other chemicals.

Source: CAMEO

ALOHA is a computer program designed especially for use by people responding to chemical accidents, as well as for emergency planning and training. Chlorine is a common chemical used in industrial operations and can be found in either liquid or gas form. Rail and truck tankers commonly haul chlorine to and from facilities.

For this scenario, moderate atmospheric and climatic conditions with a slight breeze from the west were assumed. The target area was chosen due to its high traffic patterns and its close proximity to local retail and residential areas. The geographic area covered in this analysis is depicted in Figure 4-15.

Figure 4-15: Location of Chemical Release



Analysis

The ALOHA atmospheric modeling parameters, depicted in Figure 4-16, were based upon a westerly wind speed of 5mph. The temperature was 68°F with 75% humidity and partly cloudy skies.

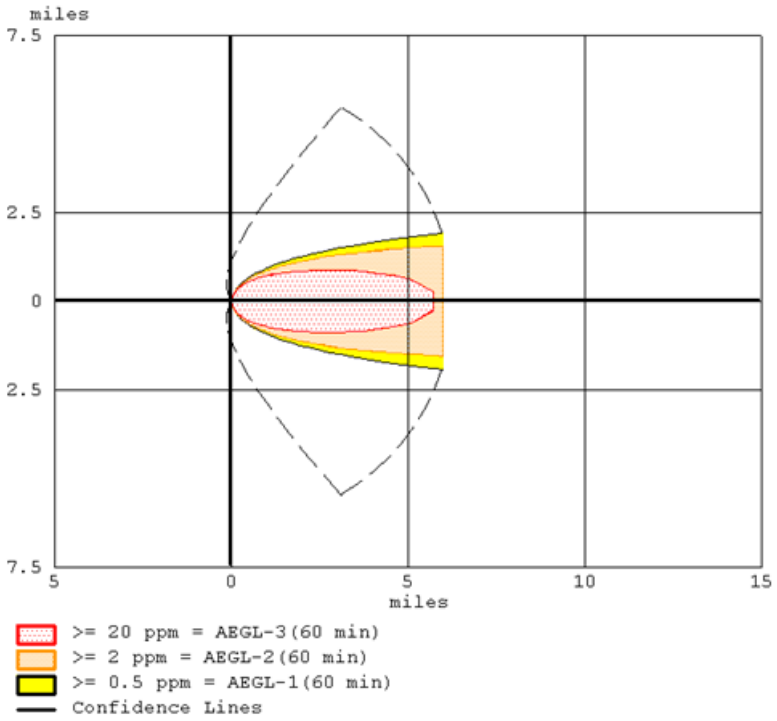
The source of the chemical spill is a leaking railroad tanker. The diameter of the tank was set to 10.4 feet and the length set to 53 feet (33,500 gallons). At the time of its release, it was estimated that the tank was 85% full. The chlorine in this tank is in its liquid state.

This release was based on a leak from a 2.5-inch-diameter hole, 12 inches above the bottom of the tank. According to the ALOHA parameters, approximately 10,400 pounds of material would be released per minute. The image in Figure 4-17 depicts the plume footprint generated by ALOHA.

Figure 4-16: ALOHA Plume Modeling Parameters

```
SITE DATA:
  Location: BLOOMINGTON, INDIANA
  Building Air Exchanges Per Hour: 0.29 (sheltered single storied)
  Time: July 9, 2009  0951 hours EST (using computer's clock)

CHEMICAL DATA:
  Chemical Name: CHLORINE                 Molecular Weight: 70.91 g/mol
  AEGL-1(60 min): 0.5 ppm   AEGL-2(60 min): 2 ppm   AEGL-3(60 min): 20 ppm
  IDLH: 10 ppm
  Ambient Boiling Point: -30.4° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 5 miles/hour from W at 10 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 68° F
  Stability Class: C (user override)
  No Inversion Height                     Relative Humidity: 75%

SOURCE STRENGTH:
  Leak from hole in horizontal cylindrical tank
  Non-flammable chemical is escaping from tank
  Tank Diameter: 10.4 feet                Tank Length: 53 feet
  Tank Volume: 33500 gallons
  Tank contains liquid                    Internal Temperature: 68° F
  Chemical Mass in Tank: 168 tons         Tank is 85% full
  Circular Opening Diameter: 2.5 inches
  Opening is 12 inches from tank bottom
  Release Duration: ALOHA limited the duration to 1 hour
  Max Average Sustained Release Rate: 10,400 pounds/min
     (averaged over a minute or more)
  Total Amount Released: 322,116 pounds
  Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE:
  Model Run: Heavy Gas
  Red   : 5.7 miles --- (20 ppm = AEGL-3(60 min))
  Orange: greater than 6 miles --- (2 ppm = AEGL-2(60 min))
  Yellow: greater than 6 miles --- (0.5 ppm = AEGL-1(60 min))
```

Figure 4-17: Plume Footprint Generated by ALOHA



Acute Exposure Guideline Levels (AEGLs) are intended to describe the health effects on humans due to once-in-a-lifetime or rare exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills or other catastrophic exposures. As the substance moves away from the source, the level of substance concentration decreases. Each color-coded area depicts a level of concentration measured in parts per million (ppm). The image in Figure 4-18 depicts the plume footprint generated by ALOHA in ArcGIS.

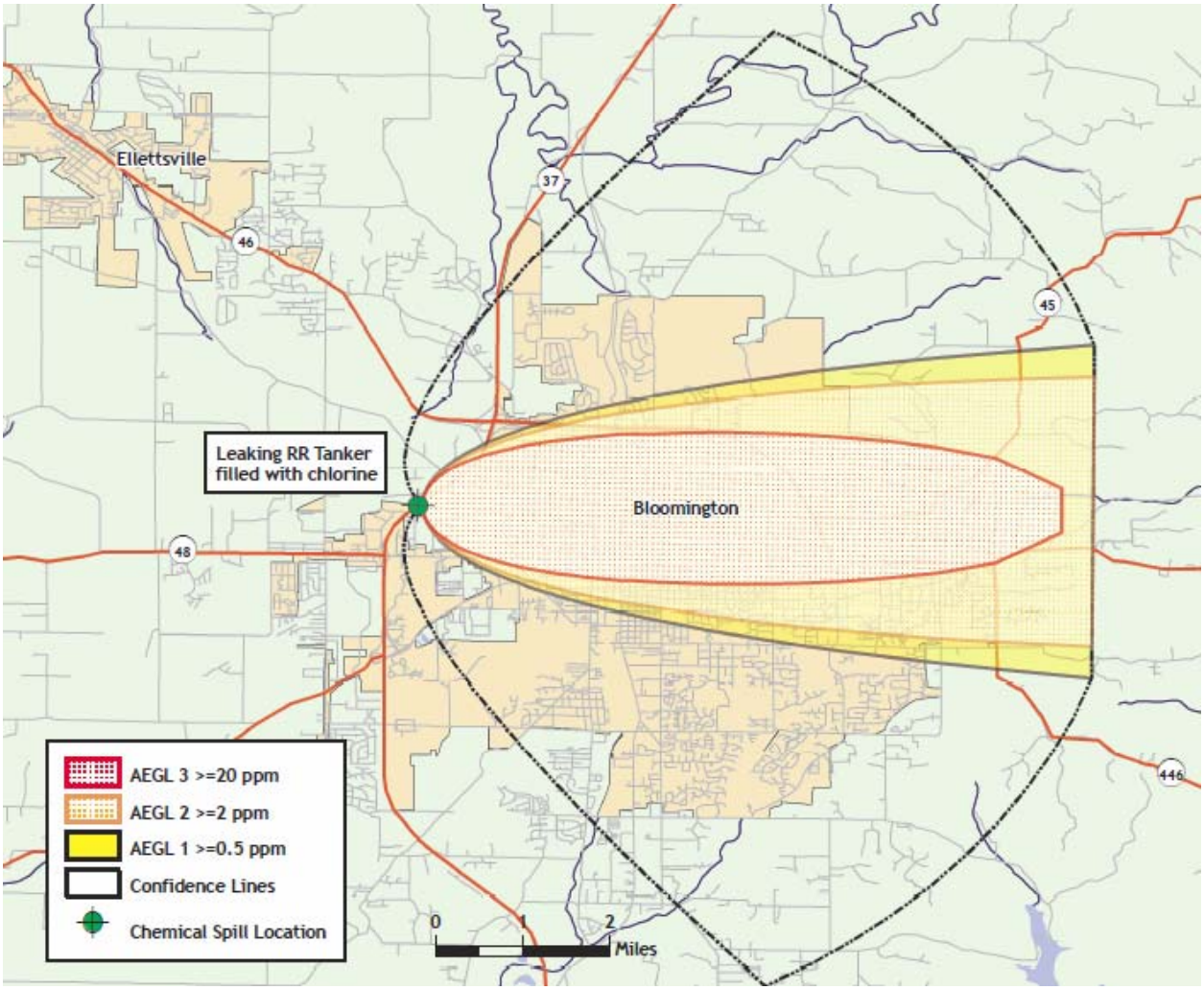
- **AEGL 3:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death. The red buffer (>=20 ppm) extends no more than 5.7 miles from the point of release after one hour.

- **AEGL 2:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. The orange buffer (>=2 ppm) extends six miles from the point of release after one hour.

- **AEGL 1:** Above this airborne concentration of a substance, it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure. The yellow buffer (>=0.5 ppm) extends more than six miles from the point of release after one hour.

- **Confidence Lines:** The dashed lines depict the level of confidence in which the exposure zones will be contained. The ALOHA model is 95% confident that the release will stay within this boundary.

Figure 4-18: ALOHA Plume Footprint Overlaid in ArcGIS

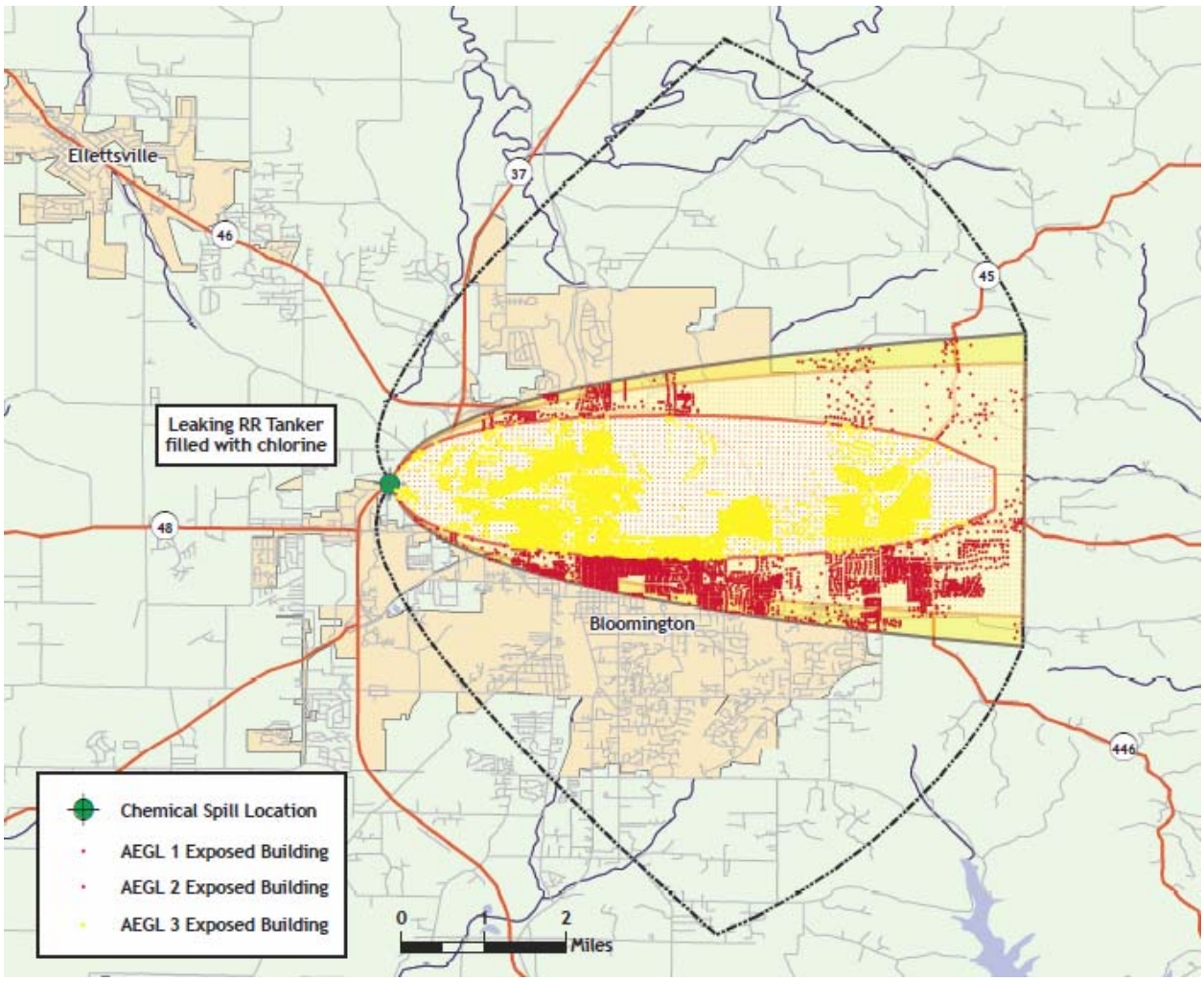


Results

By summing the building inventory within all AEGL exposure levels (AEGL 3: >=20 ppm, AEGL 2: >=2 ppm and AEGL 1: >=0.5 ppm.), the GIS overlay analysis image in Figure 4-19 predicts that as many as 8,635 buildings could be exposed at a replacement cost of $2.2 billion. The overlay was performed against parcels provided by Monroe County that were joined with Assessor records showing property improvement. If this event were to occur, approximately 18,090 people would be affected.

The Assessor records often do not distinguish parcels by occupancy class when the parcels are not taxable; therefore, the total number of buildings and the building replacement costs for government, religious/non-profit, and education may be underestimated.

Figure 4-19: Monroe County Building Inventory Classified By Plume Footprint



Building Inventory Damage

The results of the analysis against the Building Inventory points are depicted in Tables 4-35 through 4-38. Table 4-35 summarizes the results of the chemical spill by combining all AEGL levels. Tables 4-36 through 4-38 summarize the results of the chemical spill for each level separately.

Table 4-35: Estimated Exposure for all AEGL Levels (all ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	18,090	7,236	$1,338,400
Commercial	0	895	$524,051
Industrial	0	36	$33,395
Agriculture	0	32	$5,497
Religious	0	242	$211,101
Government	0	18	$0
Education	0	175	$92,725
Total	**18,090**	**8,634**	**$2,205,168**

Table 4-36: Estimated Exposure for AEGL Level 3 (>=20 ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	10,358	4,143	$763,016
Commercial	0	702	$375,132
Industrial	0	23	$24,925
Agriculture	0	4	$1,102
Religious	0	181	$88,767
Government	0	16	$0
Education	0	167	$91,913
Total	**10,358**	**5,236**	**$1,344,856**

Table 4-37: Estimated Exposure for AEGL Level 2 (>=2 ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	6,050	2,420	$443,167
Commercial	0	153	$125,401
Industrial	0	12	$8,461
Agriculture	0	23	$3,744
Religious	0	57	$120,532
Government	0	1	$0
Education	0	8	$811
Total	**6,050**	**2,674**	**$702,116**

Table 4-38: Estimated Exposure for AEGL Level 1 (>=0.5 ppm)

Occupancy	Population	Building Counts	Building Exposure (thousands)
Residential	1,683	673	$132,217
Commercial	0	40	$23,518
Industrial	0	1	$9
Agriculture	0	5	$651
Religious	0	4	$1,802
Government	0	1	$0
Education	0	0	$0
Total	**1,683**	**724**	**$158,196**

Critical Facilities Damage

There are 98 critical facilities within the limits of the chemical spill plume. The affected facilities are identified in Table 4-39. Their geographic locations are depicted in Figure 4-20.

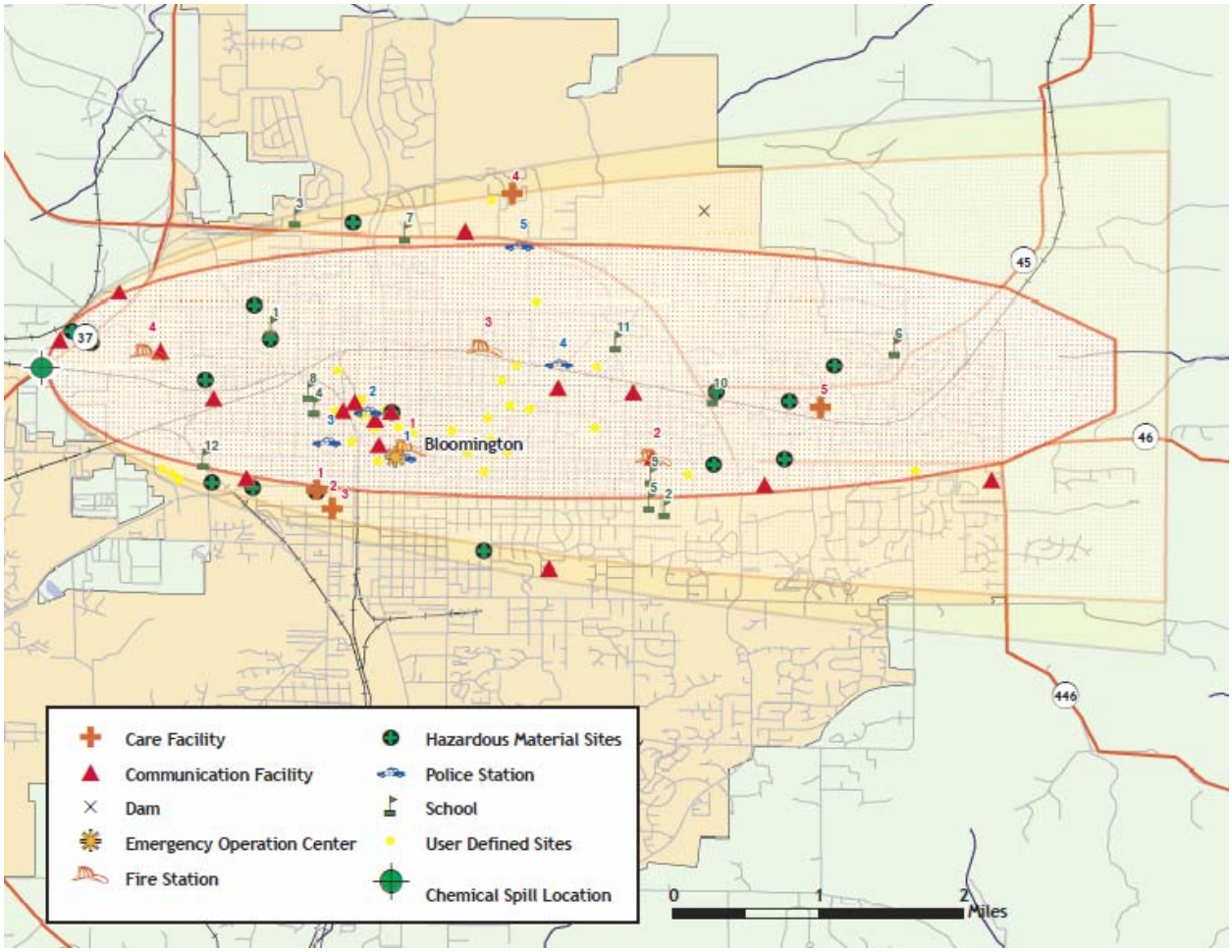
Table 4-39: Critical Facilities within Plume Footprint

Facility Type	Name
Care	Bloomington Hospital & Healthcare System
Care	Select Specialty Hospital - Bloomington
Care	Bloomington Convalescent Center
Care	Meadowood Health Pavilion
Care	Bell Trace Health and Living Center Inc.
Communication	W299BD
Communication	NEW
Communication	WIUX-LP
Communication	W251AG
Communication	WBWB
Communication	WBWB
Communication	W240AT
Communication	Cell Tower/College Mall
Communication	Cell Tower/Fire St#4
Communication	Cell Tower/Sarkes Tarzian
Communication	Cell Tower/First Assembly of God
Communication	Cell Tower/2222 East 10th Street
Communication	Cell Tower/AT&T Bldg
Communication	Cell Tower/Johnson Creamery
Communication	Cell Tower/1308 West Vernal Pike
Communication	Cell Tower/2010 West Vernal Pike
Communication	Cell Tower/2356 West Industrial Park Drive
Communication	Cell Tower/1999 Packinghouse Road
Communication	Cell Tower/205 North College Avenue
Emergency Center	Monroe County Emergency Operations Center
Fire	Bloomington Fire Department

Facility Type	Name
Fire	Bloomington Fire Department - Station 4
Fire	Bloomington Fire Department - Station 3
Fire	Bloomington Twp Fire Department - Station 15
Hazmat	AT&T
Hazmat	United States Postal Service - Woodbridge Station
Hazmat	Choice One Communications, Inc
Hazmat	ERIC INC d/b/a/ Jiffy Lube
Hazmat	IMI
Hazmat	Insight Communications
Hazmat	IU UOEHS
Hazmat	Speedway #1327
Hazmat	United Rentals
Hazmat	Bloomington Hospital
Hazmat	Bloomington Department of Public Works
Hazmat	Cinergy/Public Service Indiana
Hazmat	Tamarron Lift Station
Hazmat	Bloomington Department of Public Works - West Booster Station
Hazmat	Bryan Park Pool
Hazmat	Mills Pool
Police	Bloomington Police Department
Police	Monroe County Sheriff
Police	Monroe County Auxiliary Police
Police	Indiana University-Police Department
Police	Indiana State Police - Bloomington Post
School	Tri-North Middle School
School	Binford Elementary School
School	Arlington Heights Elementary School
School	Fairview Elementary School
School	Rogers Elementary School
School	University Elementary School
School	Adventist Christian Academy
School	Aurora Alternative School
School	Saint Charles Boromeo School
School	Campus Children's Center
School	Hoosier Courts Cooperative
School	New Technical High School
User Defined	Wonderlab Museum
User Defined	Monroe County Public Library
User Defined	Monroe County Historical Museum
User Defined	Indiana Daily Student
User Defined	Inside Indiana
User Defined	Federal Bureau of Investigation
User Defined	Monroe County Courthouse
User Defined	Health Services Building

Facility Type	Name
User Defined	Justice Building
User Defined	Johnson Building
User Defined	Curry Building
User Defined	City Hall
User Defined	Navy/Air Force/Marine Recruiting Station
User Defined	Parking Garage
User Defined	Parking Garage
User Defined	Vocational Rehabilitation
User Defined	Workforce Development
User Defined	United States Post Office - Main Branch
User Defined	SIRA
User Defined	Internal Medicine Association
User Defined	Promptcare East
User Defined	IU Cyclotron
User Defined	IU Outdoor Pool
User Defined	IU Central Heating Plant
User Defined	IU Geological Survey
User Defined	IU Education
User Defined	IU Fine Arts
User Defined	IU Franklin Hall
User Defined	IU Optometry
User Defined	IU Jordan Hall
User Defined	IU Lindley Hall
User Defined	IU Swain West
User Defined	IU Printing Service
User Defined	IU Student Recreational Sports & Aquatic Center
User Defined	IU Department of Chemistry
User Defined	IU HPER

Figure 4-20: Critical Facilities within Plume Footprint



Vulnerability to Future Assets/Infrastructure for Hazardous Materials Storage and Transport Hazard

Any new development within the county will be vulnerable to these events, especially development along major roadways.

Analysis of Community Development Trends

Because the hazardous material hazard events may occur anywhere within the county, future development will be impacted. The major transportation routes and the industries located in Monroe County pose a threat of dangerous chemicals and hazardous materials release.

4.4.8 Ground Failure Hazard

Hazard Definition for Ground Failure

For ground failure this plan will only address land subsidence and landslides.

Land subsidence

Southern Indiana has a network of underground caves formed by what is known as karst landscape. According to the IGS, karst landscapes usually occur where carbonate rocks (limestone and dolostone) underlie the surface. Freely circulating slightly acidic water in the soil slowly dissolves the bedrock causing karst formations. These karst formations have the potential to collapse under the weight of the ground above them creating a sinkhole. Ground failure of this nature is known as land subsidence. Any structures built above a karst formation could potentially be subject to land subsidence and collapse into a resulting sinkhole.

Indiana additionally has networks of coal mines scattered throughout southern Indiana. These coal mines can fail and create ground failures damaging anything on the overlying surfaces.

Landslides

The USGS claims that landslides are a significant geologic hazard in the United States causing $1-2 billion in damage and over 25 fatalities per year. The expansion of urban and recreational development into hillside areas has resulted in an increasing number of properties subject to damage as a result of landslides. Landslides commonly occur in connection with other major natural disasters such as earthquakes, wildfires, and floods.

Previous Occurrences for Ground Failure

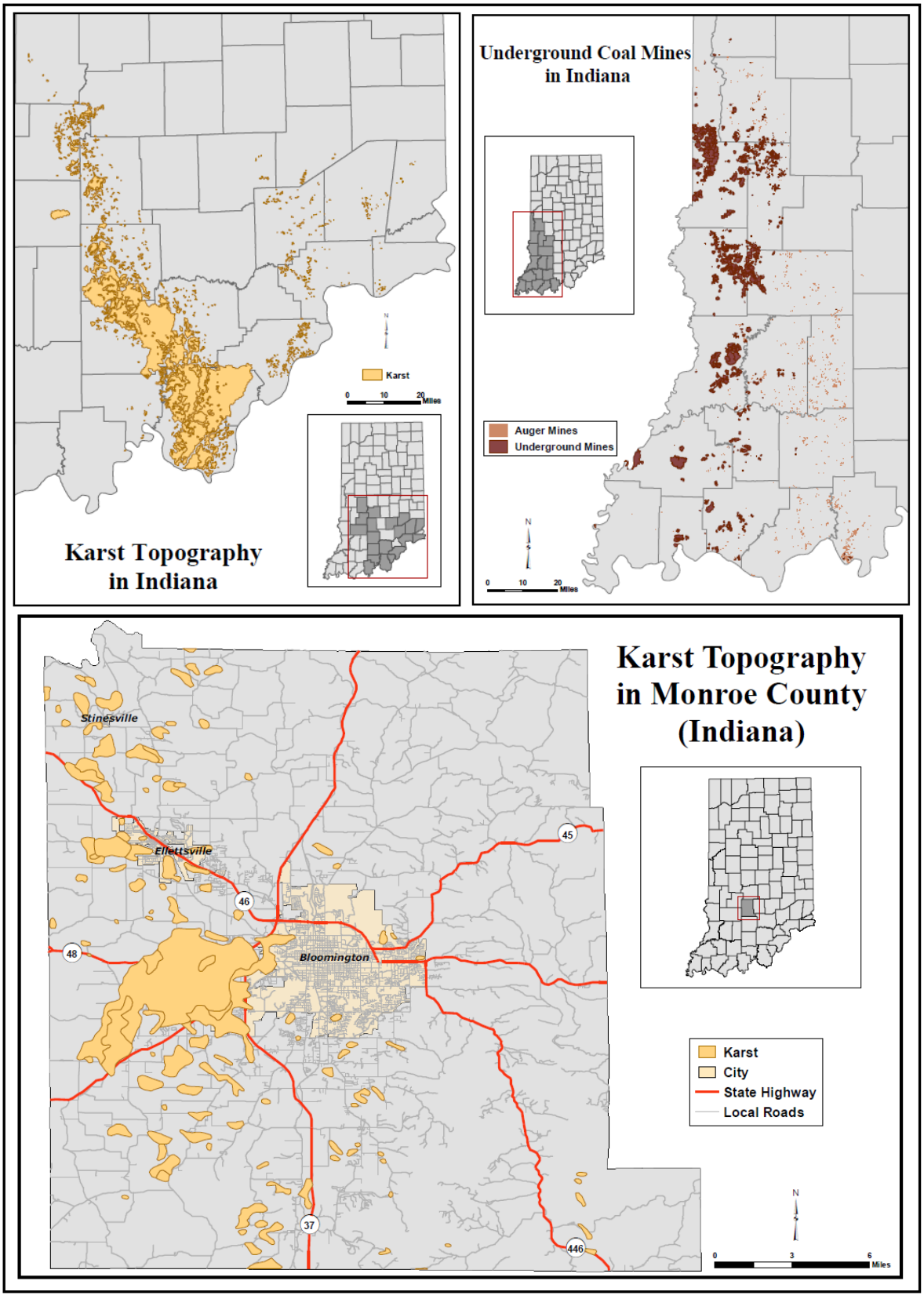
A list of previous ground failure events could not be obtained. According to the Indiana Geological Survey's GIS Atlas, there are areas of karst topography that could lead to ground failure. Unrecorded landslide and land subsidence events occur throughout Monroe County with varying degrees of severity, and subsidence sometimes occurs due to blasting at nearby quarries.

Geographic Location for Ground Failure

The Mitchell Plateau is a broad limestone karst plateau in Monroe County dissected by a few major stream systems. This plateau developed on Mississippian limestones, and extends from the eastern part of Owen County southward to the Ohio River in Harrison County.

Figure 4-21 illustrates the statewide and countywide ground failure potential: Figure 4-21A depicts the state's karst topography; Figure 4-21B depicts the state's underground coal mines; and Figure 4-21C shows the countywide locations of karst topography.

Figure 4-21 A, B, and C: Ground Failure Map

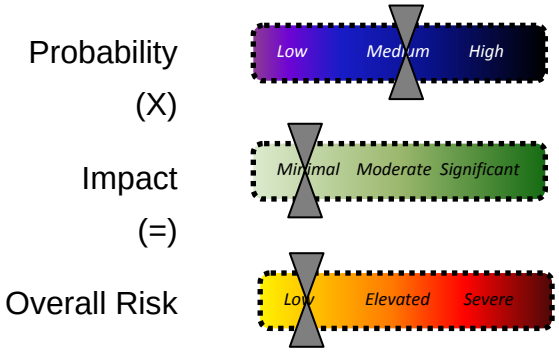


Hazard Extent for Land Ground Failure

The extent of the ground failure hazard is closely related to development near the regions that are at risk. The extent will vary within these areas depending on the potential of elevation change, as well as the size of the underground structure. The hazard extent of ground failure is spread throughout the entire county in various concentrated areas.

Risk Identification for Ground Failure

Based on historical information, the probability of ground failure is medium. Based on the guidelines discussed in Section 4.1.3 of this plan, the potential impact of a ground failure event is minimal; therefore, the overall risk for Monroe County is low.



Vulnerability Analysis for Ground Failure

Because of the difficulty predicting which communities are at risk of ground failure, the entire population and all buildings have been identified as at risk. As a result this plan will consider all buildings as vulnerable. The existing buildings and infrastructure of Monroe County are discussed in Table 4-6.

Critical Facilities

Any critical facility built above a karst landscape could be vulnerable to land subsidence. A critical facility will encounter many of the same impacts as any other building within the affected area. These impacts include damages ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while in more severe cases the failure of building foundations causes cracking of critical structural elements. Table 4-5 lists the types and numbers of all of the essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is listed in Table 4-6. The buildings within this area can all anticipate the same impacts, similar to those discussed for critical facilities. These impacts include damages ranging from cosmetic to structural. Buildings may sustain minor cracks in walls due to a small amount of settling, while

in more severe cases the failure of building foundations causes cracking of critical structural elements.

Infrastructure

In the area of Monroe County affected by land subsidence, the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. The risk to these structures is primarily associated with land collapsing directly beneath them in a way that undermines their structural integrity. Since all infrastructure in the affected area is equally vulnerable it is important to emphasize that any number of these items could become damaged as a result of significant land subsidence. The impacts to these items include broken, failed, or impassable roadways; broken or failed utility lines (e.g. loss of power or gas to community); and railway failure from broken or impassable railways. In addition bridges could fail or become impassable causing risk to traffic.

Vulnerability to Future Assets/Infrastructure for Ground Failure

All future communities, buildings, and infrastructure will remain vulnerable to ground failure in the areas of Monroe County where karst features exist and in areas of significant elevation change. In areas with higher levels of population the vulnerability is greater than in open areas with no infrastructure demands.

Analysis of Community Development Trends

Karst topography may affect several locations within the county; therefore buildings and infrastructure are vulnerable to subsidence. Continued development will occur in many of these areas. Currently, Monroe County reviews new developments for compliance with the local zoning ordinance.

4.4.9 Fire Hazard

Hazard Definition for Fire Hazard

The Monroe County comprehensive hazard analysis has identified four major categories of fires within the county.

Tire Fires

The State of Indiana generates thousands of scrap tires annually. Many of those scrap tires end up in approved storage sites that are carefully regulated and controlled by federal and state officials. However, scrap tires are sometimes intentionally dumped in unapproved locations throughout the state. Monroe County has one approved location for tire disposal and storage, but the number of unapproved locations cannot be readily determined. These illegal sites are owned by private residents who have been continually dumping waste and refuse, including scrap tires, at those locations for many years.

Tire disposal sites can be fire hazards, in large part, because of the enormous number of scrap tires typically present at one site. This large amount of fuel renders standard firefighting practices nearly useless. Flowing and burning oil released by the scrap tires can spread the fire to adjacent areas. Tire fires differ from conventional fires in the following ways:

- Relatively small tire fires can require significant fire resources to control and extinguish.
- Those resources often cost much more than Monroe County government can absorb compared to standard fire responses.
- There may be significant environmental consequences of a major tire fire. Extreme heat can convert a standard vehicle tire into approximately two gallons of oily residue that may leak into the soil or migrate to streams and waterways.

Structural Fires

Lightning strikes, poor building construction, and building condition are the main causes for most structural fires in Indiana. Monroe County has a few structural fires each year countywide.

Wildfires

Approximately 25% of Monroe County's land base is heavily wooded or forested. When hot and dry conditions develop, forests may become vulnerable to devastating wildfires. In the past few decades an increased commercial and residential development near forested areas has dramatically changed the nature and scope of the wildfire hazard in Monroe County. In addition, the increase in structures resulting from new development is a strain to the effectiveness of the fire service personnel in the county.

Arson

It is important to note that arson is a contributing factor to fire-related incidents within the county. According to the United State Fire Administration, approximately 22% of the total fires reported from 2001-2002 were of incendiary or suspicious nature.

Previous Occurrences for Fire Hazard

There have not been many structural or tire fires with a significant number of deaths or injuries. Table 4-40 lists significant recent arson events.

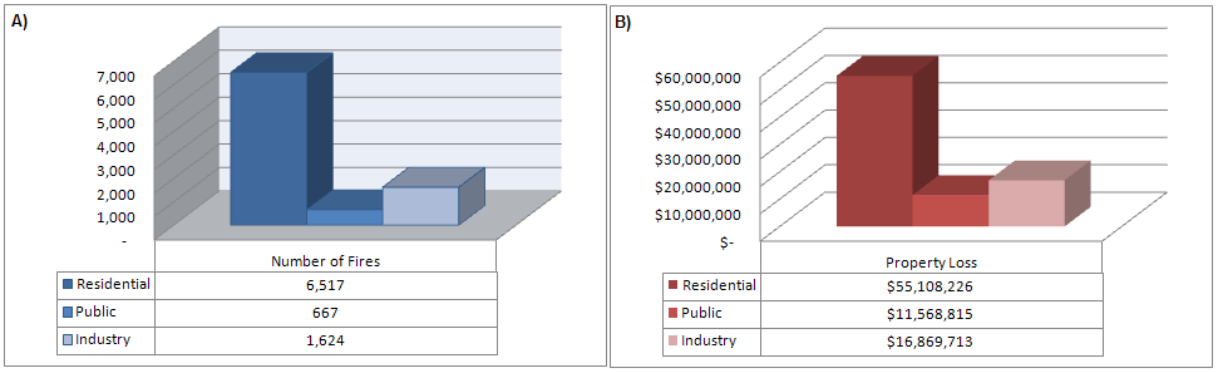
Table 4-40: Significant Arson Events in Monroe County

Year	Description
2002	The Sims Poultry Factory was set on fire by terrorists. Incendiary devices were used in the incident, but no deaths or injuries occurred during this event.
2001	Protestors against a new development by Lake Monroe set fire to two homes under construction. Again, County agencies were fortunate to not have any deaths or serious injuries related to these fires.
2000	Arsonists set fire to and destroyed construction equipment being used to construct the new highways 46 and 37.

Source: Monroe County Hazard Analysis

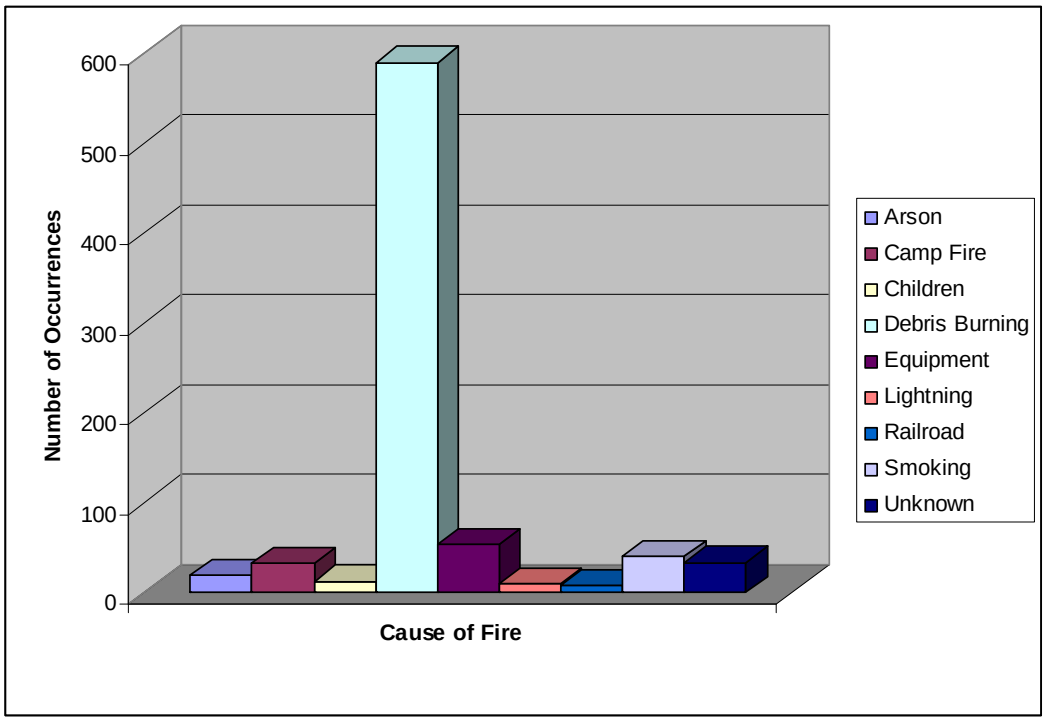
Records of structural fires in the state of Indiana between January 1, 2007 and December 31, 2007 were obtained from the Fire Service Safety and Risk Management department of the Indiana Department of Homeland Security. Figure 4-22 A and B illustrates the numbers of annual structural fires and the associated property loss respectively, categorized by property type.

Figure 4-22: 2007 Indiana Structural Fires



According to the Indiana Department of Natural Resources, there have been 795 wildfires in Monroe County in the past decade. Figure 4-23 displays the data by cause of the fire.

Figure 4-23: Monroe County Wildfires (1998-2009)



Geographic Location for Fire Hazard

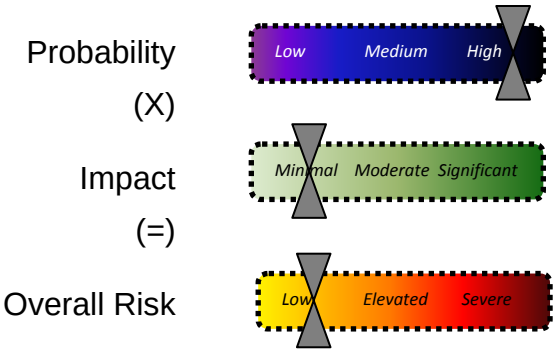
Fire hazards occur countywide and therefore affect the entire county. The heavily forested areas in the county have a higher chance of widespread fire hazard.

Hazard Extent for Fire Hazard

The extent of the fire hazard varies both in terms of the severity of the fire and the type of material being ignited. All communities in Monroe County are affected by fire equally.

Risk Identification for Fire Hazard

Based on historical information, the probability of a fire is high. In Meeting #2, the planning team determined that the potential impact of a fire is minimal; therefore, the overall risk of a fire hazard for White County is low.



Vulnerability Analysis for Fire Hazard

This hazard impacts the entire jurisdiction equally; therefore, the entire population and all buildings within the county are vulnerable to fires and can expect the same impacts within the affected area.

Table 4-5 lists the types and numbers of all essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

The building exposure for Monroe County, as determined from the building inventory, is included in Table 4-6. Because of the difficulty predicting which communities are at risk, the entire population and all buildings have been identified at risk.

Critical Facilities

All critical facilities are vulnerable to a fire hazards. A critical facility will encounter many of the same impacts as any other building within the jurisdiction. These impacts include structural damage from fire and water damage from efforts extinguishing fire. Table 4-5 lists the types and numbers of essential facilities in the area. Critical facility information, including replacement costs, is included in Appendix F. A map of the critical facilities is included in Appendix G.

Building Inventory

A table of the building exposure in terms of types and numbers of buildings for the entire county is provided in Table 4-6. Impacts to the general buildings within the county are similar to the damages expected to the critical facilities. These impacts include structural damage from fire and water damage from efforts to extinguish the fire.

Infrastructure

During a fire the types of infrastructure that could be impacted include roadways, utility lines/pipes, railroads, and bridges. Since the county's entire infrastructure is equally vulnerable, it is important to emphasize that any number of these items could become damaged during a fire. Potential impacts include structural damage resulting in impassable roadways and power outages.

Vulnerability to Future Assets/Infrastructure for Fire Hazard

Any future development will be vulnerable to these events.

Analysis of Community Development Trends

Fire hazard events may occur anywhere within the county, because of this future development will be impacted.

Section 5 - Mitigation Strategy

The goal of mitigation is to reduce the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. The goal of mitigation is to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment, which is provided in Section 4 of this plan. Mitigation should be an ongoing process adapting over time to accommodate a community's needs.

5.1 Community Capability Assessment

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities listed in Chapter 2 of this plan.

5.1.1 National Flood Insurance Program (NFIP)

The county and all of the communities within the county, except Stinesville, are members of the NFIP. Although Stinesville is adjacent to identified flood hazard areas, the town is not located within an identified flood hazard area and has chosen not to participate in the program. The county is currently drafting an agreement with Stinesville that will encourage the town to participate in the NFIP. HAZUS-MH identified approximately 434 households located within the Monroe County Special Flood Hazard Area; 182 households paid flood insurance, insuring $27,050,500 in property value. The total premiums collected amounted to $130,584, which on average was $717.49 annually. As of November 30, 2006, 18 claims were filed totaling $141,877. The average claim was $7,882.08.

The county and incorporated areas do not participate in the NFIP'S Community Rating System (CRS). The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance.

Table 5-1 identifies each community and the date each participant joined the NFIP.

Table 5-1: Additional Information on Communities Participating in the NFIP

Community	Participation Date	FIRM Date	CRS Date	CRS Rating	Flood Plain Zoning Ordinance Adopted Last
City of Bloomington	06/21/74	06/15/78	N/A	N/A	06/24/06
Town of Ellettsville	06/14/74	07/18/85	N/A	N/A	N/A
Monroe County	03/06/81	04/01/88	N/A	N/A	11/24/04
Town of Stinesville	N/A	N/A	N/A	N/A	05/06/09

5.1.2 Stormwater Management Stream Maintenance Ordinance

Monroe County does not have an ordinance dealing exclusively with stormwater management. However, stormwater management and drainage issues are addressed in the Subdivision Ordinance, Chapter 856 - IMPROVEMENT, RESERVATION AND DESIGN STANDARDS. This ordinance was last revised on 1/30/2009.

5.1.3 Zoning Management Ordinance

Zoning codes or ordinances control growth and building in various areas such as floodplains and hazardous operations in populace areas. Monroe County, the City of Bloomington, and the City of Ellettsville have ordinances or town codes which cover land use and zoning. The adoption dates or dates of last revision are presented in Table 5-2.

Table 5-2: Description of Zoning Plans/Ordinances

Community	Comp Plan	Zoning Ord	Subd Control Ord	Erosion Control	Storm Water Mgmt	Burning Ord.	Seismic Ord.	Bldg. Stndrds.
Monroe County	2004	2008	1998	2004	2008	N/A	N/A	2008
Bloomington	2002	2007	2007	2007	2007	1997	N/A	2008
Ellettsville	2008	2008	2008	2006	2003	N/A	N/A	1986

**NOTE: Stinesville is in the process of writing an MOU with Monroe County for the provision of services and the adoption of county ordinances and plans.*

5.1.4 Erosion Management Program/ Policy

Monroe County has an Erosion Control ordinance that was adopted in September 2004. It requires the submission of an erosion control plan for projects involving more than one acre of land disturbance and is designed to control erosion and sediment. Erosion management is identified within the Bloomington City Code; Chapter 24, Division VI – Erosion and Sediment Control and the Ellettsville Town Code; Chapters 152 and 153.

5.1.5 Fire Insurance Rating Programs/ Policy

Table 5-3 lists Monroe County's fire departments and respective information.

Table 5-3: Listing of Fire Departments, Ratings, and Number of Firefighters

Fire Department	Fire Insurance Rating	Number of Firefighters
Benton Township Volunteer Fire Department	5/9	15
Bloomington Fire Department	4	107
Bloomington Township Fire Department	5/9	31
Ellettsville Fire Department	7	8 FT/25 PT/14 Volunteers
Indian Creek Township Fire Department	9	11
Perry-Clear Creek Fire Department	5/9 to 10	37
Stinesville Fire Department	8/7	34
Van Buren Township Fire Department	6/9	30

5.1.6 Land Use Plan

Monroe County has an extensive Land Use Plan which was last amended 12/05/08. Both the Bloomington City Codes and the Ellettsville Town Codes include chapters that address land use issues.

5.1.7 Building Codes

The Building Code of the County of Monroe, Indiana, was revised on 2/12/1999. The county uses the Indiana State Building Code as their guide for Building Standards. Inter-local Cooperative Agreements exist between Monroe County and the cities of Bloomington, Ellettsville, and Stinesville.

5.2 Mitigation goals

In Section 4 of this plan, the risk assessment identified Monroe County as prone to nine hazards. The MHMP committee members understand that although hazards cannot be eliminated altogether, Monroe County can work toward building disaster-resistant communities. Following are a list of goals, objectives, and actions. The goals represent long-term, broad visions of the overall vision the county would like to achieve for mitigation. The objectives are strategies and steps that will assist the communities to attain the listed goals.

Goal 1: Lessen the impacts of hazards to new and existing infrastructure

(a) Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.

(b) Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.

(c) Objective: Minimize the amount of infrastructure exposed to hazards.

(d) Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.

(e) Objective: Improve emergency sheltering in Monroe County.

Goal 2: Create new or revise existing plans/maps for Monroe County

(a) Objective: Support compliance with the NFIP for each jurisdiction in Monroe County.

(b) Objective: Review and update existing, or create new, community plans and ordinances to support hazard mitigation.

(c) Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.

Goal 3: Develop long-term strategies to educate Monroe County residents on the hazards affecting their county

(a) Objective: Raise public awareness on hazard mitigation.

(b) Objective: Improve education and training of emergency personnel and public officials.

5.3 Mitigation Actions/Projects

Upon completion of the risk assessment and development of the goals and objectives, the planning committee was provided a list of the six mitigation measure categories from the *FEMA State and Local Mitigation Planning How to Guides*. The measures are listed as follows:

- **Prevention:** Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.

- **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.

- **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

After Meeting #3, held August 11, 2009, MHMP members were presented with the task of individually listing potential mitigation activities using the FEMA evaluation criteria. The MHMP members brought their mitigation ideas to Meeting #4 which was held September 22, 2009. The evaluation criteria (STAPLE+E) involved the following categories and questions.

Social:

- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:

- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:

- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:

- Is there political support to implement and maintain this action?
- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?
- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:

- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolution in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:

- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?
- What proposed actions should be considered but be “tabled” for implementation until outside sources of funding are available?

Environmental:

- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

The development of the MHMP is the first step in a multi-step process to implement projects and policies to mitigate hazards in the county and the communities in the county. Table 5-4 presents the mitigation actions and projects.

5.3.1 Completed or Current Mitigation Actions/Projects

Since this is the first mitigation plan developed for Monroe County, there are no deleted or deferred mitigation items. Table 5-4 refers to completed or ongoing mitigation actions. Table 5-4 presents the completed and ongoing mitigation actions and projects in the county.

Table 5-4: Mitigation Actions and Projects

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Comments
Install additional warning sirens	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Evaluate and strengthen the communication and transportation abilities of emergency services throughout the county.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Monroe County	This project is underway. Additional sirens may be necessary in the future and funding would be requested from IDHS or the PDM program.
Conduct a study of the fault line under Lake Monroe Dam	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Earthquake, Dam/Levee Failure	Monroe County	This study has been performed.

5.4 Implementation Strategy and Analysis of Mitigation Projects

Implementation of the Mitigation Plan is critical to the overall success of the Mitigation Planning Process. The first step is to decide based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is important. Some actions may occur before the top priority due to financial, engineering, environmental, permitting and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

In Meeting #4, the planning team prioritized mitigation actions based on a number of factors. A rating of High, Medium, or Low was assessed for each mitigation item and is listed next to each item in Table 5-6. The factors were the STAPLE+E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria listed in Table 5-5. For each mitigation action related to infrastructure, new and existing infrastructure was considered. Additionally, the mitigation strategies address continued compliance with the NFIP. While an official cost benefit review was not conducted for any of the mitigation actions, the estimated costs were discussed. The overall benefits were considered when prioritizing mitigation items from High to Low. An official cost benefit review will be conducted prior to the implementations of any mitigation actions.

Table 5-5: STAPLE+E planning factors

S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide a long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

For each mitigation action related to infrastructure, new and existing infrastructure was considered. Additionally, the mitigation strategies address continued compliance with the NFIP. While an official cost benefit review was not conducted for any of the mitigation actions, the estimated costs were discussed. The overall benefits were considered when prioritizing mitigation items from High to Low. An official cost benefit review will be conducted prior to the implementations of any mitigation actions. Table 5-6 presents mitigation projects developed by the planning committee.

Table 5-6: Mitigation Strategies

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Conduct a countywide stormwater study and create a stormwater utility	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flood	Monroe County, Bloomington, Ellettsville, Stinesville	High	The county will seek funding from IDHS to coordinate with the EPA and effectively implement this project. Funding has not been secured as of 2009, but state and federal sources are an option. Implementation will begin within one year.
Institute a buy-out plan for homes/critical infrastructure in the following areas: Stinesville – 7, unincorporated county, Bloomington – 25, Ellettsville – 10	Goal: Create new or revise existing plans/maps for Monroe County Objective: Support compliance with the NFIP for each jurisdiction in Monroe County.	Flood	Monroe County, Bloomington, Ellettsville, Stinesville	High	The County EMA oversees the implementation of the project. Funding has not been secured as of 2009 but will be sought from funding sources such as IDHS. Implementation, if funding is available, is forecasted to begin within one year.
Study the risk for critical infrastructure in detail	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Earthquake	Monroe County	High	The county EMA will work with a corps of engineers to complete this study and determine next steps. State and federal funding will be sought. If funding is available, implementation will begin within one year.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Establish public outreach programs to educate residents on the hazards affecting Monroe County	Goal: Develop long-term strategies to educate Monroe County residents on the hazards affecting their county Objective: Raise public awareness on hazard mitigation.	Tornado, Flood, Earthquake, Thunderstorm, Winter Storm, Hazmat	Monroe County, Bloomington, Ellettsville, Stinesville	High	The County has already begun a program in which it distributes manuals. With the help of schools and healthcare facilities, the County EMA will improve the program to offer more information and reach wider audiences. Local resources will be used for funding. If funding and resources are available, implementation will begin within one year.
Construct safe houses at mobile home parks (see list of locations below); also construct shelters for county recreational parks	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in Monroe County.	Tornado, Thunderstorm	Monroe County	High	The EMA director will work with local shelters to complete this project. The PDM program or local resources are funding options. If funding is available, implementation will begin within one year.
Monroe County Mobile Home Parks: Arlington Valley- 1600 N. Willis Dr. 47404 Country Club Terrace- 3225 S. Rogers St. 47403 E & N Mobile Manor- 900 N. Curry Pike 47404 Garden Hill- 4111 W. Vernal Pike 47404 Heatherwood- 3650 S. Leonard Springs Rd. 47403			Hilltop Meadows Mobile Home Community- 1255 W. Allen St. 47403 Lamplighter Estates- 1700 S. Curry Pike 47403 Lenzy Hayes, Inc.- 5665 W. St. Rd. 46 47404 Longview- 2215 W. 3rd. St. 47403 Mackenzie Park- 2005 S. Rogers St. 47403 Maple Court- 750 S. Walker 47403 Southcrest Mobile Home Manor, Inc.- 315 W. Gordon Pike 47403		
Harden fire stations	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities and structures with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Tornado, Thunderstorm, Earthquake	Ellettsville, Stinesville, Monroe County	High	The county EMA will oversee this project. Funding has not been secured as of 2009, but the PDM program and community development grants are a possibility. If funding is available, implementation will begin within one year.
Purchase backup generators for schools	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Improve emergency sheltering in Monroe County.	Tornado, Thunderstorm, Winter Storm	Monroe County, Stinesville	High	The county EMA will oversee implementation of this project. Funding has not been secured as of 2009, but the PDM program and community grants are an option. If funding is available, implementation will begin within one year.
Install inertial valves at critical facilities	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Retrofit critical facilities with structural design practices and equipment that will withstand natural disasters and offer weather-proofing.	Earthquake	Monroe County, Bloomington, Ellettsville, Stinesville	Medium	The county EMA will oversee implementation of this project. Funding has not been secured as of 2009, but the PDM program and community grants are an option. If funding is available, implementation will begin within three years.
Elevate Mount Tabor Road at Bean Blossom Bridge	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Monroe County	Medium	The county EMA will oversee this project, working with highway departments. INDOT, IDHS, and IDNR are potential funding sources. If funding is available, implementation will begin within three years.
Install a culvert near the Stinesville railroad and upgrade Ellettsville's culverts to be larger	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Flood	Stinesville, Ellettsville	Medium	The County EMA will oversee the implementation of this project. Funding has not been secured as of 2009, but INDOT is a possible funding source. Implementation, if funding is available, will begin within three years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Conduct a commodity flow study	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Hazmat	Monroe County	Medium	Community planners and local government leaders will coordinate this study. Funding will be requested from community grants or IDHS. Implementation will begin within three years.
Complete a study of the problem in the floodplain (Jackson Creek)	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Flooding	Monroe County	Medium	The EMA director will oversee this project. The county will seek help and potential funding from IDHS or IDNR to implement the study. If funding is available, implementation will begin within three years.
Conduct an impact study for potential dam/levee failure (Griffy; Lake Lemon)	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Dam/Levee Failure	Monroe County	Low	The EMA director will oversee this project. The county will seek help and potential funding from IDNR to implement the study. If funding is available, implementation will begin within five years.
Update or create new EAPs	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Dam/Levee Failure	Monroe County	Low	The EMA director will oversee this project. The county will seek help from individual dam owners to implement this project. If funding is available, implementation will begin within five years.
Explore alternate means of emergency notification	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Tornado, Flood, Earthquake, Thunderstorm, Drought, Winter Storm, Subsidence, Fire	Monroe County, Bloomington, Ellettsville, Stinesville	High	The county EMA will oversee this project. Local resources will be used to research various options of communication, e.g. Nixle. If resources are available, implementation will begin within one year.
Verify that local hospitals are equipped to treat multiple types of chemical exposure	Goal: Develop long-term strategies to educate Monroe County residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Hazmat	Monroe County	Low	The planning team will contact local hospitals to determine levels of training in hazmat-related injuries. If additional training is required, local healthcare facilities will be approached for funding. Implementation will begin within five years.
Develop a program to distribute weather radios to all critical facilities and large businesses	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Flood, Tornado, Thunderstorm, Winter Storm	Monroe County, Bloomington, Ellettsville, Stinesville	Low	The county EMA will oversee implementation of this project. Local resources will be used to determine how many radios are needed and when/where to distribute them. Funding has not been secured as of 2009, but the PDM program and community grants are an option. Implementation, if funding is available, will begin within five years.
Develop a program to distribute fans to elderly population	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Equip public facilities and communities to guard against damage caused by secondary effects of hazards.	Drought	Monroe County, Bloomington, Ellettsville, Stinesville	Low	The county EMA will oversee implementation of this project. Local resources will be used to determine how many fans are needed and when/where to distribute them. Funding has not been secured as of 2009, but local resources are an option. Implementation, if funding is available, will begin within five years.

Mitigation Item	Goals and Objects Satisfied	Hazards Addressed	Jurisdictions Covered	Priority	Comments
Conduct training for confined space rescue	Goal: Develop long-term strategies to educate Monroe County residents on the hazards affecting their county Objective: Improve education and training of emergency personnel and public officials	Subsidence	Monroe County	Low	The EMA director will work with local first responders to research possible training. The county will request funding for training and equipment from IDHS. If funding is available, implementation will begin within one year.
Study public structures that are vulnerable and establish a plan for relocation	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Subsidence	Monroe County	Low	The county EMA will oversee this project working with local resources and an engineering firm. Funding has not been secured as of 2009, but local resources are an option. Implementation will begin within five years.
Maintain a system for clearing branches from power lines	Goal: Lessen the impacts of hazards to new and existing infrastructure Objective: Minimize the amount of infrastructure exposed to hazards.	Tornado, Thunderstorm, Winter Storm	Monroe County	Low	The County EMA, municipalities, and utility companies will oversee the implementation of this project. Local and corporate resources will be used to prioritize power lines and clear them. The project is forecasted to be complete within approximately five years.
Develop a debris management plan	Goal: Create new or revise existing plans/maps for Monroe County Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Tornado, Thunderstorm, Flood, Earthquake, Winter Storm	Monroe County	Low	The county EMA and planning commission will coordinate to oversee this project. Local resources will be used to research and write the plan. If resources are available, the project will begin within five years.
Develop an ordinance to require new residential construction to include sprinkler systems	Goal: Create new or revise existing plans/maps for Monroe County Objective: Review and update existing community plans and ordinances to support hazard mitigation.	Fire	Monroe County	Low	The county EMA and planning commission will coordinate to oversee this project. Local resources will be used to research and write the plan. If resources are available, the project will begin within five years.
Develop a database of special needs populations	Goal: Create new or revise existing plans/maps for Monroe County Objective: Conduct new studies/research to profile hazards and follow up with mitigation strategies.	Winter Storm	Monroe County	Low	The county EMA will work with utility companies and healthcare staff to identify the population. Local resources will be used to create the database. Implementation will begin within five years.

The Monroe County Emergency Management will be the local champions for the mitigation actions. The county Commissioners and the city and town councils will be an integral part of the implementation process. Federal and state assistance will be necessary for a number of the identified actions.

5.5 Multi-Jurisdictional Mitigation Strategy

As a part of the multi-hazard mitigation planning requirements, at least two identifiable mitigation action items have been addressed for each hazard listed in the risk assessment and for each jurisdiction covered under this plan.

Each of the four incorporated communities within Monroe County, including the county, was invited to participate in brainstorming sessions in which goals, objectives, and strategies were discussed and prioritized. Each participant in these sessions was armed with possible mitigation goals and strategies provided by FEMA, as well as information about mitigation projects discussed in neighboring communities and counties. All potential strategies and goals that arose

through this process are included in this plan. The county planning team used FEMA's evaluation criteria to gauge the priority of all items. A final draft of the disaster mitigation plan was presented to all members to allow for final edits and approval of the priorities.

Section 6 - Plan Maintenance

6.1 Monitoring, Evaluating, and Updating the Plan

Throughout the five-year planning cycle, the Monroe County Emergency Management Agency will reconvene the MHMP planning committee to monitor, evaluate, and update the plan on an annual basis. Additionally, a meeting will be held during the year 2015 to address the five-year update of this plan. Members of the planning committee are readily available to engage in email correspondence between annual meetings. If the need for a special meeting, due to new developments or a declared disaster occurs in the county, the team will meet to update mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

The committee will review the county goals and objectives to determine their relevance to changing situations in the county. In addition, state and federal policies will be reviewed to ensure they are addressing current and expected conditions. 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 various implementation actions will report on the status of their projects, and will include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

Updates or modifications to the MHMP during the five-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the county commissioners.

The GIS data used to prepare the plan was obtained from existing county GIS data as well as data collected as part of the planning process. This updated HAZUS-MH GIS data has been returned to the county for use and maintenance in the county's system. As newer data becomes available, this updated data will be used for future risk assessments and vulnerability analyses.

6.2 Implementation through Existing Programs

The results of this plan will be incorporated into ongoing planning efforts since many of the mitigation projects identified as part of this planning process are ongoing. Monroe County and its incorporated jurisdictions will update the zoning plans and ordinances listed in Table 5-2 as necessary and as part of regularly scheduled updates. Each community will be responsible for updating its own plans and ordinances.

6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the MHMP. Comments from the public on the MHMP will be received by the EMA director and forwarded to the MHMP planning committee for discussion. Education efforts for hazard mitigation will be ongoing through the EMA. The public will be notified of periodic planning meetings through notices in the local newspaper. Once adopted, a copy of this plan will be maintained in each jurisdiction and in the County EMA Office.

Glossary of Terms

A

AEGL – Acute Exposure Guideline Levels
ALOHA – Areal Locations of Hazardous Atmospheres

B

BFE – Base Flood Elevation

C

CAMEO – Computer-Aided Management of Emergency Operations
CEMA – County Emergency Management Agency
CEMP – Comprehensive Emergency Management Plan
CPRI – Calculated Priority Risk Index
CRS – Community Rating System

D

DEM – Digital Elevation Model
DFIRM – Digital Flood Insurance Rate Map
DMA – Disaster Mitigation Act

E

EAP – Emergency Action Plan
ERPG – Emergency Response Planning Guidelines
EMA – Emergency Management Agency
EPA – Environmental Protection Agency

F

FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Maps
FIS – Flood Information Study

G

GIS – Geographic Information System

H

HAZUS-MH – **Ha**zards **US**A **M**ulti-**H**azard
HUC – Hydrologic Unit Code

I

IDHS – Indiana Department of Homeland Security
IDNR – Indiana Department of Natural Resources
IGS – Indiana Geological Survey

M

MHMP – Multi-Hazard Mitigation Plan

N

NCDC – National Climatic Data Center
NEHRP – National Earthquake Hazards Reduction Program
NFIP – National Flood Insurance Program
NOAA – National Oceanic and Atmospheric Administration

P

PPM – Parts Per Million

S

SPC – Storm Prediction Center

U

USGS – United States Geological Survey

Appendix A – Minutes of the Multi-Hazard Mitigation Planning Team Meetings

Monroe County Pre-Disaster Mitigation Meeting

MEETING #1
Monday, May, 2009 at 9:00AM
Meeting Minutes

Meeting #1 of the Monroe County Pre-Disaster Mitigation (PDM) Committee was held Monday, May 4, 2009 at 9:00AM, at the McCloskey Room, Bloomington City Hall. Those present are listed in the following table.

Name	Organization
John Buechler	The Polis Center
Melissa Gona	The polis Center
Jessica Renn	Monroe County Emergency Management
Jim Comerford	Monroe County Emergency Management
Gregg Zody	Monroe County Planning
Lisa Ridge	Monroe County Highway
Bill Williams	Monroe County Highway
Jim Davis	Town of Ellettsville
Steven Arthur	Indiana University
John Carter	Monroe County Schools
Andrea Roberts	Bloomington City Public Works
Lynne Darland	Bloomington City Planning
Kevin Robling	Bloomington City Legal
Ken Long	Indiana University

The meeting started at 9:00AM. Everyone went around the room and introduced themselves.

John Buechler of The Polis Center welcomed attendees to the first Monroe County Mitigation Plan meeting. He relayed plan details, including the following: There will be a total of 6 meetings spanning a year, at the end of which the team will compile, discuss and review data to be used in the Monroe County Mitigation Plan. In addition, all participants need to keep track of time spent at each meeting and as well as time spent gathering meeting information. The recorded time will be used as credit for the matching-funds requirement.

Pre-disaster mitigation plan information can be accessed and uploaded with a username and password at www.pdmplanning.com.

Next, Melissa discussed the team members' contributions due at meeting three. Representatives are to complete and provide the following items: facility names, correct locations, building replacement costs, number of attending students and the number of beds in the care facilities. The following are members who volunteered to obtain this information:

1. Fire Station Facilities Report – Jim Davis, Chief of Ellettsville Fire Department.
2. Police Station Facilities Report – Jim Comerford/Jessica Renn, Monroe County EMA Office
3. Medical Care Facilities Report – Lisa Ridge, Monroe County Highway Department
4. Communication Facilities- Gregg Zody, Monroe County Planning

5. Schools- John Carter, Monroe County Schools
6. Waste Water Facilities, Kevin Robling, Corporate Council for Bloomington City and Liaison for the Mayor
7. Portable Water Facilities, Kevin Robling, Corporate Council for Bloomington City and Liaison for the Mayor
8. Bus Facilities- Steve Arthur, Indiana University/John Carter, Monroe County Schools
9. Rail Facilities- Bill Williams, Monroe County Highway Department
10. Airport Facilities- Jim Comerford/Jessica Renn, Monroe County EMA Office
11. Care Facilities- Jim Comerford/Jessica Renn, Monroe County EMA Office
12. Dams- Jim Comerford/Jessica Renn, Monroe County EMA Office
13. Emergency Centers- Jim Comerford/Jessica Renn, Monroe County EMA Office
14. HazMat- Jim Comerford/Jessica Renn, Monroe County EMA Office
15. Military Facilities- Jim Comerford/Jessica Renn, Monroe County EMA Office
16. User Defined Facilities- Jim Comerford/Jessica Renn, Monroe County EMA Office

The question was asked that John elaborate on what is meant by mitigation ideas once this plan is complete. He went over examples of some of them and stated that he would send out a booklet on it for everyone to view.

At the close of meeting, John asked members to bring documentation of memorable historical hazards. He also asked that county team members prioritize hazards before the next meeting.

The meeting adjourned at 9:40AM. The next meeting will be held on Monday, June 15, 2009 at 9:00AM in the McCloskey Room at Bloomington City Hall.

Jessica Renn, Administrative Assistant, Monroe County Emergency Management

Monroe County Pre-Disaster Mitigation Meeting

MEETING 2
Monday, June 15, 2009 at 9:00AM
Meeting Minutes

Meeting #2 of the Monroe County Pre-Disaster Mitigation (PDM) Committee was held Monday, June 15, 2009 at 9:00AM, at the McCloskey Room, Bloomington City Hall. Those present are listed in the following table.

Name	Organization
John Buechler	The Polis Center
Melissa Gona	The Polis Center
Jessica Renn	Monroe County Emergency Management
Richie Carter	Town of Stinesville
Jim Comerford	Monroe County Emergency Management
Jim Davis	Town of Ellettsville
Dave Cable	US Army Corp of Engineers-Monroe Lake
John Carter	Monroe County Community Schools
Jason Eakin	Monroe County Planning
Andrea Roberts	City of Bloomington Public Works
Ken Long	Indiana University Risk Management
J. Lynne Darland	City of Bloomington Planning
Lisa Ridge	Monroe County Highway
Rusty Rozelle	Bloomington Hospital

The meeting started at 9:00AM.

John Buechler of The Polis Center gave a short description as to why we are doing a mitigation plan and some mitigation projects. He stated that once you have a plan you can apply for mitigation funds.
He went over what we did in the last meeting as far as everyone's "homework" that they were given to complete.

Next, John discussed risks and hazards. The group went through the information and filled in what needed to be added and changed for Monroe County. The group looked at the County then community to community to see what the risk is or probability or impact. They went over Bloomington, Ellettsville and Stinesville and made some additions and changes.

They also marked a map for significant events to be mapped.

The collected all of the information that was completed from the previous meeting and the next meeting will need to be a public meeting in about 6 weeks.

Monroe County Pre-Disaster Mitigation Public Meeting

MEETING 3
11, August, 2009 at 5:00PM
Meeting Minutes

Meeting #3 of the Monroe County Pre-Disaster Mitigation (PDM) Committee was held, 11, August, 2009 at 5:00PM, at the Common Council Chambers, Bloomington City Hall, Bloomington, IN. Those present are listed in the following table.

Name	Organization
Dave Coats	The Polis Center
Laura Danielson	The Polis Center
Jessica Renn	Monroe County Emergency Management
Richie Carter	Town of Stinesville
Jim Davis	Town of Ellettsville
Andrea Roberts	City of Bloomington Public Works
Lisa Ridge	Monroe County Highway Department
Gregg Zody	Monroe County Planning Department
John Carter	Monroe County School Corporation
Dee Owens	Indiana University
J. Lynne Darland	City of Bloomington Planning Department

Dave Coats of The Polis Center welcomed attendees and told them about the Mitigation Plan. Next, Dave discussed a power point presentation that was put together regarding items that are in the mitigation plan. Each member received a copy of the plan to take with them and view.
At the close of meeting, Dave told the members that the next meeting will be meeting 4.

The meeting adjourned at 6:00PM. The next meeting will be announced at a later date.

Minutes prepared by Jessica Renn, Administrative Assistant, Monroe County EMA

Monroe County Pre-Disaster Mitigation Meeting

MEETING 4
22, September, 2009 at 9:00 AM
Meeting Minutes

Meeting #4 of the Monroe County Pre-Disaster Mitigation (PDM) Committee was held 22, September, 2009 at 9:00 AM, at the McCloskey Room, Bloomington City Hall, Bloomington, IN. Those present are listed in the following table.

Name	Organization
Dave Coats	The Polis Center
Adam Campbell	The Polis Center
Jessica Renn	Monroe County Emergency Management
Jim Comerford	Monroe County Emergency Management
Andrea Roberts	City of Bloomington Public Works
John Carter	Monroe County Community School Corp.
Chris Clouse	Ellettsville Fire Department
Richard Carter	Town of Stinesville
Randy Carter	Town of Stinesville
Gregg Zody	Monroe County Planning Department
Ian Patton	Bloomington Transit
Ken Long	Indiana University
Lynne Darland	City of Bloomington Planning Department

Dave Coats gave a brief summary of why we are at the meeting today and how we got to where we are and how Monroe County was able to do their mitigation plan for those who had never attended a meeting before.

Next, Dave made sure that all of the counties and towns of municipalities were represented at the meeting today. They were all represented.

As a group they walked through the risks and looked at the mitigation strategies that can be linked to those. They made them specific to Monroe County. He advised for them to eliminate low risks if they do not occur here. For the Mitigation strategies the items below are the ones that were discussed:

Flooding:

Buy outs.

- -Stinesville 7
- - County 100's
- - Bloomington 25 homes
- - Ellettsville 10 homes

Some of these are not only residences but are critical infrastructures as well.

- **Jackson Creek**- could do a study of the problem in the flood plain.
- **Stinesville-** Railroad culvert
  Fix problem for more than ½ the homes in a flooding event.
- **Ellettsville-** Bigger culverts
  Emergency Personnel can't even get in to where needed at times.
- Elevate Mt. Tabor Rd. at Bean Blossom Creek (Bottom Rd. area)
- Create County wide storm water utility
- County wide study partnering with Bloomington, Stinesville and Ellettsville

Tornado:

Public Awareness

- 10 new sirens in next year (in works)
- Want additional sirens and maintenance
- Alternate ways to alert people (communication)
  (More weather alert radios where mass quantities of people gather)
  (More practice on drills)
  (Safe rooms for Trailer Parks/Shelters)
- Harden fire stations
  Ellettsville Station #8
  Stinesville Station #6
  Engineering study for others
- Back up generators

Dam/Levee Failure:

- Lake Monroe
- Lake Griffy Dam- Impact study
- Lake Lemon- Impact study
- (Bryants Creek)
- Notification System

Earthquake:

Public Awareness

- Risk Assessment of critical infrastructure
- Installation of Inertial gas valves

Subsidence:

Public Awareness

- Look at possible re-location

Severe thunderstorm:

Public Awareness

- Maintain utility easements
- Communication system
- Debris Management Plan

Winter Weather Storms:

Public Awareness

- Formalize plan for special populations
- Generators sites that are going to be shelters which are typically going to be schools

Drought/Heat:

Public Awareness

- Fans for elderly
- People die from heat

HazMat:

Public Awareness

- Share information
- Enhanced communication
- Commodity flow study

Structural Failure/Fires:

Public Awareness

- New construction residential sprinklers

At the close of meeting, Dave told the group what the next meeting should be like. It is a meeting at our convenience once we get the list back from the Polis Center. At that meeting our committee takes ownership of the plan and we need to go through it for any changes or additions. Once we agree after meeting 5 the plan is then submitted to the Indiana Department of Homeland Security whom then takes it and submits it to FEMA and once they have approved it we then take it to our community and town board as well as the county for adoption. They will have a formal resolution. Then we can talk to Jan Crider at the Indiana Department of Homeland Security to get proposals together to work on getting projects funded.

The meeting adjourned at 10:30AM. The next meeting will be announced at a later date.
Minutes prepared by Jessica Renn, Administrative Assistant, Monroe County EMA

Monroe County Pre-Disaster Mitigation Meeting

MEETING # 5
Tuesday, December 1, 2009 at 9:00AM
Meeting Minutes

Meeting #5 of the Monroe County Pre-Disaster Mitigation (PDM) Committee was held Tuesday, December 1, 2009 at 9:00AM, at the Health Department Meeting Room, Health Services Building. Those present are listed in the following table.

Name	Organization
Jim Comerford	Monroe County Emergency Management
Richard Carter	Bean Blossom Township FD/Stinesville
Ken Long	Indiana University
Lisa Ridge	Monroe County Highway Department
Andrea Roberts	City of Bloomington Public Works
Vickie VanDeventer	Bloomington Hospital
John Carter	Monroe County Community School Corp.
Lynne Darland	City of Bloomington Planning Department
Ian Patton	Bloomington Transit
Gregg Zody	Monroe County Planning Department

Jim Comerford called the meeting to order at 9:00AM.

To start off of the meeting on Page 6 Table 1-1 Lynne Darland indicated that Tom Micuda wanted Lynne's name to replace his on the planning team since she has been the one coming to all of the meetings. Please change.

Jim stated that they were going to go around the table for changes, corrections and questions.

Richie Carter had nothing at this time because he was unable to access the plan online. He took a printed copy and is going to go over it and pass corrections, etc…on to Jessica after he and his father go over it.

Jim Davis brought up the fact that we had a mitigation items as 'shelters for mobile home parks'. He believes that county/city parks and other open area venues should be added. The county parks have already asked about getting shelters for Karst Farm Park, etc…

The Stinesville flood pain situation was brought up. They are doing this by adopting the county flood plain plan so Gregg Zody is going to get EMA the information for complete the chart. (Table 5-1)

Ken Long mentioned the following changes:

Page 110- In paragraph above chart it should start with 'Meeting #2'. Currently it starts with 'Meeting #1'.

Page 108- Attendance should include 'Ken Long- Indiana University'. Ken states that he did attend that meeting.

Page 92. Figure 4-23 Title should say "Monroe " instead of "White".

The question was brought up if city and county government should be listed in "Major Employers"? City and County Employee numbers were sent to Polis.

Andrea Roberts had the following changes:

Page 14: 4.2.1 Question section 4.2.1 has no verbage? (appears to a title with the verbage being the subsections under it??)

Page 32: Table 4-14 Believes the word 'County' should be added after the 'Monroe' in all lines to be sure Monroe is not mistaken for a city or town.

Page 57: Table 4-27 Is 'Blmngtn Monroe Co Ar' the airport? Yes

Page 61: Weather Events Chart. Andrea asked if 'Yellowstone' existed or was it a typo for Yellow Wood.

Page 64: Table 4-30 Same thing on airport at Page 57.

Page 61: Table 4-29 Question raised if "Yellowstone' existed in Monroe County. Jim Comerford checked Google and it does exist off SR446 along Hunters Creek.

Vickie VanDeventer had the following suggested changes:

Questioned if this mitigation plan is for Natural Disasters only. No man made disasters included (chemical,etc…). Ken Long stated it was presented as Natural disasters only. Vickie asked if we were later going to have to do a mitigation plan for other items or if they are covered some other way. Vickie feels like not including other hazards leaves the plan lacking.

Other attendees had no corrections or the corrections were brought up before their turn came to them.

Ken Long suggested that we all review pages 100-104. Everyone agreed. After reading, the following items were discussed:

Page 101: It was questioned if we should change mitigation item: 'harden fire stations, Ellettsville Station #8, Stinesville station #6 and just make it 'harden fire stations' so we are not locked into only those stations. The group agreed that we should change it if it is possible.

Page 101: Elevate 'Mt. Tabor Road Bean Blossom Bridget' should not have a 't' on the end.

Page 102: Item 'Explore alternate means of emergency notification'. The group believes that she be elevated to a 'high' priority. This was placed on the corrections list.

Page 104: Section 6.1 First paragraph states meeting 'February 2015' for 5yr update. Does that date need adjusted based on the approval of our plan?

Ian Paton is going to get Carlisle Brake year for table 3-3 to EMA.

It was questioned why there is no Stinesville flood plain mapping. Gregg suggested it might be because they previously had chosen not to participate. Now that they are the maps may need to be added.

The meeting adjourned at 10:15AM.

The next meeting will be announced at a later date.

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Minutes Prepared by Jessica Renn, Administrative Assistant, Monroe County EMA

Appendix B – Articles published by Local Newspaper

http://www.heraldtimesonline.com/stories/2008/06/07/digitalcity.qp-3829396.sto

Financial harm, project effectiveness need attention: www.heraldtimesonline.com

6/7/2008

While it's fortunate that no serious bodily injuries were reported in Wednesday's flash floods in Bloomington, the financial harm is still quite painful.

Hundreds of homes, businesses and vehicles sustained water damage that will be costly to repair. Insurance will be a help to many, but thousands of
out-of-pocket dollars will be spent as a result of the flood. Who can afford that in an already tight economy?

Mayor Mark Kruzan announced Thursday he would seek help from the state in assisting local citizens and businesses with the expenses of the
clean-up. The Monroe County Emergency Management Department provided information to the state in hopes of obtaining some funds.

The effort paid off. On Friday, Gov. Mitch Daniels declared Monroe and all other counties in the H-T circulation area — Morgan, Owen, Greene,
Lawrence and Brown — disaster areas.

In addition to that, city officials also must be aggressive and transparent in determining how successful the 2000 "Big Dig" project was in dealing with
the deluge.

First impressions are lousy, since businesses in the area where the dig occurred were among the hardest hit by flooding.

Judgment should be withheld until all data about this storm are in, but the community certainly deserves to know whether the $2.8 million stormwater
project really paid off.

Aside from emergency, snow hasn't taken much financial toll: www.heraldtimesonline.com

So far, Monroe County has spent $262,000 on snow and ice control

by Michael Koryta
Hoosier Times
2/13/2005

With the exception of one severe storm, local highway departments are reporting the winter has not been too costly — yet.

"If winter were to end now, this wouldn't have been too bad for us," said Monroe County Highway Superintendent John Chambers.

Chambers said that so far this winter, the county highway department has spent $262,000 on snow and ice control. Trucks have applied 8,300 tons of
salt and sand mixture during 13 different winter events.

In some years, the highway department has had to spend more than $400,000. Since the department doesn't have a specific snow and ice control
budget, all that money comes out of cash that could have been used for maintenance projects in the summer. The good news this year, Chambers
said, is that the county will likely receive some federal assistance.

"We are probably receiving about $80,000 of that back from FEMA (Federal Emergency Management Agency) for the snow events on Dec. 21 and
22," he said. "We get that back because it was declared a snow emergency."

That brings up an interesting question: How exactly is a snow emergency defined, and who makes the call?

According to Chambers, the snow emergency has to be declared by the state government before federal funds can be accessed.

"The governor has to apply to the president for aid," he said.

When it comes to setting travel limitations during a storm, however, each county is responsible for itself. In Monroe County, an emergency declaration
is made after discussion between the county emergency management office, county highway department, police and county commissioners.

John Hooker, the Monroe County emergency management director, said an advisory council is meeting Tuesday to consider changing the county's
approach to snow emergencies.

"The ordinance we have now is kind of a lengthy and confusing ordinance, and what the commissioners have asked me to do is have my emergency
management advisory council look at revising it and breaking it down to levels," Hooker explained.

The advisory council will use Henry County's system as a model. Henry County uses three levels of road warnings, beginning with a caution advisory
and advancing to an emergency state in which only emergency travel is allowed on the roads.

While the county should receive federal assistance for this winter, it will be tougher to do so next year. Hooker said the previous year's one-day
snowfall high must be exceeded before federal funds can be claimed.

"If we had 18 inches of snow in one day this year, then next year we'd have to exceed that before we got any reimbursement," he said, referring to the
pre-Christmas snowstorm that hit Bloomington.
Chambers pointed out that pothole repair is another major expense for his department every spring. Monroe County has weight limits for certain roads
during the spring freeze-and-thaw period when potholes are most likely to begin.
"We're asking overweight vehicles to stay off these certain roads," he said. "That period began Feb. 3 and lasts 90 days."
The roads are posted, and a list is also available. It's a serious financial risk to try sneaking an overweight vehicle across — tickets for such an
offense are $500.
Chambers said he appreciates truck drivers following the rule, and said it saves the county a lot of money.
"It makes all the difference in the world," he said. "When we get heavy trucks just constantly pounding some of our local roads, they can destroy a road
in a matter of days."
Restricted roads
The following roads are covered by a Monroe County ordinance that restricts the weight of vehicles on the roads from Feb. 3 to May 3. Vehicles that
exceed the posted eight-ton weight limit on the roads during that time are subject to a $500 penalty.
The roads are:
Kirby Road; Airport Road; Bunger Road; Leonard Springs West; Fullerton Pike; Chapel Hill Road; Guthrie Road; Garrison Chapel Road; Gardner
Road; Eller Road; Gifford Road; Cave Road; Victor Pike, south of Victor Oolitic Quarry; Low Gap Road; Harmony Road; and Evans Road.

Counties declaring snow emergencies: www.heraldtimesonline.com

AP
12/23/2004
Officials in the following Indiana counties had declared snow emergencies by Thursday: Bartholomew, Clark, Crawford, Daviess, Dearborn, Decatur,
Delaware, Dubois, Fayette, Floyd, Franklin, Gibson, Greene, Harrison, Henry, Jackson, Jennings, Johnson, Knox, Lawrence, Madison, Martin,
Monroe, Ohio, Orange, Owen, Perry, Pike, Posey, Putnam, Rush, Scott, Shelby, Spencer, Switzerland, Union, Vanderburgh, Warrick, Washington,
Wayne.

Sources: Indiana governor's office.

Tornado recovery moves into second phase: www.heraldtimesonline.com

Tornado: Aftermath
By Michael Koryta
Herald-Times Staff Writer
9/30/2002
ELLETTSVILLE — The initial shock from the tornadoes that devastated Ellettsville 10 days ago has passed, but plenty of hard work remains.
"We're moving into the second phase of the recovery effort now," said Ed Vande Sande of the American Red Cross.
"Now the adrenaline has worn off, but we need to concentrate and stay coordinated to make sure every affected homeowner gets the assistance to
which they are entitled."
Over the weekend, teams of volunteers continued working to clear debris and repair damage from affected neighborhoods.
"The solid waste management district recruited a great many volunteers, churches were involved, and local individuals came out to help," Vande
Sande said. "They went out to the remote areas and did whatever they could to improve things. It was just great to see neighbors helping neighbors
like that."
The Red Cross Damage Center remains open on West Temperance Street in a room donated to the effort by Dr. Kent Guzik, an Ellettsville
chiropractor.
"Dr. Guzik graciously donated the space to us, and we'll keep the center open again this week and for as long as a need for it remains," Vande Sande
said.
The Red Cross will have additional help this week. Following the President Bush's declaration of the area as a disaster site last week, workers from
the Federal Emergency Management Agency have been dispatched to aid in the recovery effort.
"It's important that everyone who needs aid registers with the Red Cross and FEMA so they receive that aid," Vande Sande said. "We'll have a lot of
resources here this week, so we want the local people to get all the help we can give them while those resources are present."
Vande Sande said that out of the 67 homes that were completely destroyed or damaged to the point that they became uninhabitable, 22 families have
yet to register for aid.
"If they don't want our assistance, they don't have to have it," he said, "but we want to be sure everyone is aware of the assistance the Red Cross and

FEMA can provide."
Vande Sande said he has been repeatedly impressed with the response of the community during the recovery effort.
"I know it is a cliché, but this really has brought out the best in the community," he said. "We've had such a terrific response from people, it's been just
incredible to see."

Reporter Michael Koryta can be reached by phone at 349-1430 or by e-mail at mjk@heraldt.com.

Tornado cleanup: www.heraldtimesonline.com

By Katy Murphy
Hoosier Times
9/22/2002

Ellettsville
A state of emergency was declared in central and southern Indiana by Gov. Frank O'Bannon Saturday as emergency workers and volunteers began
efforts to restore order following Friday's tornado.
The declaration is the first step in securing federal assistance for cleanup and rebuilding efforts. Federal Emergency Management Agency (FEMA)
representatives were expected to be in the Ellettsville area and other parts of Indiana Monday to assess damage to public buildings and structures.
Backhoes, excavators, cranes and dumptrucks dominated the Ellettsville landscape Saturday. Countless agencies pooled their resources to begin the
cleanup and make sure displaced residents had what they needed.
In Monroe County, no one was hurt by the storm, but it racked up millions of dollars in damages. The National Weather Service Saturday classified the
tornado as an F3, which means it had winds of 158 to 206 mph.
As of Saturday evening, the Red Cross had documented 151 damaged buildings in the Ellettsville area. Twenty-one housing units were destroyed; 36
were uninhabitable and 94 sustained minor structural damage, according to Ed VandeSande, director of emergency services for the Monroe County
Chapter of the American Red Cross.
O'Bannon viewed the debris from a helicopter Saturday, as he flew in to meet with officials about the disaster.
"He was very receptive to us," said John Hooker, emergency management director for Monroe County.
Those involved in cleanup efforts Saturday were thrilled by the streamlined cooperation of the effort and the progress being made.
"Yesterday was three times worse than it is today," Ellettsville Police Chief Ron McGlocklin said.
In the area near Reeves Street alone, crews removed more than 40 truckloads of tree debris that leaned upon houses, rested on roofs and powerlines
or stretched across roads.
The Ellettsville Utilities Department kept an eye on underground water lines. The Monroe County Highway Department built a gravel road off Walker
Lane so a quarry could be used as an emergency landfill for tree debris.
Firefighters, who had searched through rubble for possible survivors Friday, focused on fallen powerlines and gas leaks Saturday. They also dealt with
more repugnant details.
"Spoiled food is an issue," Ellettsville Deputy Fire Chief Mike Cornman said.
Cinergy line workers from all over the state replaced damaged powerlines, transformers and posts to restore power to the area. About 4,200 Cinergy
customers in Monroe County lost power after the storm. At 10:30 p.m. Saturday, only five were still without power, according to Cinergy spokeswoman
Angeline Protegere. She said she believed everyone would have service before midnight.
Ellettsville and Monroe County police stood guard around the damaged areas, ensuring that no looters would scavenge the property of the displaced.
"We haven't made any arrests, but we basically ran them out," McGlocklin said about a few suspicious people lurking in the area.
While many agencies worked to restore the physical environment to normal, Red Cross volunteers focused on the people affected.
St. John the Apostle Catholic Church provided food, counseling and shelter both Friday and Saturday night, and set up a service center Saturday,
VandeSande said.
He said Red Cross volunteers met with 16 families Saturday to address their needs. Red Cross financial assistance will help fill in the gaps of
insurance coverage to provide food, medicine, eyeglasses, rental assistance — "whatever is needed to help them get back on track to recovery,"
he said.
The service center will be open from 10 a.m. to 6 p.m. today and Monday at St. John's Church. The number is 876-1974.
VandeSande said he realizes many people in need may not make it to the church. The Red Cross established mobile units of family case workers who
will go door-to-door to reach more people in need. All Red Cross assistance is free of charge.
"There's no reason for people to be sleeping in a car because their house is gone," he said.
Associated Press contributed to this report.

http://www.heraldtimesonline.com/stories/2008/01/26/news.qp-5343139.sto

Remembering the Blizzard of '78: www.heraldtimesonline.com

Thirty years ago today, Indiana was in the grip of the storm of the century

By Andy Graham
331-4346 | agraham@heraldt.com

1/26/2008

Not only did Indiana University cancel classes for the first time in 35 years, it closed its Bloomington campus for the first time in recorded history.

Recorded history had never seen anything quite like the Blizzard of 1978.

It began late on Jan. 25, continued into Jan. 27, and supplied the lowest non-hurricane-related barometric pressure ever measured in the United

States: 28.28 inches.

“Normal barometric pressure is about 30 inches (1,116 millibars),” said Dave Tucek, a National Weather Service meteorologist in Indianapolis. “Strong

winter storm systems, maybe once or twice a winter, get to around 980 millibars. Weaker systems are around 1,000. The 1978 blizzard went to 958.”

Up to 40 inches of snow fell in some areas of northern Indiana, and South Bend’s 36 inches was the highest total reported for a Hoosier city.

Indianapolis got a single-day record of 15.5 inches on the 26th which, combined with snow already on the ground before the storm arrived, made for a

20-inch snow cover.

The Indiana State Climate Office has no recorded snow totals for Bloomington, but Martinsville is listed as having gotten 13.5 inches when the storm

hit while Bedford received 6.5 inches for an actual ground cover of 12 inches. But it wasn’t the snowfall itself but the drifting that really mattered.

Howling winds, exceeding hurricane force in many places and peaking at 111 miles per hour over Lake Erie, created drifts that reached and exceeded

20 feet, covering houses and cars. Temperatures plunged to or below zero, and wind chills reached minus 50 in Indianapolis.

And it was all followed up by one of the coldest Februaries on record.

The blizzard was resulted from the combination of two intense low pressure systems, one sweeping in from the Northern Plains and another coming

up from the Gulf of Mexico, colliding over Indiana near midnight on the 25th.

The Midwest was about to meet its weather Waterloo.

“These systems are called fronts, which stems from military terminology — from the front lines on a battlefield, with masses of troop movements

documented on a map — because meteorology developed in part in the service of military campaigns,” said Ken Scheeringa, associate state

climatologist. “In the case of the 1978 event, two fronts, two pressure centers, converged and the timing was just right.

“Timing is everything, the key to a severe event like that. Even this month, in the last few weeks, we’ve had tremendous potential for snowfall but it

didn’t happen because the low pressure system filled with moisture speeded up and got too far east before the front bearing the cold air arrived. Back

in 1978, it was like two large armies merging, and becoming an exponentially stronger force.”

Other, more recent storms have packed a punch — a 2004 system dumped 29 inches of snow on Scottsburg and 19.3 on Evansville — but none has

had the ferocity of the Blizzard of ’78.

Winter records

Indianapolis, January 1978

Most snowfall from a single storm: 15.5 inches

Deepest snow ever: 20 inches

Most snowfall ever in a month: 30.6 inches

Source: National Weather Service, Indianapolis

The 1978 blizzard by the numbers

From records for Indianapolis

Snowfall total: 15.5 inches

Maximum snow depth: 20 inches

Peak wind gust: 55 mph

Low temperature: Zero degrees

Low wind chill (current formula): 30 degrees below zero

Duration of significant snowfall: 31 hours

Maximum drifts: up to 20 feet

Lowest observed pressure, Indianapolis: 29.04” (983.4 millibars)

Source: National Weather Service, Indianapolis

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http://www.heraldtimesonline.com/stories/2008/01/26/news.qp-5343139.sto

People dig out of the snow in Van Buren Park Estates two days after the storm.
Phil Whitlow | H-T file photo

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http://www.heraldtimesonline.com/stories/2008/06/09/news.qp-3948310.sto

Flooding recovery: Assessing damage, seeking assistance: www.heraldtimesonline.com

State officials tour Bloomington, Monroe areas hit Wednesday; damage reports key to aid

By Nicole Brooks
331-4232 | nbrooks@heraldt.com

6/9/2008

State officials arrived in Bloomington Monday to start assessing flood damage. The job will take at least until today to finish.

A second assessment team may even be summoned today, according to Mayor Mark Kruzan. So far, there is no report estimating the extent of flood damage.

Indiana Department of Homeland Security emergency management officials arrived Monday at the request of Monroe County Emergency Management Director John Hooker to tour areas of the city and county affected by last week's flash flooding, and to start preliminary damage assessment.

Kruzan and Assistant Director of Economic Development for Small Business Advocacy Adam Wason led a state team, headed by Tom Shoaff, senior fire and building inspector for IDHS, on rounds through numerous businesses on Kirkwood Avenue, South Walnut Street and West 17th Street.

Walking through Winters Associates, Mother Hubbard's Cupboard, Cafe Pizzaria and many other businesses, the IDHS crew realized the storm damage was more widespread than state officials had known, Kruzan said.

"They now better understand that damage is not isolated to one pocket of the city, but that we had many mini-disasters that need to be tended to as soon as possible," he said.

Perhaps due to the dry, warm weather in Bloomington over the weekend — unlike that of Greene, Owen and other nearby counties — the area was pushed to the back burner.

"I want to make sure the state and eventually federal government understand that even though Bloomington isn't under water today, there is significant damage from the floodwaters of last week," Kruzan said Monday.

Hooker accompanied the IDHS team to other parts of the county.

"Today, we went up to Stinesville and went through all the homes up there, and talked to a lot of residents," he said. "(IDHS) came back and said 'we're going to have to put a game plan together.'"

State, county and city officials are working together to create a database of the location and extent of damage left in the wake of recent storms.

City government is assessing damage to its own property and infrastructure so that those dollar amounts can be included in the coordinated total damage assessment, Kruzan said. The city intends to include property damage totals from Indiana University.

"We all want to know the what, how and when of disaster assistance," he said.

This information can eventually be translated into assistance funds, Hooker said.

"They (IDHS) want to get the numbers to FEMA."

The Federal Emergency Management Agency provides two types of assistance, individual and public, in disaster situations.

While 29 counties were declared disaster areas Sunday, including Bartholomew, Brown, Greene, Lawrence, Monroe, Morgan and Owen, only public funds have been made available.

This money can assist state and local governments and certain private nonprofit organizations, according to the FEMA Web site.

In other areas still under water, FEMA has about a half dozen incident management assistance teams working in cooperation with IDHS, according to FEMA spokesman Leo Skinner. IMAT teams are small mobile teams that can offer materials and resources during floods, such as drinking water, roofing materials, generators and so on.

FEMA began aiding the state on Saturday, when teams showed up in Indianapolis and Morgan County. Skinner did not have specific numbers available for the number of FEMA employees currently in Indiana.

Skinner added that additional employees could be sent to affected areas to offer support if necessary.

"We will have enough employees to get the job done," he said.

Reporter Joe Livarchik contributed to this story.

Call it in

Monroe County Emergency Management Agency Director John Hooker and the Monroe County commissioners are urging all city, town and county residents to call and report flood damage.

Call 349-2533 between 8 a.m. and 4 p.m., Monday through Friday, and be prepared to provide your name, address, telephone number and a description of the damage your residence or property suffered, from cracked foundation to soiled carpet. You may also be asked if you have homeowners and flood insurance.

If you get a recording, leave the information, and a person will call to verify it, Hooker said.

Report damage to crops promptly

Farmers with damaged crops or who are unable to plant because of the recent flooding need to report the loss by July 15 to the Farm Service Agency.

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http://www.heraldtimesonline.com/stories/2008/06/09/news.qp-3948310.sto

Call the FSA office at 334-4323 or 800-972-3276 to schedule an appointment to report your loss. The office services Monroe, Owen and Brown
counties.
Farmers must do this within 15 days after noticing crop damage or the inability to plant. June 5 was the final planting date for corn and June 20 is for
soybeans. Late fees will apply if crops are reported after the July 15 deadline.
Salvaging photos, documents, books
The Indiana State Archives in Indianapolis is providing the following information to assist in minimizing the damage from the flooding this past
weekend.
State Archivist Jim Corridan has established a special phone line at the State Archives to aid local governments attempting to salvage official
government records, 317-591-5220, ext. 376. Additional information is available from the Indiana Commission on Public Records' Web site at
www.in.gov/icpr.
The site has information on dealing with flood-damaged pictures, documents and books.

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http://www.heraldtimesonline.com/stories/2009/08/06/news.qp-9079924.sto

Fairfax beach closed due to high water; hundreds still without power: www.heraldtimesonline.com

H-T Report
8/6/2009

Only a few hundred homes remained without power in Monroe and Brown counties tonight, two days after torrential rains and high winds left
thousands in the dark.
For Duke Energy customers, only one home was listed without electricity in Monroe County as of 10:30 p.m. on Duke's Web site, and no one in Brown
County was without service. Duke officials have said it might take until Friday to restore all power connections.
If you're still without power, call Duke Energy toll-free at 800-343-3525.
Over in Brown County, the storm caused a loss of power at the water plant and customers there remain under a boil order. Residents can check out
the status of the boil order online at www.browncountywater.com.
And around the area, South Central Indiana REMC crews continued to work to restore electricity to members as well, saying many of the outages
were caused by trees falling on power lines.
Tonight, REMC's Web site showed 925 customers still without service in Brown County, 228 in Owen, 136 in Morgan and 14 in Monroe at 10:40 p.m.
To notify REMC if you're still without power, call the cooperative toll-free at 800-264-7362.
Tuesday's storm also has caused Lake Monroe's Fairfax beach to be closed due to high water until further notice.
Lieber State Recreation Area remained without power late Thursday, and the boat ramp will be closed until Tuesday at Falls of the Ohio State Park.
EARLIER
5:10 p.m.
Tuesday's storm also has caused Lake Monroe's Fairfax beach to be closed due to high water until further notice.
Lieber State Recreation Area remained without power late today, and the boat ramp will be closed until Tuesday at Falls of the Ohio State Park.
2:20 p.m.
Only a few hundred homes remained without power in Monroe and Brown counties today.
About 220 homes were without electricity in Monroe County as of this afternoon, while about 200 homes in Brown County were without service,
according to Duke Energy. Duke officials have said it may take until Friday to restore all power connections.
If you're still without power, call Duke Energy toll-free at 800-343-3525.
Over in Brown County, the storm caused a loss of power at the water plant and customers there remain under a boil order. Residents can check out
the status of the boil order online at www.browncountywater.com.
And in the area, South Central Indiana REMC crews continued to work to restore electricity to members as well, saying much of the outages were
caused by trees faling on power lines.
To notify REMC if you're still without power, call the cooperative toll-free at 800-264-7362.
10:37 a.m.
Crews continue to work today to restore electricity to about 2,000 South Central Indiana REMC members. Torrential rains and high winds caused
power outages to more than 17,000 REMC members on Tuesday.
"The ongoing outages were mostly caused by trees falling on power lines," vice president of engineering Jack Hubbard said in a news release. "Power
has been restored to more than 15,000 of our members since Tuesday. The worst of the damage occurred in the Bean Blossom area of Brown

County. We are working with extreme circumstances to restore power in that area. In some cases, we have to replace poles that have snapped in two
and replacing them with new ones, removing trees and debris to get to the lines is a slow process. We also care about the safety of our employees,
and want to be sure they have safe access to do their job. We ask our members for their patience and understanding so that we can restore power in
a safe manner."
SCI is receiving assistance from five Indiana REMCs including United, Northeastern, Wabash and Miami- Cass REMCs, three Hoosier Energy Crews
and two contract crews.
Hubbard said REMC officials anticipate restoral of outages in other service areas — Morgan, Monroe and Owen — by late today.
He said customers may reach the company's automated voice response system due to he volume of calls coming in to the office. Members should
stay on the line and give the information that is prompted. Once service is repaired, South Central Indiana REMC's interactive voice response system
will make call backs to homes to let them know service has been restored.
If service is not restored, notify the cooperative by calling 800-264-7362.
9:34 a.m.
More than 930 households are still without power in Monroe County this morning, according to Duke Energy.
The company also reports 27 households in Brown County remain without power, and about 100 households in Morgan County are still in the dark.
Duke Energy officials said have said it could be Friday before power connections were completely restored after a severe line of thunderstorms swept
through the area Tuesday.

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http://www.heraldtimesonline.com/stories/2009/08/06/news.qp-9079924.sto

Brown County lost power at its water plant and water customers there remain under a boil order. Residents can check out the water supply status
online at www.browncountywater.com.
EARLIER: Thousands still without power today; could be Friday before all power restored

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http://www.heraldtimesonline.com/stories/2009/01/29/news.qp-4111957.sto

Digging out: Foot of snow prompts emergency declaration: www.heraldtimesonline.com

Many schools out today; roads could still be hazardous

H-T Staff Reports
1/29/2009

With closings already announced for MCCSC and Richland-Bean Blossom school districts today, some Monroe County residents are ready for another
day at home.
Officials decided to keep schools closed again today because some county roads and sidewalks were still not clear of snow.
"We need another day to dig out," Mike Scherer, Monroe County Community School Corp. director of extended services, said Wednesday night.
Another possible problem is the accessibility of contract buses that may be buried in snow. The contract drivers need time to dig them out.
School is also canceled in Lawrence, Owen, Greene and Brown counties.
Indiana University took a rare day off Wednesday, but classes are back in session today.
State police are advising road conditions today could be quite slick and any travel should be with caution, if at all.
"The wet roads are turning to ice now, even though most of the main roads have been cleared of snow," Sgt. Curt Durnil, public information officer with
the Indiana State Police, said Wednesday evening. "Though there is no snow emergency now, we still really encourage people not to get out. If they
must, then they should definitely allow extra time for taking it slow."
Durnill said Ind. 37 is passable, though in Lawrence County only the right section of each lane is clear.
Most county and secondary roads were somewhat snow-covered, Durnil said about 9 p.m., but the hard work of county employees was showing in
spite of the foot of precipitation. "I have to hand it to those county workers, they simply have not stopped. And even though many of the county roads
are still messy, a lot of hard work has put those roads in much better shape."
Meanwhile, the forecast for today and Friday calls for a decent chance of snow showers and temps under freezing. A 40 percent chance is on the
books for today and a 30 percent chance Friday.
Some folks will no doubt use their time off today to continue digging out from the more than 12 inches of snow that had piled up by Wednesday. That
thick blanket of snow prompted a county-wide emergency declaration Wednesday, with motorists instructed to stay off the roads.
The edict, which stayed in effect until 4 p.m., placed the county under a Level 2 emergency. That meant the more than a dozen inches of powder
covering the roads threatened public safety and only essential travel was recommended per the Indiana Department of Homeland Security's
assessment system, county emergency management director Jim Comerford said.

Commissioners' President Patrick Stoffers said the county declared the emergency at the urging of the Indiana State Police, and lifted it after
consulting with the city, state police and county and state highway departments. Brown, Owen, Greene, Lawrence and Morgan counties also declared
snow emergencies Wednesday.
The county's proclamation even led to the closure of Indiana University, giving faculty and students alike a rare day off. Classes will resume today.
On the plow again ...
Monroe County Highway Superintendent John Chambers said the department's 28 snowplow operators had only a five-hour break Tuesday night
before hitting the roads again early Wednesday morning.
Snowplow operators came on duty at midnight Monday night/Tuesday morning, worked straight through until 8 p.m. Tuesday and started plowing
again at 1 a.m. Wednesday, he said.
Workers will stay on the clock until all county roads are clear, Chambers said Wednesday.
The plows were essentially just trying to keep up with the snow Tuesday night, and couldn't really begin actually clearing roads until the big flakes
stopped falling about 10 a.m. Wednesday morning, he said.
Chambers said the department received complaint calls from area subdivisions that hadn't received any attention, but said workers focused first on
clearing main roads and then worked their way down to smaller roads.
The county's salt supply is holding up well, despite concerns that a national shortage could affect local supplies, he said. That's partly because local
workers didn't apply any material until roads were clear — otherwise, they would simply plow the salt and sand away during their next pass, he said.
"I'm guessing since we went out about midnight, we've probably used 1,000 to 1,500 tons," Chambers said Wednesday. "It's not hurt us ... We're in
good shape."
The county highway department cares for 700 miles of roadway.
Bloomington Public Works director Susie Johnson said city crews began plowing at about 9 p.m. Monday night, took a short break Tuesday evening
and then hit the roads again. A few city utility workers helped run the plows during that downtime to ensure roads were passable, she said.
Crews were sent home at 3:30 p.m. Wednesday to give them a break for employee safety reasons, Johnson said. The crews will be at it again at 6
a.m., she said. As of Wednesday evening, all streets had been scraped at least once, she said, but they hadn't all gotten a last scrape and dusting of
salt.
Debbie Craig, a Fritz Terrace neighborhood resident, says she understands that the crews have been busy. However, "They came and did a couple of
roads in here and that's it," she said. By Wednesday evening she said there was still almost a foot of snow on her cul-de-sac.
Johnson said residents whose streets may have been missed can call the city at 349-3488.
She estimated the city's 34 plows will have laid down about 245 tons of deicing material throughout the recent snowstorms.
- 1 -
http://www.heraldtimesonline.com/stories/2009/01/29/news.qp-4111957.sto
Police busy with slideoffs
Local police agencies didn't work a lot of accidents Wednesday. Instead, they were busy helping motorists who were unable to negotiate the snowy
roadways.
"Most of what we worked were the slideoffs, not so much crashes," said Durnil. He said troopers worked only a few property damage accidents. And
Bloomington Police Sgt. Jeff Canada said officers worked less than a dozen accidents Wednesday.
"It's not been really too bad. We just didn't have a whole lot of traffic Wednesday morning," Canada said.
For a good part of the morning, Monroe County Sheriff's Chief Deputy Mike Pershing was stuck on a hill. Pershing was helping deputies who were
directing traffic around a semi stuck on a hill on Ind. 46 just east of Bloomington. Vernal Pike also proved to be a trouble spot for county deputies.
"Semis just couldn't go because of the snow," Pershing said. "We blocked the road off and directed traffic to make sure somebody didn't get hit
head-on trying to go around the semis."
Once the county's snow emergency was declared around 10 a.m., many motorists stayed home, giving road crews a chance to clear the snow.
Durnil said that troopers wouldn't ticket anyone who was driving on the roads during the snow emergency. He stated that county and city ordinances
are enforced by their respective police agencies. For example, when the town of Ellettsville declared a snow emergency, it would be up to the town's
police force to ticket anyone caught driving in the town.
Court goes on
What happens to the Monroe Circuit Court docket when the county closes for a snow day?
"You just do the best you can," Monroe Circuit Judge Kenneth Todd said Wednesday morning. "You just take a look at your calendar and re-set things
as best you can."

Todd said he couldn't recall the county closing its doors to the public due to the weather for at least a dozen years or more, saying it's an fairly unusual
occurrence.
Each of the county's nine judges and court commissioner handle their own dockets and will reschedule their own cases but, because the county
operates a unified court, each can help another out in time of need, he said.
And while several hearings set Wednesday were of interest to the public, Todd said it's "fortunate" that the snow day didn't happen next week when
several jury trials are scheduled. The problems of dealing with a jury over a day off could spell trouble, plus at least one of the attorneys involved in a
case is from out of town, he said.
"It would have been more difficult," Todd said.
— Compiled by reporters Bethany Nolan, Brady Gillihan, Nicole Brooks and Marci Creps
School closings, delays announced
IU plans to be open today, but the following schools are closed:
• Adventist Christian, Bloomington
• Bloomfield schools
• Brown County schools
• Eastern Greene schools
• Grace Baptist Academy, Bloomington
• Hickory Ridge Head Start, Brown County
• Monroe County Community School Corp.
• Mitchell Community Schools
• North Lawrence Community Schools
• Orleans schools
• Pinnacle School
• Richland-Bean Blossom schools
• Shakamak schools
• Spencer-Owen schools
• Springs Valley schools
• St. Charles, Bloomington
The following schools have 2-hour delays:
• Clear Creek Christian
- 2 -
http://www.heraldtimesonline.com/stories/2009/01/29/news.qp-4111957.sto
• Eminence
• Footsteps Montessori, Martinsville
• Lighthouse Christian
• Martinsville schools
• The Prep School, Bloomington, has a 1 1/2 hour delay.
- 3 -
http://www.heraldtimesonline.com/stories/2009/01/29/news.qp-4111957.sto
**Some people decided it would be easier to walk down the middle of Washington Street Wednesday instead of trying to wade through the
snow on the sidewalks. Jeremy Hogan | Herald-Times**
- 4 -
http://www.heraldtimesonline.com/stories/2009/01/29/news.qp-4111957.sto
An Indiana State Highway Department snow plow clears Ind. 46 in eastern Monroe County Wednesday. David Snodgress | Herald-Times

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http://www.heraldtimesonline.com/stories/2004/12/23/news.new.1103833599.sto

Counties declaring snow emergencies: www.heraldtimesonline.com

AP
12/23/2004
Officials in the following Indiana counties had declared snow emergencies by Thursday: Bartholomew, Clark, Crawford, Daviess, Dearborn, Decatur,
Delaware, Dubois, Fayette, Floyd, Franklin, Gibson, Greene, Harrison, Henry, Jackson, Jennings, Johnson, Knox, Lawrence, Madison, Martin,
Monroe, Ohio, Orange, Owen, Perry, Pike, Posey, Putnam, Rush, Scott, Shelby, Spencer, Switzerland, Union, Vanderburgh, Warrick, Washington,
Wayne.
Sources: Indiana governor's office.

- 1 –

http://www.heraldtimesonline.com/stories/2009/08/10/news.qp-7819215.sto

Advance: Local governmental, other meetings: www.heraldtimesonline.com

H-T Report
8/10/2009

TODAY
• Monroe County Historic Preservation Board of Review, 5:30 p.m., courthouse meeting room.
• Ellettsville Town Council, 7:30 p.m., Ellettsville Fire Station, 5080 W. Ind. 46.
TUESDAY
• Monroe County Council, 5 p.m., courthouse meeting room.
• Emergency Management Mitigation Plan, 5 p.m., council chambers, City Hall, 401 N. Morton St.
• Bloomington Public Transportation Corp. board of directors, 5:30 p.m., BT offices, 130 W. Grimes Lane.
• City of Bloomington Commission on Sustainability, 6 p.m., McCloskey Room, City Hall.
• Sister Cities International, 6:30 p.m., Dunlap Room, City Hall.
WEDNESDAY
• Bloomington Tree Commission, 9:30 a.m., Young Pavilion at Olcott Park.
• Bloomington Board of Housing Quality Appeals, 4 p.m. McCloskey Room, City Hall.
• Bloomington Multicultural Expo Planning Meeting, 4 p.m., Kelly Room, City Hall.
• Bloomington Commission on the Status of Black Males, 4:15 p.m., Hooker Room, City Hall.
• Bloomington Environmental Resources Advisory Council, 4:30 p.m., Winslow Woods shelter, 2120 S. Highland St.
THURSDAY
• Monroe County Storm Water Management Board/Water Quality Group, 9 a.m., courthouse meeting room.
• Housing Network, noon, McCloskey Room, City Hall.
• Bloomington Historic Preservation Commission, 3:30 p.m., McCloskey Room, City Hall.
• Bloomington Township board, 5:30 p.m., township office, 2111 W. Vernal Pike.
• Monroe County Plan Commission work session, 5:30 p.m., courthouse meeting room.
FRIDAY
• Monroe County commissioners, 9 a.m., courthouse meeting room.
• Monroe County Emergency Management Advisory Council, 9 a.m., council chambers, City Hall, 401 N. Morton St.
• Bloomington City Council internal work session, 11 a.m., McCloskey Room, City Hall.

Appendix C – Adopting Resolutions

Resolution #_____

ADOPTING THE MONROE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, Monroe County recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, Monroe County participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Monroe County Commissioners hereby adopt the Monroe County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that the Monroe County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Indiana Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2009.

_____
County Commissioner Chairman

_____
County Commissioner

_____
County Commissioner

_____
Attested by: County Clerk

Resolution #_____

ADOPTING THE MONROE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the Town of Ellettsville recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the Town of Ellettsville participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Town of Ellettsville hereby adopts the Monroe County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Monroe County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Indiana Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2009.

_____
Town President

_____
Town Council Member

_____
Town Council Member

_____
Town Council Member

_____
Town Council Member

_____
Attested by: Town Clerk

Resolution #_____

ADOPTING THE MONROE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the City of Bloomington recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the City of Bloomington participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the City of Bloomington hereby adopts the Monroe County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Monroe County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Indiana Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2009.

_____
City Mayor

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
City Council Member

_____
Attested by: City Clerk

Resolution #_____

ADOPTING THE MONROE COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the Town of Stinesville recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted multi-hazard mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHERAS, the Town of Stinesville participated jointly in the planning process with the other local units of government within the County to prepare a Multi-Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that the Town of Stinesville hereby adopts the Monroe County Multi-Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Monroe County Emergency Management Agency will submit on behalf of the participating municipalities the adopted Multi-Hazard Mitigation Plan to the Indiana Department of Homeland Security and the Federal Emergency Management Agency for final review and approval.

ADOPTED THIS _____ Day of _____, 2009.

_____
Town President

_____
Town Council Member

_____
Town Council Member

_____
Town Council Member

_____
Town Council Member

_____
Attested by: Town Clerk

Appendix D – Historical Hazards from NCDC

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Monroe	06/13/58	Tornado	F1	0	0	25K	0	None Reported
Monroe	06/13/58	Tornado	F1	0	0	250K	0	None Reported
Monroe	04/01/59	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	04/19/70	Tornado	F1	0	0	250K	0	None Reported
Monroe	04/19/70	Tornado	F2	0	6	250K	0	None Reported
Monroe	04/19/70	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	07/08/70	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	05/27/73	Tornado	F2	0	0	250K	0	None Reported
Monroe	05/27/73	Tornado	F2	0	0	250K	0	None Reported
Monroe	06/04/73	Tstm Wind	50 kts.	0	0	0	0	None Reported
Monroe	06/24/73	Tornado	F1	0	0	25K	0	None Reported
Monroe	06/26/73	Tornado	F2	0	0	250K	0	None Reported
Monroe	05/02/74	Tornado	F1	0	0	0K	0	None Reported
Monroe	01/10/75	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	04/18/75	Tornado	F2	0	1	250K	0	None Reported
Monroe	04/18/75	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	05/12/78	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/01/78	Tornado	F1	0	0	0K	0	None Reported
Monroe	06/25/78	Tstm Wind	70 kts.	0	0	0	0	None Reported
Monroe	07/26/78	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	08/02/78	Hail	1.75 in.	0	0	0	0	None Reported
Monroe	08/06/79	Hail	1.75 in.	0	0	0	0	None Reported
Monroe	10/01/79	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/07/80	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/28/80	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	08/02/80	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	04/10/81	Hail	2.00 in.	0	0	0	0	None Reported
Monroe	06/09/81	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	05/27/82	Hail	0.75 in.	0	0	0	0	None Reported
Monroe	06/20/82	Hail	1.00 in.	0	0	0	0	None Reported
Monroe	06/20/82	Tstm Wind	52 kts.	0	0	0	0	None Reported
Monroe	07/31/83	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/24/85	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	08/14/85	Tstm Wind	65 kts.	0	0	0	0	None Reported
Monroe	05/13/86	Hail	0.75 in.	0	0	0	0	None Reported
Monroe	07/12/86	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	07/12/86	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	07/14/86	Hail	0.75 in.	0	0	0	0	None Reported
Monroe	09/26/86	Hail	1.75 in.	0	0	0	0	None Reported
Monroe	05/20/87	Hail	1.00 in.	0	0	0	0	None Reported

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Monroe	06/02/87	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/13/87	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/13/87	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/13/87	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	07/05/87	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	08/03/88	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	08/03/88	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	08/06/89	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	10/16/89	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	05/16/90	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	05/16/90	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	06/02/91	Tstm Wind	70 kts.	0	0	0	0	None Reported
Monroe	11/30/91	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	04/16/92	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	07/02/92	Tstm Wind	0 kts.	0	0	0	0	None Reported
Monroe	07/11/92	Hail	1.00 in.	0	0	0	0	None Reported
Monroe	11/22/92	Tornado	F3	0	3	250K	0	None Reported
Monroe	08/17/93	Flash Flood	N/A	0	0	50K	5K	
Monroe	08/17/93	Tstm Winds	0 kts.	0	0	5K	0	
Monroe	10/29/93	Snow	N/A	0	0	0	0	Snow of two to six inches fell across the southern half of Indiana. The snow began in southwest Indiana during the evening of October 29, and spread northeast during the night. Snow ended in southwest Indiana during the morning of October 30, but continued in the southeast part of the state for much of the day. The heaviest snow fell in a band from Evansville to near Cincinnati, Ohio, with the greatest amounts of around six inches reported in the southeast corner of the state. Evansville set a new 24 hour snowfall record for October with 4.10 inches from the 29th to the 30th. Evansville also experienced its second snowiest October on record with a total of 4.60 inches. The only October with more snow at Evansville was in 1925, with a total of five inches.
Monroe	11/14/93	Flood	N/A	0	0	5.0M	500K	The flash flood event on November 14 developed into a widespread major flood event over central and southern Indiana during the third week of November. The heavy rain on November 14 was followed by an additional 1.50 to 2.50 inches of rain from November 16 to November 17. Flooding in much of central and southern Indiana was reminiscent of the late December 1990 and early January 1991 flood. Flood levels in portions of the state exceeded the late December 1990 and early January 1991 flood, and were the highest experienced in 50 or more years. Over 1,000 people were forced to flee their homes, and the Indiana Department of Natural Resources made numerous rescues of hunters and stranded residents. Because of flood warnings protective actions were undertaken in the following communities: Muncie, Anderson, Noblesville, Clare, Strawtown, Trails End, Ravenswood, Waverly, Spencer, Elnora, Edwardsport, Smithville, East Mount Carmel, New Harmony, Shelbyville, Columbus, Edinburgh, Seymour, Fort Ritner, Bedford, Williams, Shoals, Connersville, Laurel, Martinsville, Terre Haute, and the southern portions of Indianapolis.
Monroe	01/14/94	Extreme Cold	N/A	3	0	5.0M	0	Bitter cold weather settled over Indiana during the third week of January. Many locations recorded daily minimum temperatures below zero each day from January 14 to January 21. Some locations with official temperatures of -30 or colder on the 19th included Cambridge City with -35, Martinsville with -35, Spencer with -33, the Bloomington Airport with -33, Salem with -32, Rushville with -31, and Brookville with -31. In parts of southern Indiana one-quarter to one-half inch of freezing rain accumulated before the precipitation changed to snow. Most of central and southern Indiana received between six and nine inches of snow. Many businesses and schools were closed for several days following the storm, with some schools remaining closed for an entire

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								week. Many roads in southern Indiana were impassable for several days following the storm. IOWA
Monroe	02/08/94	Sleet/ice Storm	N/A	0	0	500K	0	A mixture of snow, sleet, and freezing rain fell over northern Indiana, with mostly sleet and freezing rain in the south. Most of the significant sleet and freezing rain occurred south of a line from Lafayette to Marion, and north of a line from Vincennes to Madison. Freezing rain in south-central and southeast Indiana resulted in ice accumulations of up to one inch. The ice downed power lines and damaged trees. In areas of central Indiana from Indianapolis to Connersville one to two inches of sleet accumulated. The sleet and freezing rain in central and southeast Indiana was accompanied by thunder and lightning at times. Numerous schools were closed in southern and central Indiana.
Bloomington	04/27/94	Tstm Winds	0 kts.	0	0	5K	0	An automobile was totaled after a large tree fell on top of it.
Monroe	11/21/94	High Wind	0 kts.	0	0	50K	0	An intense low pressure system over the Great Lakes and its associated cold front produced high winds across all of Indiana. Winds in excess of 50 mph were common across the state beginning near midnight in western Indiana. High winds spread to eastern Indiana by noon EST. Scattered power outages and downed trees were reported across many parts of Indiana including the South Bend, Lafayette, Indianapolis areas as well as rural areas northeast of Evansville.
Monroe	11/27/94	High Wind	0 kts.	0	0	120K	0	An intense low pressure area and its associated cold front swept across the region with high winds both before and after the cold front. The cold front itself triggered a squall line that produced damage. The high winds resulted in a roof collapse at the ATF automotive business in Indianapolis around 2 PM EST. Also, a church steeple was damaged late Sunday evening on Indianapolis' eastside.
Monroe	11/27/94	Tstm Wind	0 kts.	0	0	9K	0	Thunderstorm winds estimated at 60-65 mph caused minor damage to a home just north of Bloomington.
Monroe	03/07/95	Flood	N/A	0	0	0	0	One to three inch rains fell across west-central, north-central, and northeast Indiana on the 6th and 7th. This caused minor street flooding in some counties and minor river flooding of agricultural areas. Since this was before the growing season, farmers were not impacted.
Harrodsburg	04/08/95	Hail	0.75 in.	0	0	0	0	
Bloomington	06/20/95	Tstm Winds	0 kts.	0	0	2K	0	Trees and power lines were downed on the east side of Bloomington.
Bloominton	06/20/95	Tstm Winds	0 kts.	0	0	2K	0	Heat wave conditions developed across all of Indiana. High temperatures reached between 95 and 105 degrees with heat indices between 100 and 120 degrees. The Evansville area temperatures reached or exceeded 95 degrees from July 11-17. Nearly all heat related deaths occurred in the sick or elderly populations and most occurred in northwest Indiana. Also, nearly 800,000 baby chickens died at the Rose Acre Farms in Seymour resulting in losses totaling near one million dollars.
Monroe	07/13/95	Heat Wave	N/A	14	0	1.0M	0	One man was killed and another injured after they were struck by lightning while standing under a tree. The men had just exited a boat at Monroe Reservoir after a strong thunderstorm moved through. M47UT
Harrodsburg	07/15/95	Tstm Winds	0 kts.	0	0	0	0	Trees were downed.
Monroe	07/15/95	Lightning	N/A	1	1	0	0	One man was killed and another injured after they were struck by lightning while standing under a tree. The men had just exited a boat at Monroe Reservoir after a strong thunderstorm moved through. M47UT
Monroe	08/21/95	Heat Wave	N/A	1	0	0	0	Heat wave conditions initially developed over southwest Indiana on the 12th then overspread all but northwest Indiana for the remainder of the week. Heat wave conditions ended across the north and central sections on the 19th and over the south by the 21st. High temperatures were in the 90s throughout the period and near 100 across the south. High humidity also yielded Heat Index values between 100 and 115 degrees most of the week. These extreme conditions resulted in a heat stroke and death of an elderly male. The Indiana State Fair lost over $400 thousand due to low turnouts and most of Indiana crops suffered some due to the heat. M72PH
Monroe	12/08/95	Winter Storm	N/A	0	0	0	0	A low pressure system and cold front swept across Indiana bringing the first significant snowfall and cold temperatures of the winter season. Though snowfall amounts only averaged from two to four inches across the state, numerous vehicle accidents occurred, several resulting in fatalities. The cold front brought the first subzero temperatures to the state and prompted wind chill advisories for all of Indiana.
Monroe	12/18/95	Winter Storm	N/A	0	0	0	0	A low pressure system moving east through the Ohio and Tennessee River Valleys brought significant ice and snow to the northern two thirds of Indiana. Freezing rain began during the evening on the 18th across central and northeast Indiana while snow fell in northwest and north central sections. The freezing rain changed to snow between 0600 and 1100 on the 19th across central and northeast sections. Total snowfall amounts of

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								four to eight inches were common across central and northeast Indiana. Ice accumulations of a quarter to a half inch were common in east-central Indiana. The ice accumulation caused widespread power outages in central and east central Indiana leaving up to 65,000 homes without power at one point. Locations near Muncie did not have power restored until the 21st.
Monroe	01/02/96	Winter Storm	N/A	0	0	0	0	The first big snowstorm of 1996 impacted all but northwest Indiana. In central sections, snowfall amounts averaged six to twelve inches. Twenty four counties declared snow emergencies.
Monroe	01/06/96	Winter Storm	N/A	0	0	0	0	A major winter storm produced one to ten inches of snow across central and southern Indiana. Five to ten inch snows were concentrated in south central Indiana from Bloomington east to Greensburg. Strong winds also caused three to ten foot drifts leaving many roads impassable. Snow emergencies were declared in 41 counties.
Monroe	02/02/96	Extreme Cold	N/A	0	0	0	0	Bitter cold high pressure moved into the Midwest on February 2nd and remained in central Indiana through the 5th. Low temperatures were between zero and 15 below zero each day. High temperatures on the 4th barely reached above zero. Moderate winds also brought dangerously cold wind chills in the 20 to 50 below zero range.
Monroe	02/20/96	Fog	N/A	0	0	0	0	None Reported
Monroe	03/19/96	Heavy Snow	N/A	0	0	0	0	Major snowfall occurred as the result of an intense low pressure system that tracked from east Kentucky into Ohio. Snow amounts of 4 to 6 inches were common in central Indiana. Snow amounts around 12 inches occurred in west central Indiana near Crawfordsville. Amounts of 12 to 18 inches occurred in south central Indiana near Bloomington. A combination of wet heavy snow and 25 to 35 mph winds resulted in numerous trees falling across central Indiana. These trees took out power lines and blocked numerous roads. Up to 200,00 were without power in central Indiana. Many roads were impassable for several days, including Interstate 74 between Indianapolis and Illinois.
Bloomington	03/25/96	Tstm Wind	0 kts.	0	0	1K	0	None Reported
Bloomington	05/03/96	Lightning	N/A	0	0	0	0	Lightning strike causes 150 homes to lose power.
Monroe	05/04/96	Flood	N/A	0	0	0	0	Heavy rain caused many rivers and streams to rise above flood stage. Low lands and some roads were flooded.
Bloomington	05/08/96	Tstm Wind	0 kts.	0	0	1K	0	Trees blown down on the west side of Bloomington near the airport.
Bloomington	05/24/96	Tstm Wind	50 kts.	0	0	0	0	Thunderstorm winds were estimated at 50 knots by local law enforcement in Bloomington.
Blmngtn	05/28/96	Hail	1.75 in.	0	0	0	0	None Reported
Monroe	12/16/96	Winter Storm	N/A	0	0	0	0	A winter storm spread snow, sleet and freezing rain across southern and central Indiana. The precipitation began as snow around daybreak in the south but changed to sleet and freezing rain by late morning. Across central Indiana the precipitation remained mainly as snow. Snow accumulations ranged from 2 to 6 inches with amounts of 3 to 4 inches most common. Though freezing rain did occur with this event it did not cause any significant power outages.
Monroe	01/15/97	Winter Storm	N/A	0	0	0	0	A winter storm in the plain states moved into Indiana on January 15th producing rain, freezing rain, sleet and snow across most parts of the state. Freezing rain did not result in widespread power outages but did lead to numerous car accidents. Snowfall amounts averaged 3 to 5 inches across the central third of Indiana with most accumulation occurring just before the precipitation ended. Bitter cold arctic air poured in behind this weather system producing wind chills to 30 below zero. Drifting and blowing snow also caused several hours of white-out conditions on the 16th. Heavy lake effect snows associated with the arctic outbreak were confined to Indiana counties near Lake Michigan.
Unionville	03/28/97	Hail	1.75 in.	0	0	0	0	None Reported
Monroe	04/06/97	High Wind	49 kts.	0	0	0	0	Strong cold front approaching from the west brought significant large scale wind to nearly all of Indiana. Scattered power outages were reported across much of the area. Numerous trees were also blown down. There were also reports of some minor structural damage in Boone and Miami Counties.
Ellettsville	04/30/97	Tstm Wind	0 kts.	0	0	0	0	Thunderstorm winds blew down trees in Ellettsville.
Monroe	07/26/97	Excessive	N/A	0	0	0	0	None Reported

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
		Heat						
Monroe	02/04/98	Heavy Snow	N/A	0	0	0	0	A strong and nearly stationary upper level low pressure area over the lower Ohio Valley, in combination with a strong and cold anticyclone over the upper Great Lakes resulted in a 3 day period of heavy snow across southern Indiana. Airflow from the Atlantic Ocean pushed west into the Ohio Valley yielding anywhere from 4 to 10 inches of snow north of the Ohio valley. Counties along the Ohio River in both Indiana, kentucky and Ohio experienced record snowfall events for a single storm with amounts reaching from 18 to 24 inches.
Monroe	04/15/98	Flash Flood	N/A	0	0	10K	0	Severe thunderstorms producing anywhere from 3 to 6 inches of rain over about a six hour period caused major flooding across all parts of the counties listed above. Most roads were under water for a period of time. Some evacuations were required in Martin County and along Kelso Creek in Knox County. Numerous cars were also stranded in high water while some bridges and culverts were washed out.
Ellettsville	05/23/98	Hail	1.75 in.	0	0	0	0	None Reported
Ellettsville	06/18/98	Tstm Wind	0 kts.	0	0	1K	0	Few trees down.
Bloomington	06/22/98	Tstm Wind	54 kts.	0	0	0	0	None Reported
Bloomington	06/22/98	Tstm Wind	61 kts.	0	0	60K	0	Thunderstorm winds to 70 mph blew down dozens of trees and power lines. Up to four homes and several vehicles were damaged by fallen trees.
Monroe	06/22/98	Urban/sml Stream Fld	N/A	0	0	0	0	None Reported
Monroe	06/29/98	Tstm Wind	0 kts.	0	0	8K	0	A large and powerful squall line known as a Derecho originated in Iowa the morning of the 29th, slammed through Central Illinois the afternoon of the 29th and swept across Central Indiana the evening of the 29th. This squall line produced wind gusts of 40 to nearly 80 mph across central Indiana causing damage in nearly every central Indiana County. A weak tornado briefly touched down near Brazil around 7 PM while another weak tornado briefly touched down near Edwardsport around 9 PM. These tornadoes caused minor house damage and major tree damage. Otherwise, most wind damage resulted in widespread tree and powerline damage across central Indiana and in a handful of cases, trees fell on houses and/or cars causing additional damage. Hardest hit areas included the Indianapolis area near Plainfield where hundreds of trees were mowed down by 70 mph straightline winds. Also hard hit was the Bedford area with hundreds of trees being toppled. And the Columbus area also experienced widespread tree and powerline damage in addition to two semitractor trucks being blown off I-65.
Monroe	11/10/98	Tstm Wind	50 kts.	0	0	0	0	A vigorous low pressure system developed across the northern plains lowering to 968 millibars on the morning of November 10. Meanwhile, an associated strong cold front moved west to east across central Indiana during the morning and early afternoon. Very moist and slightly unstable air was rapidly returned northward ahead of this front which allowed a severe squall-line to form and push across the state just ahead of the front. Numerous reports of downed trees were reported across most of the counties in the storm's path. The squall-line produced widespread wind gusts from 50 to 70 mph, although very little cloud-to-ground lightning was detected with the line. Gradient winds were very strong ahead of the line which aided the thunderstorm gusts. Property damage was reported in Ipton, Morgan, Hendricks, Randolph, Madison, Hancock and Jackson counties. Damage was mainly done to roofs.
Monroe	01/01/99	Winter Storm	N/A	0	0	0	0	1999 started off with a bang across Central Indiana as a vigorous low pressure system pivoted from the southern plains into the Ohio Valley and Lower Great Lakes producing widespread heavy snow across all but the extreme southern extent of the Indianapolis CWA. Snowfall totals from New Year's evening to the morning of January 3 ranged from around 6 inches across the extreme southern areas of the CWA to10 plus inches north of a line from Shelbyville to just north of Terre Haute. Highway travel was made even more difficult or impossible in places as the strong pressure gradient produced significant blowing and drifting of the snow. Also, the morning and afternoon of January 2 saw the snow change over to several hours of freezing rain and/or sleet before changing back to snow later that afternoon and evening. The freezing rain and/or sleet accumulated a significant ice layer on top of the snow. On the night of January 2 into the morning of January 3, in addition to the blowing and drifting snow, an additional light coat of snow fell on top of the ice layer. Many of the counties and/or cities across Central Indiana were under snow emergencies. Numerous motorists were

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								stranded for days especially along Interstate 65 from Lebanon northward.
Monroe	01/21/99	Flood	N/A	0	0	19.0M	0	Heavy rain of up to 5 inches on the 21st and 22nd combined with rapid snow melt upstream causing widespread flooding along the White River from Muncie to East Mount Carmel. Crests ranged from around a foot above flood stage along extreme eastern sections of the White to around 10 feet above flood stage across extreme western sections. Flooding along the river in Hamilton and northern Marion counties were the highest seen since December 1990 and January 1991. Many homes and streets were flooded, and a few rescues took place. The following are various crests along the river: Muncie - 9.62 feet (flood stage is 9 feet); Anderson - 12.8 feet (flood stage is 10 feet); Noblesville - 20.42 feet (flood stage is 14 feet); Nora - 16.67 feet (flood stage is 11 feet); Ravenswood - 10.8 feet (flood stage is 6 feet); Centerton - 16.61 feet (flood stage is 12 feet); Spencer - 22.33 feet (flood stage is 14 feet); Worthington - 26.0 feet (flood stage is 18 feet); Ellisten - 27.62 feet (flood stage is 18 feet); Newberry - 23.66 feet (flood stage is 13 feet); Edwardsport - 24.6 feet (flood stage is 15 feet); Petersburg 24.89 feet (flood stage is 16 feet) and Hazleton - 25.10 feet (flood stage is 16 feet)
Monroe	02/01/99	Flood	N/A	0	0	0	0	In addition, 1 to 2 inches of rain fell on the the sixth of February causing additional flooding along the White River as far northeast as Centerton. Flooding of agricultural bottomland and county roads was most extensive from Elliston downstream. The following are crests and dates: Centerton: FS - 12 Feet; Crest - 13.47 Feet on February 08 Spencer: FS - 14 Feet; Crest - 18.51 Feet on February 09 Worthington: FS - 18 Feet; Crest - 23.52 Feet on February 10 Elliston: FS - 18 Feet; Crest - 24.45 Feet on February 10 Newberry: FS - 13 Feet; Crest - 19.06 Feet on February 10 Edwardsport: FS - 15 Feet; Crest - 21.10 Feet on February 11 Petersburg: FS - 16 Feet; Crest - 22.15 Feet on February 13 Hazleton: FS - 16 Feet; Crest - 22.30 Feet on February 14
Monroe	03/08/99	Winter Storm	N/A	0	0	0	0	A strong upper level low pressure system aided by a strong southerly flow and copious amounts of moisture led to a prolonged period of wintry precipitation featuring heavy snow across northern counties in the CWA and a mix of snow, freezing rain and sleet in southern zones of the CWA. Snowfall amounts ranged from 5-9 inches across the northern CWA. Roads were very slick and hazardous the entire area. Many schools were closed for the day as a result of the roads.
Bloomington	05/17/99	Tstm Wind	50 kts.	0	0	0	0	Numerous severe thunderstorms marched across central Indiana during the afternoon and evening. Hail was the main culprit during the afternoon hours, while damaging winds became more common during the evening as a squall line and embedded bow echo moved across. A 6 year old boy was killed near Linton in Greene county as a tree fell on him resulting in fatal head injuries. 2 other boys were injured as well as they took a glancing blow from the tree. Meanwhile, a woman was injured as a tree fell on her car in Faribanks, and another woman was injured as thunderstorm winds blew her car off the road in Putnamville. A tree fell on a house in Vincennes causing $75,000 damage. Finally, lightning destroyed a house in Oolitic and injured a woman as debris struck her after lightning hit a circuit box. In general, wind gusts to near 70 mph across central Indiana caused numerous trees to fall across much of the CWA.
Ellettsville	05/17/99	Hail	0.75 in.	0	0	0	0	Numerous severe thunderstorms marched across central Indiana during the afternoon and evening. Hail was the main culprit during the afternoon hours, while damaging winds became more common during the evening as a squall line and embedded bow echo moved across. A 6 year old boy was killed near Linton in Greene county as a tree fell on him resulting in fatal head injuries. 2 other boys were injured as well as they took a glancing blow from the tree. Meanwhile, a woman was injured as a tree fell on her car in Faribanks, and another woman was injured as thunderstorm winds blew her car off the road in Putnamville. A tree fell on a house in Vincennes causing $75,000 damage. Finally, lightning destroyed a house in Oolitic and injured a woman as debris struck her after lightning hit a circuit box. In general, wind gusts to near 70 mph across central Indiana caused numerous trees to fall across much of the CWA.
Unionville	05/17/99	Hail	0.75 in.	0	0	0	0	Numerous severe thunderstorms marched across central Indiana during the afternoon and evening. Hail was the main culprit during the afternoon hours, while damaging winds became more common during the evening as a squall line and embedded bow echo moved across. A 6 year old boy was killed near Linton in Greene county as a tree fell on him resulting in fatal head injuries. 2 other boys were injured as well as they took a glancing blow from the tree. Meanwhile, a woman was injured as a tree fell on her car in Faribanks, and

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								another woman was injured as thunderstorm winds blew her car off the road in Putnamville. A tree fell on a house in Vincennes causing $75,000 damage. Finally, lightning destroyed a house in Oolitic and injured a woman as debris struck her after lightning hit a circuit box. In general, wind gusts to near 70 mph across central Indiana caused numerous trees to fall across much of the CWA.
Bloomington	04/20/00	Tstm Wind	60 kts.	0	0	200K	0	Separate lines of thunderstorms swept across central Indiana producing numerous large hail and damaging wind reports as a strong low pressure system moved across the state during the afternoon of April 20, 2000. In addition, a single thunderstorm moved across in the early morning producing golfball size hail near Pendleton. The first line of thunderstorms moved across northwestern parts of the IND CWA just before noon producing penny to golfball size hail across Tippecanoe, Carroll and Warren counties. The second line produced large hail but more notably damaging winds across the center of the IND CWA. The worst damage was near Bloomington, Terre Haute, Lebanon and Nineveh in Johnson county. Structural damage occurred across these areas. In Bloomington, 1 person was injured as three mobile homes were blown off their foundations from winds estimated up to 70 mph. A parked vehicle was damaged in downtown Bloomington, while a car was damaged as part of the sheet metal roof of the Indiana University Creative Arts building was thrown on it. 10 homes, a few businesses and 3 vehicles received significant damage in southern Johnson county from Princes Lake to Nineveh. National Weather Service survey indicated straight-line microburst damage with winds estimated to around 80 mph. Otherwise, some other central Indiana sites saw large hail and numerous trees and power lines down.
Ellettsville	05/12/00	Tstm Wind	50 kts.	0	0	0	0	A squall-line moved across central Indiana during the evening of May 12 producing widespread tree and power line damage as well a few large hail reports. A few scattered storms preceding the line also produced a few large hail and damaging wind reports across northwestern parts of the IND CWA early in the evening.
Bloomington	06/24/00	Tstm Wind	50 kts.	0	0	0	0	Separate supercells produced isolated wind damage across parts of central Indiana during the afternoon and evening. Most of the damage were trees down, however numerous funnel clouds were observed and a Chrysler plant in Kokomo received major damage. A rubberized fabric roof was peeled back on the plant and aluminum siding was blown off. Also, some debris from the plant was found 3 miles away. Trees in the area were snapped and all in the same direction and several semi trailers were tipped on their side.
Ellettsville	09/20/00	Tstm Wind	50 kts.	0	0	10K	0	A squall line moved across Central Indiana producing numerous reports of tree damage and a couple reports of golfball size hail. A man was injured as he was thrown from his truck near Southport. His home also received some minor damage. A press box at Ellettsville High School was also destroyed in the thunderstorm gusts. Otherwise the only other damage was very sporadic and limited to small barns.
Bloomington	10/05/00	Flash Flood	N/A	1	0	0	0	Heavy rain of 2 to 5 inches caused flash flooding along Moores Creek just southeast of Bloomington. A 29 year old woman was killed as her car was swept off a county road adjacent to the creek. Police determined she was able to get out of her car, but found her body was carried about a quarter mile downstream and she subsequently drowned. F29IW
Monroe	10/05/00	Flood	N/A	0	0	0	0	Rain of 4 to 6 inches of rain fell in West Central Indiana during the evening of the 4th and the morning of the 5th causing widespread small stream flooding across this area. This caused extensive flooding of agricultural bottomland across most of these creeks as well as numerous roads closed. A few recreational cabins were also flooded. Crests: Flood Stages: Big Walnut Creek at Reelsville 14.1 12.0 Busseron Creek near Carlisle 17.0 16.0 Eel River at Bowling Green 18.6 17.0 Mill Creek near Catatact 15.1 10.0 Salt Creek near Harrodsburg 25.4 25.0 Sugar Creek near Edinburgh 12.5 9.0 White Lick Creek at Mooresville 15.6 15.0
Monroe	12/13/00	Heavy Snow	N/A	0	0	0	0	A strong upper level system tracked along the Ohio River during the evening of December 13. Strong lift and deep moisture allowed for a widespread heavy snow event across Central Indiana. The accumulating snow began during the late morning of December 13 and continued through about midnight before the activity tapered off to flurries in the early morning hours of December 14. The snowfall was rather uniform with 6 to 7 inch totals common.
Monroe	12/13/00	Ice Storm	N/A	0	0	0	0	A strong upper level system moved along the Ohio River during the evening of December 13. The system produced moderate to heavy snow across South Central Indiana during the morning and afternoon of December 13 before the precipitation changed over to freezing rain during the evening. Law enforcement reported significant ice amounts as much as 1/2 an inch on top of the snow across South Central Indiana.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								Power outages were noted across many of these counties.
Hindustan	06/05/01	Tstm Wind	50 kts.	0	0	0	0	A squall line moved across south central Indiana with numerous reports of trees down. A mobile home and barn were also damaged in Daviess County.
Bloomington	06/19/01	Hail	0.75 in.	0	0	0	0	Separate clusters of severe thunderstorms laid a path of downed trees and power lines as well as large hail across central Indiana. Two trees fell on a 1992 Grand Am in Bloomfield totaling it.
Kirksville	06/19/01	Hail	0.88 in.	0	0	0	0	Separate clusters of severe thunderstorms laid a path of downed trees and power lines as well as large hail across central Indiana. Two trees fell on a 1992 Grand Am in Bloomfield totaling it.
Bloomington	07/08/01	Tstm Wind	50 kts.	0	0	0	0	Early in the afternoon of July 8, an squall line developed over northwest Illinois and accelerate southeastward across the IND CWA . Dew points in the mid 70s were pooled south of a stationary front that was located across Northern Indiana and the upper dynamics were strong for July with strong uni-directional shear present. These ingredients resulted in a derecho event during the late afternoon and evening across Central Indiana. Trees were down across most of the counties in the IND CWA. Structural damage was not widespread, however as it was limited to trees falling on cars and houses and broken windows at the Kokomo Courthouse. An 18 year old girl had her neck broken as a tree fell on her car.
Bloomington	08/18/01	Tstm Wind	50 kts.	0	0	0	0	A squall line dropped southeast across Central Indiana knocking down numerous trees and producing large hail. A few supercells also formed southwest of Indianapolis producing mainly large hail. A tree fell on a car near Cloverdale, while a man was injured as a garage under construction collapsed on him in Chesterfield. The squall line was fueled by near full afternoon sunshine ahead of it and a very strong upper level low trailing a cold front which lagged behind the squall line. Many streets were also water covered as nearly 4 inches of rain fell across many spots south of Indianapolis.
Ellettsville	09/23/01	Hail	1.00 in.	0	0	0	0	Separate supercell storms produced mainly large hail but also knocked a few trees down across Central Indiana.
Bloomington	10/24/01	Tstm Wind	60 kts.	0	0	0	0	Several supercell thunderstorms and a squall line moved across Central Indiana during the afternoon and early evening of October 24. There were numerous reports of large hail and downed trees as well as a brief tornado touchdown near Williams. Notable damage reports included semis blown off the highway at several locations, a mobile destroyed at Wesport and several barns destroyed and roofs blown off homes at various locations. A very strong cold front and negatively tilted trough combined with very unstable conditions and strong wind shear allowed many of the storms to develop rotating wall clouds, however only 1 brief touchdown occurred.
Bloomington	04/12/02	Hail	1.75 in.	0	0	0	0	None Reported
Bloomington	04/12/02	Hail	1.00 in.	0	0	0	0	Hail covered the ground
Ellettsville	04/12/02	Hail	1.00 in.	0	0	0	0	None Reported
Monroe	04/12/02	Flash Flood	N/A	0	0	0	0	None Reported
Monroe	05/07/02	Flash Flood	N/A	0	0	100K	0	Thunderstorms moved across the southern half of central Indiana during the early morning hours of May 7. These storms produced heavy rain, which lead to extensive flash flooding. Numerous roads were flooded and closed, including some state roads. In Clinton in Clay county, 10 to 12 blocks were evacuated due to flooding. In Morgan county, a school bus became stuck in high water and the occupants were evacuated.
Monroe	05/12/02	Flash Flood	N/A	0	0	50K	0	Thunderstorms moved across all of central Indiana during the day of May 12 and continuing into the evening. These thunderstorms produced very heavy rain, with many areas seeing more than one round of thunderstorms. The result was extensive flash flooding. Numerous roads were closed, including state roads and U.S. highways. A couple of bridges were washed out, and some culverts were destroyed. At Ball State University in Delaware county, residence halls experienced flooding. Elsewhere in Delaware county water was up to 6 feet deep at underpasses. At Vincennes in Knox county, a trailer park was evacuated resulting in 80 families being moved to a shelter. Other smaller evacuations occurred in Owen and Greene counties.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Bloomington	05/25/02	Tstm Wind	0 kts.	0	0	1K	0	Trees down
Bloomington	05/25/02	Tstm Wind	50 kts.	0	0	0	0	Large limbs down
Bloomington	07/29/02	Tstm Wind	50 kts.	0	0	0	0	A squall-line moved across central Indiana during the afternoon of July 29th. 3 separate bowing segments caused widespread damage with trees and power lines down across much of the area. A home in construction collapsed near Fishers, trees fell on houses in Lebanon and Muncie, and a roof was blown off of an airplane hangar at the Delaware County Airport.
Ellettsville	09/20/02	Tornado	F3	0	0	10.0M	20K	One of Indiana's longest tracking tornados formed along a squall line on the morning of September 20. The tornado touched down near Ellettsville in Monroe county and then remained on the ground for 112 miles before lifting in Blackford county. The tornado produced F3 damage at its strongest points. Nearly 100 single family homes were destroyed, along with several mobile homes. Some apartments were also destroyed. Many businesses and hundreds of homes received damage. Several counties were declared disaster areas.
Bloomington	11/10/02	Tstm Wind	50 kts.	0	0	0	0	A squall line moved across Central Indiana during the afternoon producing numerous dime size hail reports and a few tree damage reports.
Monroe	02/23/03	Winter Storm	N/A	0	0	0	0	An area of low pressure brought heavy snow to southern sections of central Indiana. Around 6 inches of snow fell.
Bloomington	04/20/03	Hail	2.00 in.	0	0	0	0	A line of thunderstorms with embedded supercells produced large hail and damaging winds.
Bloomington	05/31/03	Hail	0.75 in.	0	0	0	0	A strong area of low pressure with its associated cold front and dry line approached Indiana from the Great Lakes Region. Much of the northern and central half of the state was placed under a tornado watch until 300 am EST. Scattered storms moved into western Indiana over the late nighttime hours. Although these storms exhibited features of severe thunderstorms, the environment to which they entered contained little instability due to lingering cloudiness. No severe weather was reported with the strongest cells in west central Indiana. Only one hail report was received from Bloomington.
Bloomington	07/08/03	Hail	0.88 in.	0	0	0	0	A squall line with bow segments and embedded supercells moved from west to east across central Indiana during the evening of July 8. An F1 tornado near Bainbridge destroyed 3 metal barns and did minor to moderate damage to 2 homes. Otherwise, trees and power lines were the main casualties from straight-line winds. Finally, there was more flash flooding across the northern part of the Indianapolis CWA due to heavy rain and continued saturated grounds.
Bloomington	07/09/03	Tstm Wind	55 kts.	0	0	0	0	Trees down in Harrodsburg Squall line knocked down numerous trees. The line damaged more than 400 homes in the Rosedale area of Parke county. Many roads were water covered due to heavy rain falling on very saturated grounds.
Bloomington	07/09/03	Tstm Wind	55 kts.	0	0	0	0	Squall line knocked down numerous trees. The line damaged more than 400 homes in the Rosedale area of Parke county. Many roads were water covered due to heavy rain falling on very saturated grounds.
Bloomington	07/21/03	Tstm Wind	55 kts.	0	0	0	0	On the morning of Monday, July 21, 2003, a large derecho moved across most of central Indiana. This event began around 4:00 am EST across the NWS Indianapolis Northwestern CWA and moved Southeast over the next 2 hours. Numerous Severe Thunderstorm Warnings were issued based on inbound radar velocities near 90 knots. Numerous wind damage reports to homes, business and trees were uncovered throughout the daylight hours. Over 100 trees were toppled in at McCormick State Park in Owen County injuring 5. There were also 2 brief F0 tornado touchdowns. One tornado was reported in Boone County near the northern apex of the bow. This tornado was later confirmed to be an F0 causing some property and tree damage. Another F0 was confirmed during an NWS storm survey on the south side of Lafayette. Numerous trees were snapped, and a set of bleachers were lifted to mid-field of a High School football field.
Monroe	09/01/03	Flood	N/A	0	0	22.0M	0	8 to 10 inches of rain fell across central Indiana during the Labor Day weekend causing major flooding along parts of the White River. In fact, Indianapolis received the most rain ever for a calendar day (7.2 inches) breaking the old record set in 1895 (6.8 inches). According to a local newspaper account, nearly 3,000 residents across central Indiana applied for flood assistance and flood damage was estimated in excess of 20 million dollars. FEMA reports indicated more than 300 homes and nearly 60 businesses were flooded. Nearly 200 people were forced to evacuate their residences.
Monroe	01/03/04	Flood	N/A	0	0	0	0	2 to 5 inches of rain fell along the White River Basin from the 1st through the 5th causing the worst flood along

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								the lower White River since May 2002. Extensive river flooding closed numerous local river roads and several state roads across south central Indiana. Location: FS: Crest: Date of Crest: Muncie 9.0 10.9 January 5 Anderson 10.0 13.6 January 6 Noblesville 14.0 17.0 January 6 Nora 11.0 13.4 January 6 Ravenswood 6.0 7.9 January 6 Centerton 12.0 16.0 January 5 Spencer 14.0 22.2 January 6 Elliston 18.0 27.3 January 7 Newberry 13.0 22.8 January 8 Edwardsport 15.0 23.5 January 9 Petersburg 16.0 25.1 January 11 Hazleton 16.0 25.9 January 12
Monroe	01/04/04	Flood	N/A	3	0	0	0	The grounds were still rather saturated at the start of the New Year from the December heavy rain episodes when from the 1st to the 5th of January another 2-2.5 inches of rain fell across most locales north of Interstate 70 and as much as 5 inches of rain fell south of Interstate 70 (many locations recorded new daily rainfall records for January 4). This caused widespread flooding of streams and creeks especially across south central Indiana. There were also 3 fatalities all associated with people trying to drive through flooded roadways and being swept into higher water. 2 were killed in Jackson county near the Scott county line and along the Muscatatuck River. Meanwhile, a 16 year old female was killed as her car crossed high flowing water and hydroplaned upside down into a ditch filled with 4-5 feet of water. There were also numerous successful rescues of people trapped in cars in high water especially across south central Indiana. M77IW, M22IW, F16IW
Stanford	05/17/04	Flash Flood	N/A	0	0	0	0	None Reported
Bloomington	05/27/04	Hail	0.75 in.	0	0	0	0	A series of supercell thunderstorms moved across central Indiana during the afternoon and evening of May 27. There were numerous large hail occurrences mainly across the far northern and southern parts of the Indianapolis County Warning Area. There were only a few cases of severe thunderstorm winds. Flash flooding also occured in the northeastern part of the CWA and also across the far southern CWA.
Bloomington	05/27/04	Hail	0.75 in.	0	0	0	0	A series of supercell thunderstorms moved across central Indiana during the afternoon and evening of May 27. There were numerous large hail occurrences mainly across the far northern and southern parts of the Indianapolis County Warning Area. There were only a few cases of severe thunderstorm winds. Flash flooding also occured in the northeastern part of the CWA and also across the far southern CWA.
Monroe	05/28/04	Flood	N/A	0	0	0	0	Several inches of rain from a series of thunderstorms from the 23rd through the 28th caused minor flooding along the lower part of the White River from southern Greene county into Knox county. Additional heavy rains over the last few days of the month caused new flooding along the White River from Centerton in Morgan county southward. These additional rains also helped prolong the flooding into June. Location: FS: Crest: Date of Crest: Centerton 12 12.84 May 31, 2004 Spencer 14 15.98 June 1, 2004 Elliston 18 20.99 June 2, 2004 Newberry 13 13.89 May 28, 2004 Edwardsport 15 17.00 May 29, 2004 Petersburg 16 20.37 May 31, 2004 Hazleton 16 20.00 June 1, 2004
Bloomington	05/30/04	Tornado	F0	0	0	150K	0	An F0 tornado moved across Lake Monroe southeast of Bloomington sinking several sailboats. On 30 May 2004, a warm front was draped across far southern portions of Indiana in the morning, as part of an unseasonably strong cyclone centered in Minnesota. This warm front began the day nearly stationary, taking 8 hours to move from Vincennes to Bloomington, then rocketing northward as the low pressure system quickly pushed off to the northeast late, dragging a cold front through the state during the overnight hours. All the necessary ingredients for a major severe weather outbreak were falling into place. Morning upper-air observations showed very deep moisture and intense wind shear (wind change in speed and direction with respect to height) in the lower levels of the atmosphere. Fairly clear skies during the course of the day contributed to moderately strong instability across much of Indiana. Along and north of the warm front, winds backed to the east-southeast, further enhancing the wind shear. This area of enhanced shear with the deep moisture and instability pooled along it would serve as the focus for the first two rounds of severe weather in the Indianapolis County Warning Area (CWA) on May 30th. The first wave of severe weather came in the early afternoon, as individual rotating thunderstorms, or supercells, formed just south of the warm front, crossing over the boundary soon after forming and moving into the area of enhanced shear. These supercells began to show strong rotation soon after their formation, and produced several funnel reports and confirmed tornadoes near Spencer and Ellettsville. Each of these tornadoes were rated F1 on the Fujita Scale of Tornado Intensity, a rating corresponding to the partial peeling of roofs and destruction of small outbuildings. Wave number two began in the late afternoon and continued into the early evening hours. Additional supercell development

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								occurred further west along the warm front, in an area that had been receiving plenty of heating all day, maximizing instability in the very moist air mass. This wave of storms included a storm that produced tornadoes in Fountain and Tippecanoe counties, one of which was rated F2 near Dayton, just southeast of Lafayette, and a long-lived supercell that tracked along and just south of the I-70 corridor, producing tornadoes in Brazil, Little Point, Monrovia, just south of Plainfield, Camby, and Indianapolis. Power flashes from the Camby tornado were visible from the front door of NWS Indianapolis. The strongest of these tornadoes was the Indianapolis tornado, which briefly achieved F2 strength on the southeast side near Keystone Avenue between Raymond and Troy where there was significant damage to numerous homes, a nursing home and an elementary school. 26 nursing home inhabitants were treated at local hospitals for minor injuries, and the rest were relocated as the building was inhabitable. In addition to this tornado, the Monrovia tornado was rated F1. All additional tornadoes from this particular supercell were rated F0, a rating corresponding to moderate tree damage and damage to outbuildings and signboards. There was also a lightning fatality in Veedersburg in Fountain County as a 24 year old male was struck while on a baseball field. The final wave of severe weather came in the late evening and early nighttime hours, and was mostly in the form of wind damage, although brief tornadoes did occur along the squall line that had formed near the Mississippi River and tracked eastward, accompanying the passage of the cold front, including tornadoes near Lake Monroe and Crothersville in south central Indiana, and Atlanta and Frankton in north central Indiana. The tornado near Lake Monroe was rated F1, while all additional tornadoes were rated F0. To complicate the issue, the repeated rounds of heavy rain caused flooding problems across much of the area, with several flash flood warnings and urban/small stream flood advisories being issued during the evening and overnight hours. Fifteen total tornadoes touched down in central Indiana on May 30th, with damage estimates approaching $13,000,000 for central Indiana alone. In all, an additional eight tornadoes touched down in portions of Indiana that are served by neighboring NWS forecast offices, bringing the statewide total for the day to 23, four over the yearly average of 19. This places the May 30th outbreak as the second largest outbreak in state history, behind the outbreak of 2 June 1990, and ahead of the "Super Outbreak" of 3-4 April 1974. 37 tornadoes touched down statewide in the 1990 outbreak, and 21 tornadoes touched down during the Super Outbreak, which was the largest outbreak of tornadoes in recorded history, with 148 tornadoes touching down across 13 states and southern Canada, killing 351 and injuring thousands. Nationwide, several more tornadoes were reported, along with nearly 200 reports of large hail and nearly 600 reports of wind damage. Reports occurred all along the Mississippi, Ohio, and Tennessee Valleys, stretching from central Minnesota all the way to northeast Texas.
Ellettsville	05/30/04	Tornado	F1	0	0	250K	0	An F1 tornado caused significant damage to a cabin northeast of Ellettsville. Most of the path was along a wooded area with numerous trees felled. On 30 May 2004, a warm front was draped across far southern portions of Indiana in the morning, as part of an unseasonably strong cyclone centered in Minnesota. This warm front began the day nearly stationary, taking 8 hours to move from Vincennes to Bloomington, then rocketing northward as the low pressure system quickly pushed off to the northeast late, dragging a cold front through the state during the overnight hours. All the necessary ingredients for a major severe weather outbreak were falling into place. Morning upper-air observations showed very deep moisture and intense wind shear (wind change in speed and direction with respect to height) in the lower levels of the atmosphere. Fairly clear skies during the course of the day contributed to moderately strong instability across much of Indiana. Along and north of the warm front, winds backed to the east-southeast, further enhancing the wind shear. This area of enhanced shear with the deep moisture and instability pooled along it would serve as the focus for the first two rounds of severe weather in the Indianapolis County Warning Area (CWA) on May 30th. The first wave of severe weather came in the early afternoon, as individual rotating thunderstorms, or supercells, formed just south of the warm front, crossing over the boundary soon after forming and moving into the area of enhanced shear. These supercells began to show strong rotation soon after their formation, and produced several funnel reports and confirmed tornadoes near Spencer and Ellettsville. Each of these tornadoes were rated F1 on the Fujita Scale of Tornado Intensity, a rating corresponding to the partial peeling of roofs and destruction of small outbuildings. Wave number two began in the late afternoon and continued into the early evening hours. Additional supercell development occurred further west along the warm front, in an area that had been

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								receiving plenty of heating all day, maximizing instability in the very moist air mass. This wave of storms included a storm that produced tornadoes in Fountain and Tippecanoe counties, one of which was rated F2 near Dayton, just southeast of Lafayette, and a long-lived supercell that tracked along and just south of the I-70 corridor, producing tornadoes in Brazil, Little Point, Monrovia, just south of Plainfield, Camby, and Indianapolis. Power flashes from the Camby tornado were visible from the front door of NWS Indianapolis. The strongest of these tornadoes was the Indianapolis tornado, which briefly achieved F2 strength on the southeast side near Keystone Avenue between Raymond and Troy where there was significant damage to numerous homes, a nursing home and an elementary school. 26 nursing home inhabitants were treated at local hospitals for minor injuries, and the rest were relocated as the building was inhabitable. In addition to this tornado, the Monrovia tornado was rated F1. All additional tornadoes from this particular supercell were rated F0, a rating corresponding to moderate tree damage and damage to outbuildings and signboards. There was also a lightning fatality in Veedersburg in Fountain County as a 24 year old male was struck while on a baseball field. The final wave of severe weather came in the late evening and early nighttime hours, and was mostly in the form of wind damage, although brief tornadoes did occur along the squall line that had formed near the Mississippi River and tracked eastward, accompanying the passage of the cold front, including tornadoes near Lake Monroe and Crothersville in south central Indiana, and Atlanta and Frankton in north central Indiana. The tornado near Lake Monroe was rated F1, while all additional tornadoes were rated F0. To complicate the issue, the repeated rounds of heavy rain caused flooding problems across much of the area, with several flash flood warnings and urban/small stream flood advisories being issued during the evening and overnight hours. Fifteen total tornadoes touched down in central Indiana on May 30th, with damage estimates approaching $13,000,000 for central Indiana alone. In all, an additional eight tornadoes touched down in portions of Indiana that are served by neighboring NWS forecast offices, bringing the statewide total for the day to 23, four over the yearly average of 19. This places the May 30th outbreak as the second largest outbreak in state history, behind the outbreak of 2 June 1990, and ahead of the "Super Outbreak" of 3-4 April 1974. 37 tornadoes touched down statewide in the 1990 outbreak, and 21 tornadoes touched down during the Super Outbreak, which was the largest outbreak of tornadoes in recorded history, with 148 tornadoes touching down across 13 states and southern Canada, killing 351 and injuring thousands. Nationwide, several more tornadoes were reported, along with nearly 200 reports of large hail and nearly 600 reports of wind damage. Reports occurred all along the Mississippi, Ohio, and Tennessee Valleys, stretching from central Minnesota all the way to northeast Texas.
Monroe	06/14/04	Flood	N/A	0	0	0	0	Heavy rain on the 11th and 16th caused minor flooding along the lower half of the White River from Centerton to Hazleton. Mainly only agricultural bottomland was effected. Location: Flood Stage: Crest: Date of Crest: Centerton 12.0 14.9 June 17 Spencer 14.0 18.9 June 18 Elliston 18.0 22.6 June 20 Newberry 13.0 15.0 June 20 Edwardsport 15.0 18.6 June 21 Petersburg 16.0 18.2 June 23 Hazleton 16.0 18.2 June 23
Bloomington	07/13/04	Tstm Wind	50 kts.	0	0	0	0	A very strong bow echo moved from north to south across west central and southwest Indiana on the afternoon and evening of 13 July 2004, with measured winds as high as 72 mph reported. Very widespread wind damage occurred with the bow echo, with a large amount of damage to trees, power lines, and utility poles. Some structural damage occurred as well.
Ellettsville	07/13/04	Tstm Wind	50 kts.	0	0	0	0	A very strong bow echo moved from north to south across west central and southwest Indiana on the afternoon and evening of 13 July 2004, with measured winds as high as 72 mph reported. Very widespread wind damage occurred with the bow echo, with a large amount of damage to trees, power lines, and utility poles. Some structural damage occurred as well.
Bloomington	07/22/04	Tstm Wind	50 kts.	0	0	0	0	Trees were downed. Scattered severe thunderstorms moved across mainly the southern half of central Indiana during the afternoon and evening of 22 July 2004.
Bloomington	07/22/04	Tstm Wind	50 kts.	0	0	0	0	A large tree was downed. Scattered severe thunderstorms moved across mainly the southern half of central Indiana during the afternoon and evening of 22 July 2004.
Bloomington	08/04/04	Tornado	F0	0	0	1K	0	A very small and brief tornado touched down from a thunderstorm near Bloomington, causing damage to several trees in the backyard of a residence. No one was injured, and no other significant damage was reported. A few strong thunderstorms moved through central Indiana on the morning of 4 August, 2004. A brief

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								tornado was the only severe event reported from these thunderstorms; however lightning strikes caused some damage as well.
Bloomington	08/18/04	Hail	0.75 in.	0	0	0	0	A round of severe thunderstorms moved across mainly southern portions of central Indiana on 18 August 2004. Wind damage and hail occurred in some areas.
Bloomington	08/18/04	Tstm Wind	50 kts.	0	0	30K	0	Trees were downed in several locations across Bloomington, including one that crushed a car and another that fell on a barn. Damage amounts were estimated. A round of severe thunderstorms moved across mainly southern portions of central Indiana on 18 August 2004. Wind damage and hail occurred in some areas.
Ellettsville	08/18/04	Tstm Wind	50 kts.	0	0	0	0	Several trees were downed by wind gusts. A round of severe thunderstorms moved across mainly southern portions of central Indiana on 18 August 2004. Wind damage and hail occurred in some areas.
Monroe	12/22/04	Heavy Snow	N/A	0	3	3.0M	0	A snow storm of historic proportions affected central Indiana on 22-23 December 2004. Unusual in that the first round of heavy snow was not directly associated with the passage of a surface cyclone, but rather an area of strong forcing well ahead of the main area of low pressure, the storm nonetheless produced snow totals rivaling and exceeding those of the legendary Blizzard of January 1978 in some areas, crippling much of mainly southern portions of central Indiana, in some cases for several days. Fortunately for those affected, however, blizzard conditions were not produced thanks to winds much weaker than those accompanying the 1978 storm. The snow storm began during the very early morning hours of the 22nd, and continued through the day in south central Indiana. By that evening heavy snow of 4 to nearly 10 inches had fallen, generally south of Interstate 70. The greatest totals were in southern Indiana where approximately 10 inches had fallen. There was a sharp cutoff for this heavy snow. Much of the state north of I-70 did not see any snow. In the Indianapolis area, the Carmel and Brownsburg areas received no snow while the Greenwood area measured 4 inches. During the evening of the 22nd, the second band of snow moved in as the surface low passed to the southeast of the state, blanketing all of central and southern Indiana. Thundersnow was reported in several areas across central Indiana. Snow of 4 to more than 18 inches fell from this next storm system. Once again the heaviest snow fell in southern Indiana. This brought the accumulation in much of southern Indiana to more than 20 inches with some spots reporting more than 30 inches of total snow by the afternoon of the 23rd. Such snowfall amounts are historic not only in southern Indiana but for the entire state. Snowfall in northwestern portions of central Indiana was heavy at times, approaching 3 to 5 inches in Warren, Tippecanoe, Carroll, Clinton, Fountain, Vermillion, and Parke Counties. This epic snow storm closed I-64, I-65, I-74 and crippled I-70 in Indiana. This stranded hundreds of motorists in their vehicles for hours and some for a few days. A train derailment and collision also occurred in southern Indiana as a result of the snow. One hundred National Guardsmen were called out in some areas, especially in those areas where motorists were stranded. Two blackhawk helicopters and 47 humvees were used in searching for stranded motorists. Statewide, 200 property damage auto accidents were reported, along with 1,000 slide-offs, according to the Indianapolis Star. Several rescues were necessary. Snow drifts of up to 4 feet occurred in much of southern Indiana. Damage estimates were found in local newspaper reports.
Monroe	01/03/05	Flood	N/A	0	0	0	0	Heavy rain of over 5 inches between 3 January and 7 January 2005, for a total of over 9 inches in the first half of the month, coupled with rapid snowmelt from the region's historic late December 2004 snowstorm, induced extensive areal flooding over all of central Indiana. Numerous county roads and state highways were closed by high water.
Bloomington	05/13/05	Tstm Wind	50 kts.	0	0	0	0	Power lines were blown down at the south end of Lake Monroe. Severe thunderstorms moved through central Indiana during the afternoon and evening of 13 May 2005. The most serious severe weather came in the form of wind damage, with one person being injured when tree debris fell on their vehicle in Parke County. Some severe hail, mostly marginal, was reported as well.
Bloomington	05/19/05	Tstm Wind	50 kts.	0	0	0	0	Several trees were blown down. Several areas of severe thunderstorms, producing high winds, large hail, and extremely heavy rain, moved through central Indiana on 19 May 2005. Serious flooding occurred in some areas due to the extremely heavy rain.
Bloomington	05/19/05	Tstm Wind	50 kts.	0	0	0	0	Trees were downed near Bloomington. Several areas of severe thunderstorms, producing high winds, large hail, and extremely heavy rain, moved through central Indiana on 19 May 2005. Serious flooding occurred in some areas due to the extremely heavy rain.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Ellettsville	05/19/05	Heavy Rain	N/A	0	0	0	0	Nearly an inch of rain fell in 30 minutes in Ellettsville. Several areas of severe thunderstorms, producing high winds, large hail, and extremely heavy rain, moved through central Indiana on 19 May 2005. Serious flooding occurred in some areas due to the extremely heavy rain.
Monroe	05/19/05	Flash Flood	N/A	0	0	0	0	Roads were flooded by heavy rain in southern Monroe County on 19 May 2005. Some motorists were reportedly stranded. Several areas of severe thunderstorms, producing high winds, large hail, and extremely heavy rain, moved through central Indiana on 19 May 2005. Serious flooding occurred in some areas due to the extremely heavy rain.
Blmngtn Monroe Co Ar	06/05/05	Hail	0.75 in.	0	0	0	0	Hail was reported in Bloomington METAR. Size was reported by the tower observers. A series of severe thunderstorms moved across central Indiana on the afternoon and evening of 5 June 2005. Several central Indiana residents and buildings were struck by lightning, and widespread wind damage occurred. In addition, large hail fell in several areas.
Bloomington	06/05/05	Hail	1.75 in.	0	0	0	0	A series of severe thunderstorms moved across central Indiana on the afternoon and evening of 5 June 2005. Several central Indiana residents and buildings were struck by lightning, and widespread wind damage occurred. In addition, large hail fell in several areas.
Bloomington	06/05/05	Hail	1.00 in.	0	0	0	0	A series of severe thunderstorms moved across central Indiana on the afternoon and evening of 5 June 2005. Several central Indiana residents and buildings were struck by lightning, and widespread wind damage occurred. In addition, large hail fell in several areas.
Bloomington	06/05/05	Hail	0.75 in.	0	0	0	0	A series of severe thunderstorms moved across central Indiana on the afternoon and evening of 5 June 2005. Several central Indiana residents and buildings were struck by lightning, and widespread wind damage occurred. In addition, large hail fell in several areas.
Ellettsville	06/05/05	Hail	0.75 in.	0	0	0	0	A series of severe thunderstorms moved across central Indiana on the afternoon and evening of 5 June 2005. Several central Indiana residents and buildings were struck by lightning, and widespread wind damage occurred. In addition, large hail fell in several areas.
Bloomington	06/30/05	Tstm Wind	50 kts.	0	0	0	0	Trees were blown down. Severe thunderstorms moved through central Indiana on the evening of 30 June 2005. Events were fairly evenly split between large hail and damaging winds.
Bloomington	07/21/05	Tstm Wind	50 kts.	0	0	0	0	Large tree limbs fell. A line of severe thunderstorms containing high winds and heavy rain, in addition to very frequent cloud-to-ground lightning, moved through central Indiana, one evening after a similar line of storms moved through the area.
Monroe	08/30/05	Flood	N/A	0	0	0	0	U.S. 52 was closed by high water. Heavy rain from the remnants of devastating Hurricane Katrina fell across central Indiana on 30 August 2005. Rainfall was heavy in several locations, with the heaviest rain falling in a southwest to northeast corridor from Vincennes to Indianapolis and Muncie. Areal flooding took place in many areas in south central Indiana. By contrast, northeast portions of central Indiana received only light rainfall amounts.
Bloomington	11/06/05	Tstm Wind	50 kts.	0	0	0	0	Trees were downed. On a night in which tragedy was visited upon far southwestern Indiana, when the deadliest Indiana tornado in 31 years killed 23 Hoosiers, a large and damaging squall line moved through central Indiana in the early morning hours, fueled by a cold front and the unusual early November warmth. Widespread wind damage occurred throughout central Indiana, including several reports of downed trees and power lines. Billboards were reported downed by the winds in Howard County. The squall line continued into Ohio, but had weakened slightly by the time it reached the Indiana border.
Ellettsville	11/06/05	Tstm Wind	50 kts.	0	0	0	0	Trees were downed. On a night in which tragedy was visited upon far southwestern Indiana, when the deadliest Indiana tornado in 31 years killed 23 Hoosiers, a large and damaging squall line moved through central Indiana in the early morning hours, fueled by a cold front and the unusual early November warmth. Widespread wind damage occurred throughout central Indiana, including several reports of downed trees and power lines. Billboards were reported downed by the winds in Howard County. The squall line continued into Ohio, but had weakened slightly by the time it reached the Indiana border.
Monroe	12/08/05	Heavy Snow	N/A	0	0	0	0	The first significant snowstorm of the 2005-2006 winter season struck central Indiana on the afternoon and evening of 8 December 2005, causing a minor transportation controversy in the Indianapolis area. City streets were clogged with commuters, many of whom left their places of business at the height of the storm in an attempt to avoid a snowy rush hour. This brought traffic to a virtual standstill across the city, with many citizens

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								reporting commutes taking up to ten or more times the normal amount of time due to the gridlock. Compounding the problem were 214 accidents reported by the Marion County Sheriff's Department, 119 accidents to which the Indiana State Police responded, and many cars which were simply abandoned in the roads as they ran out of gas in the heavy traffic. Streets were snowy and slick, but traffic prevented snowplow crews from remedying the problem quickly. The 7.7 inches of snow measured at the Indianapolis International Airport made the day the sixth snowiest on record at that site. Throughout central Indiana, snowfall totals generally ranged from 4 to 8 inches, with most areas receiving 6-7 inches of snow.
Monroe	03/09/06	Flood	N/A	0	0	0	0	Several state roads were flooded, and Brummett Creek left its banks east of Bloomington. No property damage was reported. Strong thunderstorms produced significant rainfall over central Indiana, causing sporadic areal flooding. Little property damage was reported.
Bloomington	03/12/06	Flood	N/A	0	0	0	0	Two roads were closed due to high water. No property damage was reported. Scattered thunderstorms moved through central Indiana late in the evening and during the overnight hours of 11-12 March 2006. Heavy rain caused some flooding, and two isolated severe storms developed over northwest central Indiana.
Bloomington	03/31/06	Hail	0.75 in.	0	0	0	0	Severe thunderstorms which formed over northwest central Indiana quickly transitioned to a powerful and expanding squall line with embedded supercells that moved southeast through central Indiana during the afternoon and evening of 31 March 2006. Two tornadoes touched down in the 9-county Indianapolis metropolitan area, one of which was on the ground for 17 miles and did an estimated 8 million dollars in damage.
Bloomington	04/02/06	Tstm Wind	51 kts.	0	0	20K	0	Trees fell on a house.
Bloomington	04/07/06	Hail	0.75 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	0.75 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	2.00 in.	0	0	0	0	No property damage estimates were available. A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	1.00 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	1.00 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	1.00 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	1.75 in.	0	0	0	0	No property damage estimates were available. A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	0.75 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	04/07/06	Hail	0.88 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.

Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
Ellettsville	04/07/06	Hail	1.00 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Ellettsville	04/07/06	Hail	1.75 in.	0	0	0	0	No property damage estimates were available. A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Kirksville	04/07/06	Hail	0.75 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Kirksville	04/07/06	Hail	1.00 in.	0	0	0	0	A series of prodigious large hail producing thunderstorms moved across central Indiana during the afternoon and early evening of 7 April 2006. Large hail fell on some portions of central Indiana more than once. Many portions of the Indianapolis area experienced severe weather several times during the afternoon and evening.
Bloomington	05/25/06	Hail	0.88 in.	0	0	0	0	Severe thunderstorms moved through central Indiana on the afternoon and evening of 25 May 2006. While some areas reported wind damage, the only serious structural damage of the day was caused by a lightning strike in the Carmel area around 6:00 PM EST. Large hail also occurred, with hail reaching golfball size to as much as 2 inches in diameter in some areas.
Bloomington	06/07/06	Hail	0.75 in.	0	0	0	0	A few severe thunderstorms, including one powerful supercell, moved mainly southern portions of central Indiana on 7 June 2006. The supercell produced a tornado in eastern Jackson county. This tornado took an unusual path from north to south.
Bloomington	06/19/06	Hail	0.75 in.	0	0	0	0	The third severe weather event in as many days for central Indiana turned out to be the most intense, as several rounds of damaging storms moved through the area. In a change from previous days, however, much of the severe weather came in the form of large hail.
Ellettsville	06/19/06	Hail	1.25 in.	0	0	0	0	The third severe weather event in as many days for central Indiana turned out to be the most intense, as several rounds of damaging storms moved through the area. In a change from previous days, however, much of the severe weather came in the form of large hail.
Unionville	01/28/07	Flood	N/A	1	0	10K	0K	Lake Monroe flooded due to January rains. A man was killed when he drove into flooded local roads.Heavy rain flooded Lake Monroe. A man drove into flooded roads near Lake Monroe after apparently becoming disoriented and was killed.
Monroe	02/12/07	Winter Storm	N/A	0	0	0K	0K	A powerful winter storm moved through central Indiana on 12-14 February 2007. Extremely heavy snow and blizzard conditions crippled much of the northern half of central Indiana for as much as several days, while southern portions of the area were affected by freezing rain. The largest snow event of the season struck central Indiana on February 12th through the 14th. The snow began during the evening of February 12th, moving from the southwest to northeast across Central Indiana. The snow continued at Indianapolis for nearly 30 hours, and when it was all done, during the early morning hours of February 14th, Indianapolis had received 8.5 inches of snow. Blowing and drifting of snow became problematic during the evening of February 13th and during the early morning hours of February 14th. Snow drifts caused the most problems in the areas that received the most snow, mainly north of Interstate 70. Many county highway departments were forced to pull their crews off the roads by extremely treacherous conditions, instead opting to wait the snow and wind out before venturing back out for a lengthy and difficult cleanup process. The low pressure system that produced the storm tracked along and south of the Ohio River across Kentucky which is an ideal storm track for heavy snow in central Indiana. Snow amounts with the storm were heaviest along a Lafayette to Muncie line. Many cities along this line received over a foot of snow. The largest amount of snow was measured in Lafayette, where 17 inches was measured by meteorologists at a television station. This ranks a tie for the second largest snowfall over a three day period in Lafayette. The largest snowfall in Lafayette was 20.5 inches on December 19-20, 1929.
Bloomington	04/03/07	Hail	0.75 in.	0	0	0K	0K	Severe thunderstorms moved through central Indiana on the afternoon of 3 April 2007. The storms produced mostly large hail, with isolated damaging wind.
Hindustan	04/03/07	Tstm Wind	50 kts.	0	0	0K	0K	Trees were reported down due to damaging thunderstorm winds. Severe thunderstorms moved through central

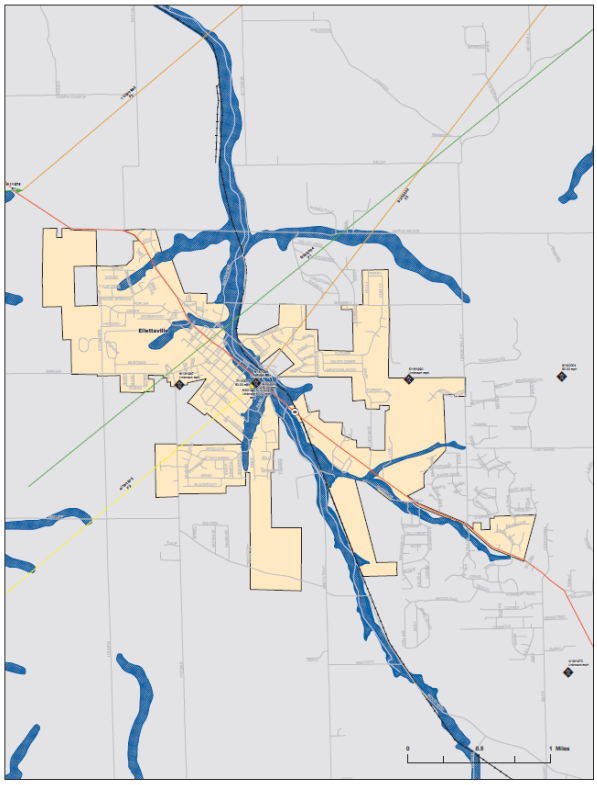
Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								Indiana on the afternoon of 3 April 2007. The storms produced mostly large hail, with isolated damaging wind.
Bloomington	04/11/07	Tstm Wind	50 kts.	0	0	0K	0K	Trees were reported down in several places due to damaging thunderstorm winds. Severe thunderstorms moved through central Indiana on the afternoon of 11 April 2007. The storms produced tornadoes, large hail, and damaging winds. The National Weather Service Indianapolis damage assessment teams confirmed four tornadoes in central Indiana. These tornadoes occurred from mini supercells.
Stinesville	01/08/08	Flash Flood	N/A	0	0	5K	0K	Several county roads were under water due to flash flooding. Heavy rain caused flash flooding across central Indiana. Numerous roads were closed due to the rain.
Bloomington	01/29/08	Tstm Wind	55 kts.	0	0	0K	0K	The wind gust was measured by ASOS equipment. A squall line moved through central Indiana during the evening hours of January 29th. Hail, damaging winds, and a tornado occurred with this storm system in central Indiana. The tornado was rated EF1 and occurred in Marion County.
Monroe	02/21/08	Winter Storm	N/A	0	0	0K	0K	A quarter of an inch of ice accumulated and was measured in Vincennes. A winter storm moved across central Indiana on February 21st and 22nd. Snow, sleet, and freezing rain accompanied this system as it moved through the state.
Stinesville	03/18/08	Flood	N/A	0	0	50K	0K	Flooding occurred in many locations throughout Monroe County. Heavy rain caused high water which closed several roads. One man was rescued by boat from the roof of a submerged vehicle. One household was submerged by the high water. Flooding occurred across central Indiana due to heavy rain. Rain of five to more than eight inches fell on the 18th and 19th in much of southern Indiana near and south of U.S. Highway 50. Many areas of southern Indiana were paralyzed for two or more days as a result. Martin County declared an emergency and told drivers to stay off the roads until flood waters receded.
Smithville	06/03/08	Tstm Wind	50 kts.	0	0	0K	0K	A tree was knocked down on Zikes Road due to damaging thunderstorm winds. Severe weather and torrential downpours began to move through during the morning hours and continued into the early afternoon hours. Flash flooding, damaging winds, and tornadoes all occurred with this system as it moved through.
Arlington	06/04/08	Flash Flood	N/A	0	0	30K	0K	The intersection of Sheridan and Hawthorne flooded. Adjacent yards flooded as well to a depth of about 2 feet. Water entered homes and commercial buildings. People were stuck in or on top of their cars. A strong system moved across central Indiana bringing damaging winds, large hail, and flooding.
Bloomington	06/04/08	Hail	0.88 in.	0	0	0K	0K	A strong system moved across central Indiana bringing damaging winds, large hail, and flooding.
Bloomington	06/04/08	Hail	1.00 in.	0	0	0K	0K	A strong system moved across central Indiana bringing damaging winds, large hail, and flooding.
Bloomington	06/04/08	Hail	1.00 in.	0	0	0K	0K	A strong system moved across central Indiana bringing damaging winds, large hail, and flooding.
Bloomington	06/04/08	Lightning	N/A	0	3	0K	0K	Two individuals had lightning strike near them and were taken to the hospital for lighting related injuries. The cell phone of another individual was stuck while the person was talking on the phone. This individual was also taken to the hospital for treatment. A strong system moved across central Indiana bringing damaging winds, large hail, and flooding.
Ellettsville	06/06/08	Heavy Rain	N/A	0	0	0K	0K	Measured rainfall of 6.00 inches was reported. Massive and historic flash flooding struck central Indiana. The Great Flood of June 2008 was one of Indiana's costliest natural disasters. Major roads and interstates flooded. Heavy rainfall on May 30th allowed streams and rivers to rise. Additional heavy rainfall on the 3rd and the 4th added to these high levels. Severe weather brought heavy rainfall on the 6th as well. The stage was set for historic flooding in portions of central and southern Indiana. The storms on the 6th exacerbated the situation by laying down a boundary in southern Illinois and southern Indiana. A moist southerly low level jet rode over this boundary for more than 12 hours continually generating showers and thunderstorms. Rainfall of two to nearly eleven inches fell across portions of central and southern Indiana. The impact of the rain was immediate with widespread flash flooding occurring.
Stinesville	06/06/08	Heavy Rain	N/A	0	0	0K	0K	Measured rainfall of 7.73 inches was reported. Massive and historic flash flooding struck central Indiana. The Great Flood of June 2008 was one of Indiana's costliest natural disasters. Major roads and interstates flooded. Heavy rainfall on May 30th allowed streams and rivers to rise. Additional heavy rainfall on the 3rd and the 4th added to these high levels. Severe weather brought heavy rainfall on the 6th as well. The stage was set for historic flooding in portions of central and southern Indiana. The storms on the 6th exacerbated the situation by laying down a boundary in southern Illinois and southern Indiana. A moist southerly low level jet rode over this boundary for more than 12 hours continually generating showers and thunderstorms. Rainfall of two to nearly

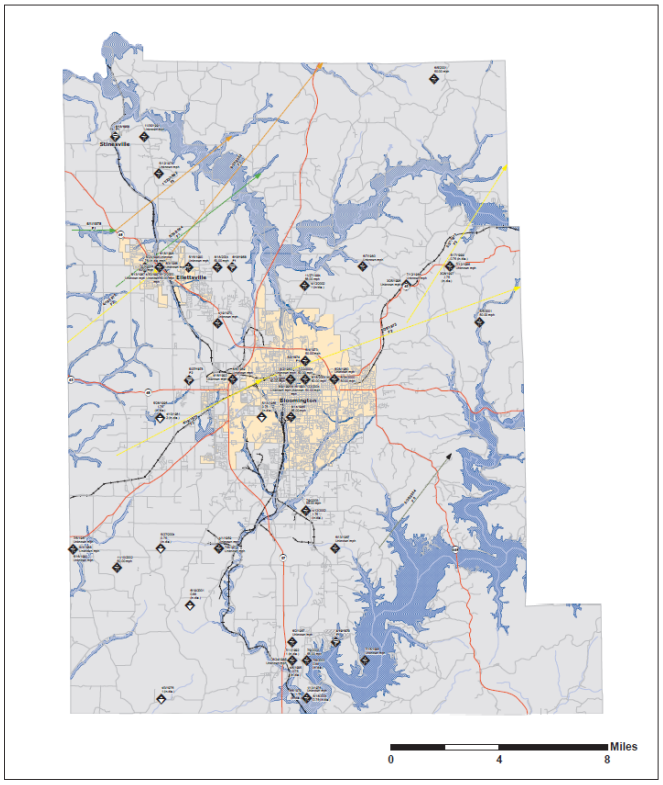
Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								eleven inches fell across portions of central and southern Indiana. The impact of the rain was immediate with widespread flash flooding occurring.
Stinesville	06/07/08	Flash Flood	N/A	0	0	1.0M	250K	State Road 37 was flooded across the northern part of Monroe County due to heavy rain that caused flash flooding. Many roads were closed and some homes were being evacuated at Stinesville and Ellettsville. Flash flooding along Bryant's Creek caused people to be stuck in their houses. Indiana University's campus sustained damage to the football field and Psychology building. Massive and historic flash flooding struck central Indiana. The Great Flood of June 2008 was one of Indiana's costliest natural disasters. Major roads and interstates flooded. Heavy rainfall on May 30th allowed streams and rivers to rise. Additional heavy rainfall on the 3rd and the 4th added to these high levels. Severe weather brought heavy rainfall on the 6th as well. The stage was set for historic flooding in portions of central and southern Indiana. The storms on the 6th exacerbated the situation by laying down a boundary in southern Illinois and southern Indiana. A moist southerly low level jet rode over this boundary for more than 12 hours continually generating showers and thunderstorms. Rainfall of two to nearly eleven inches fell across portions of central and southern Indiana. The impact of the rain was immediate with widespread flash flooding occurring.
Bloomington	06/09/08	Flash Flood	N/A	0	0	5K	5K	Roadways were covered and previous flooding conditions were exacerbated due to heavy rainfall that caused renewed flash flooding. Severe storms produced heavy rainfall and caused flash flooding as they moved across central Indiana during the afternoon hours and through the overnight time period.
Ellettsville	06/14/08	Flash Flood	N/A	0	0	5K	0K	Law enforcement informed the NWS that numerous roads were flooded in the Bloomington area. A landslide occurred on Harmony Road just off of Kirksville Road, located near SR 45 in southwest Bloomington. Thunderstorms brought flash flooding and minor wind damage to central Indiana. Lightning also injured an individual as the storms moved through.
Bloomington	07/08/08	Tstm Wind	60 kts.	0	0	1K	0K	Thunderstorm winds blew a tree down. Thunderstorms moved from in Illinois and across central Indiana during the evening hours of July 8th. Damaging winds were the primary threat.
Clear Creek	07/08/08	Tstm Wind	60 kts.	0	0	1K	0K	Thunderstorm winds blew a tree down. Thunderstorms moved from in Illinois and across central Indiana during the evening hours of July 8th. Damaging winds were the primary threat.
Ellettsville	07/08/08	Tstm Wind	60 kts.	0	0	3K	0K	Trees and utility lines were blown down by thunderstorm winds. Thunderstorms moved from in Illinois and across central Indiana during the evening hours of July 8th. Damaging winds were the primary threat.
Handy	07/08/08	Tstm Wind	60 kts.	0	0	1K	0K	Thunderstorm winds blew a tree down. Thunderstorms moved from in Illinois and across central Indiana during the evening hours of July 8th. Damaging winds were the primary threat.
Hunters	07/08/08	Tstm Wind	60 kts.	0	0	1K	0K	Thunderstorm winds blew a tree down. Thunderstorms moved from in Illinois and across central Indiana during the evening hours of July 8th. Damaging winds were the primary threat.
Mt Tabor	07/08/08	Tstm Wind	60 kts.	0	0	1K	0K	Thunderstorm winds blew a tree down. Thunderstorms moved from in Illinois and across central Indiana during the evening hours of July 8th. Damaging winds were the primary threat.
Yellowstone	07/20/08	Tstm Wind	55 kts.	0	0	0K	0K	Trees were blown down over Tower Ridge Road in Hoosier National Forest by thunderstorm winds. Strong daytime heating and humid air destabilized the atmosphere during the late morning and early afternoon hours. Turbulent clouds developed along a west to east low-level confluence boundary and were aided by wind shear of 30 to 35 knots at low- to mid-levels of the atmosphere. These conditions increased the number and intensity of thunderstorms during the late afternoon and early evening. They produced damaging winds across Indiana from west to east just south of Indianapolis.
Bloomington	07/22/08	Hail	0.88 in.	0	0	0K	0K	During the early- to mid-evening hours, the Storm Prediction Center upgraded central, and much of southern, Indiana to a moderate risk for severe weather and issued a severe thunderstorm watch for the area effective until 3 AM EST. The atmosphere was extremely unstable and the growth of any developing storms was unimpeded. A roughly west to east frontal boundary stretched from southern Nebraska to central Indiana. Dewpoints in the lower 70s F were in place along the front, contributing to strong instability. A strong shortwave trough skirted the area, enhancing coverage of storms. Winds were expected to be the primary threat, and this is what indeed ending up being the main problem in central Indiana.
Broadview	07/22/08	Hail	1.75 in.	0	0	3K	0K	Hail hit the Bloomington area around 12:30 AM EST, ranging from 1/2-inch in diameter to almost 2 inches. Two waves of hail hit with about one half hour in between episodes. One gentleman had over 100 dents on the top of his car, causing an estimated $1,400 in damage, while his wife had 60+ dents at an estimated repair cost of

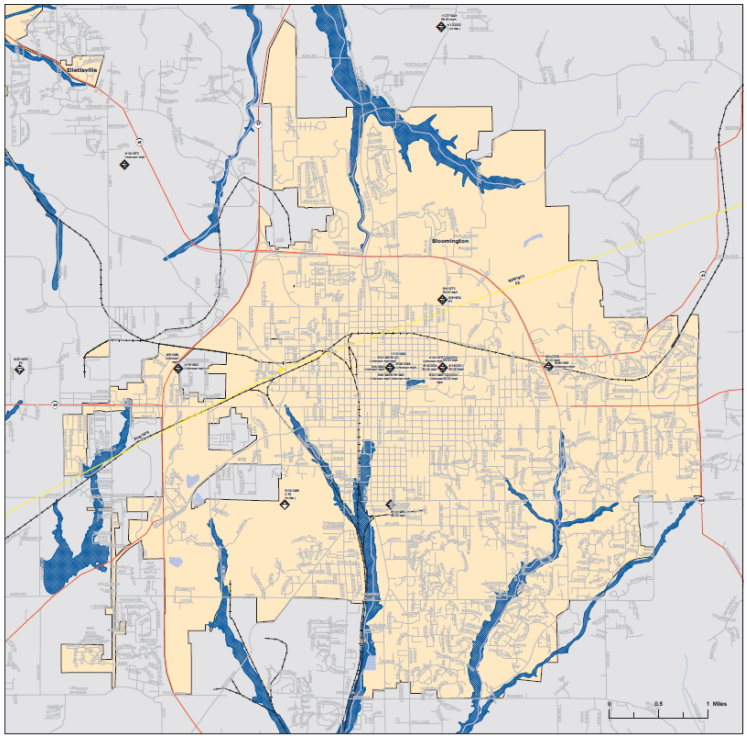
Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								$1,200.During the early- to mid-evening hours, the Storm Prediction Center upgraded central, and much of southern, Indiana to a moderate risk for severe weather and issued a severe thunderstorm watch for the area effective until 3 AM EST. The atmosphere was extremely unstable and the growth of any developing storms was unimpeded. A roughly west to east frontal boundary stretched from southern Nebraska to central Indiana. Dewpoints in the lower 70s F were in place along the front, contributing to strong instability. A strong shortwave trough skirted the area, enhancing coverage of storms. Winds were expected to be the primary threat, and this is what indeed ending up being the main problem in central Indiana.
Monroe	09/14/08	High Wind	60 kts.	0	0	0K	0K	High winds blew down scattered trees and utility lines across the county as a result of gradient winds from the remnants of Ike. In the early morning hours tropical storm Ike was located near western Arkansas, while a slowly advancing cold front and tropical plume of moisture to the northwest helped steer Ike across Indiana during the afternoon hours. An upper level trough pushed through the great lakes overnight...pushing Ike and the cold front quickly to the northeast, with mid level drying moving in during the late evening hours. This episode generally produced the heaviest rainfall in northwest Indiana and Illinois...rather than the originally expected location of central Indiana as it moved through. The speed of the system, increasing as it neared Indiana, helped keep precipitation amounts to a manageable level. Much of southern and eastern Indiana received little or no rain from Ike???s passage. Widespread wind damage occurred however. The peak wind speed at the Indianapolis airport was 63 mph, but areas in southeast Indiana experienced gusts approaching 80 mph. Because of wind damaged corn fields, many farmers bought equipment for their combines to pick up the downed corn. Harvesting of the corn fell behind schedule due to the necessity of slow combine speeds in damaged fields.
Monroe	01/26/09	Winter Storm	N/A	0	0	0K	0K	During the 24-hour period ending approximately 0830 EST 6 inches of snow fell. Snow depth was 10 inches. This was one of the greatest snow storms of all time to strike the Indianapolis, Indiana area. Snow began late on the 26th in central and southern Indiana. Snow totals by the morning of the 27th ranged from around an inch in central Indiana to 6 inches in southern Indiana. After a brief pause, snow returned by early afternoon and continued through the late morning hours on the 28th. When the snow ended, 5 to over 16 inches blanketed central and southern Indiana. Significant freezing rain and sleet lowered overall snow totals in southern Indiana. Some areas in southern Indiana were coated by more than one inch of ice. As a result over 200,000 homes and businesses lost electrical power in the area. Snowfall in the Indianapolis area exceeded 12 inches. The last time Indianapolis received more snow from a winter storm was in January 1996. Snowfall records since 1884 indicate that this storm was among the top eight deepest. Little wind accompanied this storm. This allowed the airport to remain open and aided highway crews in the clearing of roads. The first of multiple winter storm watches across central Indiana was issued for the southern two tiers of counties within the Indianapolis National Weather Service office area of responsibility during the afternoon of January 25th. The winter storm watch was upgraded to a warning mid-afternoon on the 26th and a mix of winter precipitation ensued. The warning area expand north mid-afternoon on the 27th to cover an area from Vigo to Madison to Randolph to Rush to Vigo Counties in anticipation of the second and more vigorous round of snowfall.
Monroe	02/03/09	Winter Weather	N/A	0	0	0K	0K	A measurement of 2.8 inches of snow was recorded by a trained spotter at County Road 900 East and 200 South, or 1.7 miles south of the Avon rail yard. A brief, intense snowstorm struck the Indianapolis area on the 3rd. The rapidly intensifying storm dumped approximately 2 to 4 inches of snow in about an hour during the morning. Snowfall of 2 inches from 0700 to 0800 EST and a storm total of 3.8 inches by 1100 at the Indianapolis National Weather Service office had significant traffic impact during and after morning commute. Two multi-vehicle accidents occurred on Interstate 69 just northeast of Indianapolis, resulting in road closure, 3 deaths and numerous injuries. The number of injuries is unclear. The first accident was a ten-car pile-up at mile marker 8.5 at approximately 0950 EST near Fishers, IN and the second accident was a 50-car pile-up at mile marker 19 at approximately 1030 EST near Pendleton, IN. The number of vehicles involved is a rough estimate due to varying reports.
Monroe	02/11/09	High Wind	60 kts.	0	0	0K	0K	Numerous trees were blown down onto roadways in/around Nashville. At least twelve hundred customers were without power. Mainly non-thunderstorm winds occurred during the afternoon and evening hours of February 11th. A High Wind Warning was in effect for the day as well as portions of the days on either side. A strong low

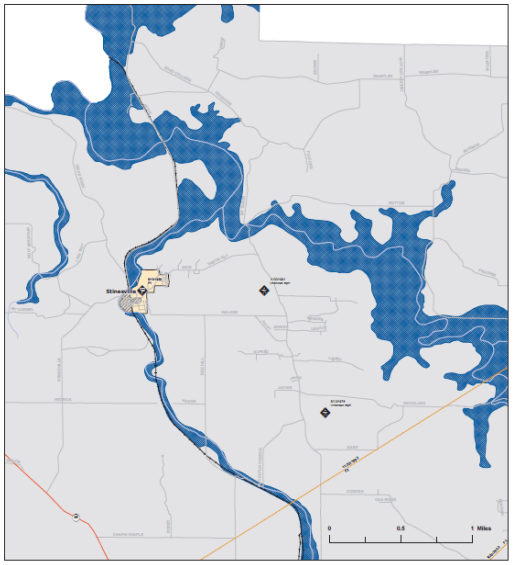
Location or County	Date	Type	Mag	Dth	Inj	PrD	CrD	Description
								pressure system moved across Illinois and northern Indiana with a trailing cold front that passed through Indiana. An intense pressure gradient ahead of the front and strong pressure rises behind the front caused very strong winds to blow. A saturated ground from recent snowmelt and new rainfall may have contributed to the reports of downed trees.

Appendix E – Hazard Map









Monroe County
Pre-Disaster Mitigation Plan

Historical Natural Hazards Map

Legend

- *Severe Thunderstorm (Wind Event)*
- *Severe Thunderstorm (Hail Event)*
- *Tornado Touchdown*
- *100 Year Flood Area*
- *F0*
- *F1*
- *F2*
- *F3*
- *State Highway*
- *Local Road*
- *Railroad*
- *IN_Monroe_FLood_FlashFlood*
- *River*
- *Underground Coal Mine*
- *Lake*
- *City*
- *County*

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Data Sources: NOAA - National Climatic Data Center; Indiana Department of Transportation, Indiana Department of Natural Resources, Monroe County GIS, National Hydrologic Dataset, US Census Bureau

Monroe County Emergency Management Agency

119 W. 7th Street
Bloomington, IN 47404

Phone: (812) 349-2546
Fax: (812) 349-2052

www.co.monroe.in.us

Appendix F – Complete List of Critical Facilities

Airport Facilities

ID	Class	Name	Address	City	Contact	Use	Year Built	Cost (x$1,000)
1	ADFLT	MONROE COUNTY	AIRPORT	BLOOMINGTON	BMG	Public	1900	$5,614
2	ADFLT	LAKE MONROE	SEAPLANE BASE	BLOOMINGTON	07I	Public	1900	$5,614

Bus Facilities

ID	Class	Name	Address	City	Contact	Use	Year Built	Cost (x$1,000)
1	BDFLT	Bloomington Transit	130 W Grimes Ln	Bloomington	Lew May			$1,123
3	BDFLT	Monroe Co Comm Sch Corp	560 E Miller Drive	Bloomington	John Carter	Unknown	1969	$1,400

Care Facilities

ID	Class	Name	Address	City	NumBeds	Use	Year Built	Cost (x$1,000)
1	EFHL	BLOOMINGTON HOSPITAL &	601 W 2ND ST	BLOOMINGTON	297	Hospital		$14,420
2	EFHM	BHC MEADOWS	3600 N PROW RD	BLOOMINGTON	52	Hospital		$7,210
3	EFHS	SELECT SPECIALTY HOSP -	601 W 2ND ST	BLOOMINGTON	30	Hospital		$3,605
9	MDFLT	Community Health Center	333 E Miller	Bloomington		Community		$500
10	EFMC	BLOOMINGTON HOSPITALINC.	333 E MILLER DR	BLOOMINGTON		Rural		$500
11	EFHL	HOSPITALITY HOUSE CARE	1100 S CURRY PIKE	BLOOMINGTON	259	Long_Term		$14,420
12	EFHL	BLOOMINGTON	714 S ROGERS ST	BLOOMINGTON	178	Long_Term		$14,420
21	EFHS	Monroe Hospital	4011 Monroe Medical Park Blvd.	Bloomington	32	Hospital		$13,520
23	EFHS	Monroe Hospital	4001 Monroe Medical Park Blvd	Bloomington	32	Unknown		$13,520
13	EFHL	MEADOWOOD HEALTH	2455 TAMARACK TRAIL	BLOOMINGTON	66	Long_Term		$14,420
14	EFHS	WALNUT CREEK AT	120 E MILLER DR	BLOOMINGTON	40	Long_Term		$3,605
15	EFHL	RICHLAND BEAN BLOSSOM	5911 W STATE RD 46	ELLETTSVILLE	79	Long_Term		$14,420
16	EFHL	ALTERRA STERLING HOUSE O	3802 S SARE RD	BLOOMINGTON	56	Long_Term		$14,420
17	EFHL	FONTANBLEU NURSING AND	3305 SOUTH HIGHWAY 37	BLOOMINGTON	201	Long_Term		$14,420
18	EFHS	BELL TRACE HEALTH AND	725 BELL TRACE CIR	BLOOMINGTON	43	Long_Term		$3,605

Communication Facilities

ID	Class	Name	Address	City	Contact	Use	Year Built	Cost (x$1,000)
1	CBR	WGCL		BLOOMINGTON	DA2 Daytime LIC	AM		$103
2	CBT	WTIU		BLOOMINGTON	DA LIC	TV		$103
3	CBT	WTIU		BLOOMINGTON	DA LIC	DT		$103
4	CBR	W299BD		BLOOMINGTON	299 ND CP	FX		$103
5	CBR	W292DD		ELLETSVILLE	292 ND CP	FX		$103

6	CBR	NEW		BLOOMINGTON	282 ND APP	FX	$103
7	CBR	NEW		BLOOMINGTON	281 ND APP	FX	$103
8	CBR	WFIU		BLOOMINGTON	279 ND CP	FS	$103
9	CBR	WFIU		BLOOMINGTON	279 ND LIC	FM	$103
10	CBR	WFIU		BLOOMINGTON	279 ND USE	FA	$103
11	CBR	W276BF		BLOOMINGTON	276 ND CP MOD	FX	$103
12	CBR	W270BH		BLOOMINGTON	270 ND CP	FX	$103
13	CBR	WIUX-LP		BLOOMINGTON	262 ND CP	FL	$103
14	CBR	W256AR		KIRKSVILLE	256 ND CP MOD	FX	$103
15	CBR	W251AG		BLOOMINGTON	251 DA LIC	FX	$103
16	CBR	WCLS		SPENCER	249 ND CP MOD	FM	$103
17	CBR	WBWB		BLOOMINGTON	244 ND LIC	FM	$103
18	CBR	WBWB		BLOOMINGTON	244 ND USE	FA	$103
19	CBR	W240AT		BLOOMINGTON	240 ND LIC	FX	$103
20	CBR	WVNI		NASHVILLE	236 ND LIC	FM	$103
21	CBR	NEW		BLOOMINGTON	231 ND APP	FX	$103
23	CBR	WCJL		MORGANTOWN	215 DA CP	FM	$103
24	CBO	Cell Tower/College Mall	2894 E 3rd St	Bloomington	<Add contact	Cell	$130
25	CBO	Cell Tower/Fire St#4	2201 E 3rd St	Bloomington	<Add contact	Cell	$130
26	CBO	Cell Tower/Fire St#8	900 N Curry Pike	Bloomington	<Add contact	Cell	$130
27	CBO	Cell Tower	1200 E Hillside Avenue	Bloomington	<Add contact	Cell	$130
28	CBO	Cell Tower/Sarkes Tarzian	1020 S Highland Avenue	Bloomington	<Add contact	Cell	$130
29	CBO	Cell Tower/CBU	1969 S Henderson St	Bloomington	<Add contact	Cell	$130
31	CBO	Cell Tower/First Assmbly of God	801 E Matlock	Bloomington	<Add contact	Cell	$130
30	CBO	Cell Tower	2222 E 10th St	Bloomington	<Add contact	Cell	$130
32	CBO	Cell Tower/AT&T Bldg	301 N Washington	Bloomington	<Add contact	Cell	$130
33	CBO	Cell Tower/Johnson Creamery	400 W 7th	Bloomington	<Add contact	Cell	$130
34	CBO	Cell Tower	1308 W Vernal Pike	Bloomington	<Add contact	Cell	$130
35	CBO	Cell Tower	2010 W Vernal Pike	Bloomington	<Add contact	Cell	$130
36	CBO	Cell Tower	2356 W Industrial Park Drive	Bloomington	<Add contact	Cell	$130
37	CBO	Cell Tower	1999 Packinghouse Road	Bloomington	<Add contact	Cell	$130

38	CBO	Cell Tower	5996 Tower Road	Bloomington	<Add contact	Cell	$130
39	CBO	Cell Tower/T-Mobile	3907 S Walnut St	Bloomington	<Add contact	Cell	$130
40	CBO	Cell Tower	1604 S Rogers St	Bloomington	<Add contact	Cell	$130
41	CBO	Cell Tower	205 N College Avenue	Bloomington	<Add contact	Cell	$130
42	CBO	Cell Tower/Hoosier Energy	St Rd 37 & Ellis Rd	Bloomington	<Add contact	Cell	$130
43	CBO	Cell Tower	8346 S Fairfax Rd	Bloomington	<Add contact	Cell	$130
44	CBO	Cell Tower	3445 S Knightridge Road	Bloomington	<Add contact	Cell	$130

Dams

ID	Class	Name	Near City	Distance To City	Owner	Purpose	Year Built	Normal Storage
1	HPDA	UNIVERSITY LAKE DAM	MARLIN HILLS	2	IND. UNIV. PHYSICAL PLANT	S	1910	88
2	HPDE	LAZY LAKE DAM	DOLAN	3	WHEELER MISSION MINISTRIE	R	1940	84
3	HPDE	BRYANTS CREEK DAM	GOSPORT	10	IDNR--FORESTRY	R	1940	54
5	HPDE	WEIMER LAKE DAM	LEONARD	0	HOOSIER TRAILS COUNCIL	R	1939	0
6	HPDE	GRIFFY RESERVOIR DAM	MARLIN HILLS	1	CITY OF BLOOMINGTON UTILI	R	1924	1280
7	HPDE	BETHAL LAKE DAM	MOUNT TABOR	10	NATHAN SILVERSTEIN	R	1964	35
8	HPDE	SCHACHT LAKE DAM	MONROE LAKE	3	ALFRED & LEE STRICKHOLM	R	1960	9
9	HPDE	CHERRY LAKE DAM	MARTINSVILLE	10	IDNR--FORESTRY	R	1940	25
10	HPDE	EGENOLF LAKE DAM	DOLAN	3	EGENOLF RIDGE	RC	1964	155
11	HPDE	BUGHER LAKE DAM	ROMONA	9	TEN HIGH VENTURE	R	1938	44
13	HPDE	LAKE LEMON DAM	DOLAN	7	CITY OF BLOOMINGTON	SR	1952	13300
14	HPDE	MONROE LAKE DAM	GUTHRIE	3	CELRL	CRS	1965	182250
15	HPDZ	FIELDSTONE	<Add nearest		BOB BURKETT	Unknown		
16	HPDZ	LINNEMEIER LAKE DAM	<Add nearest		ALLEN LINNEMEIER	Unknown		
17	HPDZ	SHAWNEE LAKE DAM	<Add nearest		NADINE WAY	Unknown		

Electric Power Facilities

ID	Class	Name	Address	City	Contact	Use	Year Built	Cost (x$1,000)
1	EDC	Cinergy Substation	1604 S Rogers Street	Bloomingtion	<Add contact	Substation		$141,625

Emergency Centers

ID	Class	Name	Address	City	Contact	Year Built	Cost (x$1,000)
1	EDFLT	Monroe County EOC	220 E 3rd Street	Bloomington	Jim Comerford		$1,288

Fire Stations

ID	Class	Name	Address	City	Contact	Year Built	Cost (x$1,000)
1	EFFS	Ellettsville Fire Dept -Station 7	5080 W SR 46	Ellettsville	Fire Departments		$618
2	EFFS	Van Buren Twp Fire Dept -Station 9	2130 S Kirby Rd	Bloomington	Fire Departments		$618
3	EFFS	Bloomington Fire Dept	300 E 4th St	Bloomington	Fire Departments		$618
4	EFFS	Bloomington Twp Fire Dept-Stn 5	5081 N Old State Road 37	Bloomington	Fire Departments		$618
5	EFFS	Benton Township Volunteer Fire	7606 E State Road 45	Unionville	Fire Departments		$618
6	EFFS	Stinesville Fire Dept	7951 W Main St	Stinesville	Fire Departments		$618
7	EFFS	Perry-Clear Creek Fire Dept	9094 S Strain Ridge Rd	Bloomington	Fire Departments		$618
8	EFFS	Bloomington Fire Dept - Station 4	2201 E 3rd St.	Bloomington	<Add contact name>		$618
9	EFFS	Bloomington Fire Dept - Station 3	900 N Woodlawn	Bloomington	<Add contact name>		$618
10	EFFS	Bloomington Fire Dept - Station 2	209 S Fairfield Drive	Bloomington	<Add contact name>		$618
11	EFFS	Bloomington Fire Dept - Station 5	1987 S Henderson St	Bloomington	<Add contact name>		$618
12	EFFS	Perry-Clear Creek Fire Dept	3953 S Kennedy Drive	Bloomington	<Add contact name>		$618
13	EFFS	Van Buren Twp Fire Dept-Stn 19	9019 W Hinds Road	Bloomington	<Add contact name>		$618
14	EFFS	Ellettsville Fire Dept - Station 8	900 N Curry	Bloomington	<Add contact name>		$618
15	EFFS	Bloomington Twp Fire Dept	2111 N Vernal Pike	Bloomington	<Add contact name>		$618
16	EFFS	Indian Creek Twp Fire Dept	8019 S Rockport Road	Bloomington	<Add contact name>		$618

Hazmat

ID	Class	Name	Address	City	Owner	Chemical	Year Built	Amount
1	HDFLT	PROGRESSIVE PLATING CO. INC.		2064 COLUMBIA AVE.		INDIANAPOLIS ZINC COMPOUNDS		
2	HDFLT	GE APPLIANCES BLOOMINGTON		301 N. CURRY PIKE		BLOOMINGTON	XYLENE (MIXED	
27	HDFLT	Amerigas	1829 S. Curry Pike	Bloomington	<Add facility	Propane		
28	HDFLT	AT&T	301 NWashington St	Bloomington	<Add facility	Sulfuric Acid		
29	HDFLT	Baxter Pharmaceutical Solutions	927 S Curry Pike	Bloomington	<Add facility	Other		
30	HDFLT	Baxter Pharmaceutical Solutions	1801 N Curry Pike	Bloomington	<Add facility	Other		
31	HDFLT	Baxter Pharmaceutical Solutions	555 Daniels Way	Bloomington	<Add facility	Lead		
32	HDFLT	Bloomington Dillman WWTP	100 W Dillman	Bloomington	<Add facility	Diesel		
33	HDFLT	Bloomington Street Dept	1969 S Henderson St	Bloomington	<Add facility	Diesel		
34	HDFLT	Blucher Poole WWTP	5555 N Bottom Rd	Bloomington	<Add facility	Chlorine		
14	HDFLT	OTIS ELEVATOR CO.	1331 S. CURRY PIKE	BLOOMINGTON		CHROMIUM		
20	HDFLT	ABB POWER T&D CO. INC.	300 N. CURRY PIKE	BLOOMINGTON		COPPER		

22	HDFLT	INDIANA METAL CRAFT INC.	4602 Innovation CT. P.O. BOX 546	BLOOMINGTON		COPPER
35	HDFLT	USPS Woodbridge Station	3210 E 10th St	Bloomington	<Add facility	Gasolene
36	HDFLT	Carlisle Braking Systems	1031 E Hillside Dr	Bloomington	<Add facility	Unknown
37	HDFLT	Choice One Communications, Inc	2599 W Vernal Pike	Bloomington	<Add facility	Unknown
38	HDFLT	Circle-Prosco, Inc.	401 N Gates Drive	Bloomington	<Add facility	Nitric Acid
39	HDFLT	Cook Incorporated - Park 48	750 Daniels Way	Bloomington	<Add facility	Other
40	HDFLT	ERIC INC d/b/a/ Jiffy Lube	2621 E 3rd St	Bloomington	<Add facility	Other
23	HDFLT	PTS ELECTRONICS CORP.	5233 S. OLD HWY. 37	BLOOMINGTON		DIISOCYANATES
24	HDFLT	INDEPENDENT PACKAGING	303 N. CURRY PIKE	BLOOMINGTON		CERTAIN
25	HDFLT	COOK INC.	6300 N MATTHEWS DR.	ELLETTSVILLE		ETHYLENE OXIDE
41	HDFLT	Frank Southern Center Ice Arena	2100 S Henderson	Bloomington	<Add facility	Anhydrous
42	HDFLT	Hoosier Disposal	6660 S Old State Rd 37	Bloomington	<Add facility	Diesel
43	HDFLT	IMI	1600 S Rogers St	Bloomington	<Add facility	Other
44	HDFLT	IMI	1800 N Kinser Pike	Bloomington	<Add facility	Other
45	HDFLT	Insight Communications	1600 W Vernal Pike	Bloomington	<Add facility	Sulfuric Acid
46	HDFLT	Inter Art Distribution	3963 W Vernal Pike	Bloomington	<Add facility	Sulfuric Acid
47	HDFLT	IU UOEHS	2735 E 10th	Bloomington	<Add facility	Other
48	HDFLT	Monroe Water Treatment Plant	7470 Shields Ridge Rd	Bloomington	<Add facility	Diesel
49	HDFLT	Otis Elevator Co.	1331 S Curry Pike	Bloomington	<Add facility	Chromium
50	HDFLT	Penske Truck Leasing	2212 S Yost Avenue	Bloomington	<Add facility	Diesel
51	HDFLT	Printpak	303 N Curry Pike	Bloomington	<Add facility	Sulfuric Acid
52	HDFLT	PYA/Monarch	311 N Curry Pike	Bloomington	<Add facility	Ammonia
53	HDFLT	Sam's Club	3205 W SR 45	Bloomington	<Add facility	Sulfuric Acid
54	HDFLT	Sims and Pedigo Co., Inc.	8311 N St. Rd 37	Bloomington	<Add facility	Methanol
55	HDFLT	Speedway #5183	3585 W St. Rd 46	Bloomington	<Add facility	Kerosene
56	HDFLT	Speedway #6010	2700 N Walnut	Bloomington	<Add facility	Kerosene
57	HDFLT	Speedway #6009	3939 W 3rd	Bloomington	<Add facility	Kerosene
58	HDFLT	Speedway #1327	3021 E 3rd	Bloomington	<Add facility	Kerosene
59	HDFLT	Swifty Station #277	2200 W 3rd St	Bloomington	<Add facility	Gasolene
60	HDFLT	Swifty Oil #225	4723 W SR 46	Bloomington	<Add facility	Gasolene
61	HDFLT	Coca-Cola Bottling Company	1701 Liberty Drive	Bloomington	<Add facility	Other

62	HDFLT	United Parcel Service	1700 Liberty Drive	Bloomington	<Add facility	Gasolene
63	HDFLT	United Rentals	2520 Industrial Park Drive	Bloomington	<Add facility	Gasolene
64	HDFLT	Verizon Wireless	5996 Tower Road	Bloomington	<Add facility	Sulfuric Acid
65	HDFLT	Victor Oolitic Stone Company	7850 Victor Pike	Bloomington	<Add facility	Nitrate
66	HDFLT	Allcares	5699 W SR 45	Bloomington	<Add facility	Oxygen
67	HDFLT	Bloomington Hospital	601 W 2nd	Bloomington	<Add facility	Diesel
68	HDFLT	BMG Aviation	984 S Kirby Road	Bloomington	<Add facility	Gasolene
69	HDFLT	Bloomington DPW	545 S Adams St	Bloomington	<Add facility	Diesel
70	HDFLT	Cinergy/PSI	1100 W 2nd St	Bloomington	<Add facility	Gasolene
71	HDFLT	Koorsen Protection Services	4700 W Innovation Ct	Bloomington	<Add facility	Other
72	HDFLT	Tamarron Lift Station	3660 E Tamarron Dr	Bloomington	<Add facility	Diesel
73	HDFLT	White River Co-Op	1305 W Bloomfield Rd	Bloomington	<Add facility	Diesel
74	HDFLT	Bloomington DPW West Booster	1075 W 17th St	Bloomington	<Add facility	Diesel
75	HDFLT	Bryan Park Pool	1020 S. Woodlawn Avenue	Bloomington	<Add facility	Calcium Chloride
76	HDFLT	Mills Pool	1100 N 14th Street	Bloomington	<Add facility	Calcium Chloride

Military Facilities

ID	Class	Name	Address	City	Owner	Use	Year Built	Cost (x$1,000)
1	HMI12	Indiana National Guard Armory	3380 S Walnut	Bloomingtion	Unknown	Unknown		$10,000
2	HMI12	US Army Reserve Center	520 S Woodcrest Drive	Bloomington	Unknown	Unknown		$10,000

Police Stations

ID	Class	Name	Address	City	Contact	Year Built	Cost (x$1,000)
1	EFPS	Ellettsville Police Dept	1406 West Temperance Street	Ellettsville	Police Departments		$1,442
2	EFPS	Monroe County Police Legal	122 S Walnut St	Bloomington	Sheriff		$1,442
3	EFPS	Bloomington Police Dept	220 E 3rd St	Bloomington	Police Departments		$1,442
4	EFPS	Monroe County Sheriff	301 N College Ave	Bloomington	Sheriff		$1,442
5	EFPS	Monroe County Auxiliary Police	505 W 4th St	Bloomington	Sheriff		$1,442
6	EFPS	Stinesville Police Dept	7951 W Main St	Stinesville	Police Departments		$1,442
7	EFPS	Indiana University-Police Dept	801 N Jordan Ave	Bloomington	Police Departments		$1,442
8	EFPS	Indiana State Police - Bloomington	2135 N Fee Lane	Bloomington	<Add contact name>		$1,442

Potable Water Facilities

ID	Class	Name	Address	City	Contact	Use	YearBuilt	Cost (x$1,000)
4	PDFLT	Chalmers Municipal Water	SR 43 and Main Street	Chalmers	<Add contact	Unknown		42874

Schools

ID	Class	Name	Address	City	Contact	Students	Year Built	Cost (x$1,000)
1	EFS1	Edgewood Early Childhood Cntr	8045 W SR 46	Ellettsville	Richland-Bean			$515
2	EFS1	Edgewood High School	601 S Edgewood Dr	Ellettsville	Richland-Bean			$515
3	EFS1	Forest Hills Spec Educ Coop	8045 W SR 46	Ellettsville	Richland-Bean			$515
4	EFS1	Edgewood Primary School	7700 W Reeves Rd	Bloomington	Richland-Bean			$515
5	EFS1	Edgewood Intermediate School	7600 W Reeves Rd	Bloomington	Richland-Bean			$515
6	EFS1	Unionville Elementary School	8144 E SR 45	Unionville	Monroe County			$515
7	EFS1	Lakeview Elementary School	9090 S Strain Ridge	Bloomington	Monroe County			$515
8	EFS1	Grandview Elementary School	2300 S Endwright Rd	Bloomington	Monroe County			$515
9	EFS1	Highland Park Elem Sch	900 Park Square Dr	Bloomington	Monroe County			$515
10	EFS1	Bloomington High School South	1965 S Walnut St	Bloomington	Monroe County			$515
11	EFS1	Bloomington High School North	3901 Kinser Pike	Bloomington	Monroe County			$515
12	EFS1	Tri-North Middle School	1000 W 15th St	Bloomington	Monroe County			$515
13	EFS1	Lora L Batchelor Middle Sch	900 Gordon Pike	Bloomington	Monroe County			$515
14	EFS1	Binford Elementary School	2300 E Second St	Bloomington	Monroe County			$515
15	EFS1	Arlington Heights Elem Sch	800 Gourley Pike	Bloomington	Monroe County			$515
17	EFS1	Childs Elementary School	2211 S High St	Bloomington	Monroe County			$515
18	EFS1	Clear Creek Elementary School	300 Clear Creek Dr	Bloomington	Monroe County			$515
19	EFS1	Fairview Elementary School	627 W 8th St	Bloomington	Monroe County			$515
20	EFS1	Hoosier Hills Career Center	3070 Prow Rd	Bloomington	Monroe County			$515
21	EFS1	Marlin Elementary School	1655 E Bethel Ln	Bloomington	Monroe County			$515
22	EFS1	Rogers Elementary School	2200 E 2nd St	Bloomington	Monroe County			$515
23	EFS1	Jackson Creek Middle Sch	3980 S Sare Rd	Bloomington	Monroe County			$515
24	EFS1	University Elementary School	1111 N Russell Rd	Bloomington	Monroe County			$515
32	SDFLT	Adventist Christian Academy	2230 N Martha St	Bloomington	<Add contact		300	$644
25	EFS1	Aurora Alternative School	524 N Fairview St	Bloomington	Monroe County			$515
27	EFS1	Templeton Elementary School	1400 S Brenda Ln	Bloomington	Monroe County			$515
28	EFS1	Stinesville Elementary School	7973 W Main St	Stinesville	Richland-Bean			$515
29	EFS1	Edgewood Junior High School	851 W Edgewood Rd	Ellettsville	Richland-Bean			$515
30	SDFLT	Saint Charles Boromeo School	2224 E 3rd St	Bloomington	<Add contact		300	$644
31	EFS1	Summit Elementary School	1450 W Countryside Ln	Bloomington	<Add contact		300	$644

33	SDFLT	Bloomington Dev Learning Center	1807 S Highland	Bloomington	<Add contact	300	$644
34	SDFLT	Campus Children's Center	2613 E 10th St	Bloomington	<Add contact	300	$644
35	SDFLT	High Achievers	1313 S Stull Avenue	Bloomington	<Add contact	300	$644
36	SDFLT	Hoosier Courts Cooperative	1150 N Union St	Bloomington	<Add contact	300	$644
37	SDFLT	Kid Angles-The Early Education	1500 E Hillside Drive	Bloomington	<Add contact	300	$644
38	EFS1	Broadview Elementary School	705 W Coolidge Drive	Bloomington	<Add contact	300	$644
39	EFS2	Ivy Tech St College-Bloomington	200 N Daniels Way	Bloomington	<Add contact	300	$644
40	EFS1	Honey Creek School	8325 N Low Gap Road	Unionville	<Add contact	300	$644
41	EFS1	New Technical High School	444 S Patterson	Bloomington	<Add contact	300	$644

User Defined Facilities

ID	Class	Name	Address	City	Use	Occupancy	Year Built	Cost (x$1,000)
1	UDFGB	MCCSC Adminstration Building	315 E North Drive	Bloomington	Other	EDU1		1000
2	UDFGB	MCCSC Svc/Transportation Bldg	560 E Miller Drive	Bloomington	Other	EDU1		1000
3	UDFGB	Wonderlab Museum	308 W 4th St	Bloomington	Other	REL1	2003	1000
4	UDFGB	Monroe County Public Library	303 E Kirkwood avenue	Bloomington	Other	COM8		1000
5	UDFGB	Monroe County Historical Museum	202 E 6th St	Bloomington	Other	COM8		1000
6	UDFGB	Richland BeanBlossom CSC Admin	600 Edgewood Drive	Ellettsville	Other	EDU1		1000
7	UDFGB	Monroe Co Pub Library Ellettsville	600 W Temperance St	Ellettsville	Other	COM8		1000
8	UDFGB	Herald Times	1900 S Walnut St	Bloomington	Commercial	COM1		1000
9	UDFGB	Indiana Daily Student	940 E 7th St #120	Bloomington	Other	EDU2		1000
10	UDFGB	Inside Indiana	3901 E Hagan	Bloomington	Other	COM4		1000
11	UDFGB	Ellettsville Journal	211 N Sale	Ellettsville	Commercial	COM1		1000
12	UDFGB	FBI	400 W 7th St #232	Bloomington	Other	GOV1		1000
13	UDFGB	Monroe County Courthouse	100 W 7th St	Bloomington	Other	GOV1		1000
14	UDFGB	Health Services Building	119 W 7th St	Bloomington	Other	GOV1		1000
15	UDFGB	Justice Building	301 N College Avenue	Bloomington	Other	GOV1		1000
16	UDFGB	Johnson Building	405 W 7th St	Bloomington	Other	GOV1		1000
17	UDFGB	Curry Building	290 W 7th St	Bloomington	Other	GOV1		1000
18	UDFGB	City Hall	401 N Morton St	Bloomington	Other	GOV1		1000
19	UDFGB	Navy/AF/Marine Recruiting Station	327 S Walnut St	Bloomington	Other	GOV1		1000
20	UDFGB	Parking Garage	4th & Walnut St	Bloomington	Other	COM10		1000
21	UDFGB	Parking Garage	7th & Walnut	Bloomington	Other	COM10		1000

22	UDFGB	Animal Shelter	3410 S Walnut St	Bloomington	Other	GOV1	1000
23	UDFGB	Sanitation Garage	3406 S Walnut st	Bloomington	Other	GOV1	1000
24	UDFGB	Bloomington Street Dept	1987 S Henderson	Bloomington	Other	GOV1	1000
25	UDFGB	Perry Township Trustee	1010 SWalnut	Bloomington	Other	GOV1	1000
26	UDFGB	Health & Human Services	555 E Miller Drive	Bloomington	Other	GOV1	1000
27	UDFGB	Social Security Adminstration	555 E Miller Dr	Bloomington	Other	GOV1	1000
28	UDFGB	Child Protective Services	401 E Miller Drive	Bloomington	Other	GOV1	1000
29	UDFGB	Monroe County Family & Children	401 E Miller Drive	Bloomington	Other	GOV1	1000
30	UDFGB	Division of Fish & Wildlife	553 E Miller Drive	Bloomington	Other	GOV1	1000
31	UDFGB	Indiana Department of Revenue	410 S Landmark Ave	Bloomington	Other	GOV1	1000
32	UDFGB	Vocational Rehabilitation	450 S Landmark Avenue	Bloomington	Other	GOV1	1000
33	UDFGB	Workforce Development	450 S Landmark Avenue	Bloomington	Other	GOV1	1000
34	UDFGB	IRS	2017 S Liberty Drive	Bloomington	Other	GOV1	1000
35	UDFGB	Youth Services	615 S Adams St	Bloomington	Other	GOV1	1000
36	UDFGB	US Post Office - Main Branch	206 E 4th St	Bloomington	Other	GOV1	1000
38	UDFGB	INDOT	2965 N Prow Road	Bloomington	Other	GOV1	1000
39	UDFGB	Ellettsville Post Office	104 NSale St	Ellettsville	Other	GOV1	1000
40	UDFGB	Ellettsville Town Hall	221 N Sale St	Ellettsville	Other	GOV1	1000
41	UDFGB	Richland Township Trustee	207 N Sale St	Ellettsville	Other	GOV1	1000
42	UDFGB	Monroe County Highway Garage	2800 S Kirby Road	Bloomington	Other	GOV1	1000
43	UDFGB	Harrodsburg Post Office	9262 S Harrodsburg Rd	Harrodsburg	Other	GOV1	1000
44	UDFGB	Stanford Post Office	9048 SSR 45	Bloomington	Other	GOV1	1000
45	UDFGB	BMV	1612 S Liberty Drive	Bloomington	Other	GOV1	1000
46	UDFGB	Indiana Dept of Natural Resources	4850 S SR 446	Bloomington	Other	GOV1	1000
47	UDFGB	Ellettsville Street Department	102 S Park St	Ellettsville	Other	GOV1	1000
48	UDFGB	Unionville Post Office	7910 E SR 45	Unionville	Other	GOV1	1000
49	UDFGB	Smithville Post Office	7300 S Strain Ridge Road	Smithville	Other	GOV1	1000
50	UDFGB	SIRA	500 SLandmark Avenue	Bloomington	Other	COM4	1000
51	UDFGB	Internal Medicine Association	550 S Landmark Avenue	Bloomington	Other	COM7	1000
52	UDFGB	Bloomington Oncology Center	2620 W Cota Drive	Bloomington	Other	COM7	1000
53	UDFGB	Indiana MRI LLC	3802 W Industrial Blvd #4	Bloomington	Other	COM7	1000

54	UDFGB	Promptcare West	3443 W 3rd Street	Bloomington	Other	COM7	1000
55	UDFGB	Promptcare East	326 S Woodcrest Drive	Bloomington	Other	COM7	1000
56	UDFGB	IU Cyclotron	2401/2425 N Milo Sampson Ln	Bloomington	Other	EDU2	1000
57	UDFGB	IU Outdoor Pool	1490 N Fee Lane	Bloomington	Other	EDU2	1000
58	UDFGB	IU Central Heating Plant	820 N Walnut Grove	Bloomington	Other	EDU2	1000
59	UDFGB	IU Geological Survey	611 N Walnut Grove	Bloomington	Other	EDU2	1000
60	UDFGB	IU Education	201 N Rose Avenue	Bloomington	Other	EDU2	1000
61	UDFGB	IU Fine Arts	1201 E 7th St	Bloomington	Other	EDU2	1000
62	UDFGB	IU Franklin Hall	601 E Kirkwood Avenue	Bloomington	Other	EDU2	1000
63	UDFGB	IU Optometry	800 E Atwater Avenue	Bloomington	Other	EDU2	1000
64	UDFGB	IU Jordan Hall	1001 E 3rd St	Bloomington	Other	EDU2	1000
65	UDFGB	IU Lindley Hall	150 S Woodlawn Avenue	Bloomington	Other	EDU2	1000
66	UDFGB	IU Swain West	727 E 3rd St	Bloomington	Other	EDU2	1000
68	UDFGB	IU Printing Service	638 N Rogers St	Bloomington	Other	EDU2	1000
69	UDFGB	IU Student Rec Sports & Aquatic	1601 E Law Lane	Bloomington	Other	EDU2	1000
70	UDFGB	IU Dept of Chemistry	800 E Kirkwood Avenue	Bloomington	Other	EDU2	1000
71	UDFGB	IU HPER	1025 E 7th St	Bloomington	Other	EDU2	1000

Waste Water Facilities

ID	Class	Name	Address	City	Contact	Use	Year Built	Cost (x$1,000)
1	WDFLT	HARDIN MONROE INC	8029 HARDIN RIDGE RD	HELTONVILLE	MRS. DEBBIE	Front Gate	2000	$68,598
2	WDFLT	MONROE COUNTY REG. WASTE	HARRODSBURY RD & FOGGY	BLOOMINGTON	MR. JEFF	Building	2002	$68,598
3	WDFLT	STINESVILLE WWTP	SR 46 & STINESVILLE RD	STINESVILLE	MR. JEFF	Front Gate	1998	$68,598
4	WDFLT	ELLETTSVILLE MUN WWTP	MCNEELY & MATTHEWS RD	ELLETTSVILLE	MR. JEFF	Building	2001	$68,598
5	WDFLT	BLOOMINGTON, DILLMAN ROAD	100 Dillman Road	BLOOMINGTON	MR. BILL	Building	1987	$68,598
6	WDFLT	BLUCHER POOLE STP	MAPLE GROVE AND BOTTOM	BLOOMINGTON	MR. TED E.	Other	1998	$68,598

City of Bloomington Historic Locations

City of Bloomington, Indiana

Survey Results By Address

Survey Listings by Street Name

1st | 2nd | 3rd | 4th | 6th | 7th | 8th | 9th | 10th | 11th | 12th-15th

A | B | C | D | E | F | G | H | I | J | K | L | M | O-P | R | S | U-V | Waldron - Walnut | Washington - Wylie

Street names on current page: 1st | 2nd | 3rd

Keys

Rating Classification Key
The survey assigns a rating that indicates the significance of the property.

O : Outstanding
N : Notable
C : Contributing
NC : Non-Contributing

Designation Key
The Designation field lists other Historic Registers associated with the property.

BHD: Bloomington Historic District
NR: National Historic Register
SR: State Historic Register

1st

Number	Dir	Street Name	Suffix	Rating	Survey District	Designation	Survey ID
105	E	1ST	ST	C	Scattered Sites		105-055-90077
106	E	1ST	ST	C	Scattered Sites		105-055-90078
112	E	1ST	ST	C	Scattered Sites		105-055-90079
114	E	1ST	ST	C	Scattered Sites		105-055-90080
201	E	1ST	ST	C	East Second		105-055-74083
212	E	1ST	ST	C	Bryan Park		105-055-83003
217	E	1ST	ST	N	Bryan Park		105-055-83001
222	E	1ST	ST	C	Bryan Park		105-055-83004
223	E	1ST	ST	C	Bryan Park		105-055-83002
302	E	1ST	ST	N	Bryan Park		105-055-83005
311	E	1ST	ST	C	East Second		105-055-74084
316	E	1ST	ST	C	East Second		105-055-74098
320	E	1ST	ST	C	East Second		105-055-74099

321	E	1ST	ST	C	East Second		105-055-74085
322	E	1ST	ST	C	East Second		105-055-74100
324	E	1ST	ST	C	East Second		105-055-74101
400	E	1ST	ST	C	East Second		105-055-74102
401	E	1ST	ST	C	East Second		105-055-74086
402	E	1ST	ST	C	East Second		105-055-74103
404	E	1ST	ST	C	East Second		105-055-74104
405	E	1ST	ST	C	East Second		105-055-74087
407	E	1ST	ST	NC	East Second		105-055-74088
409	E	1ST	ST	C	East Second		105-055-74089
411	E	1ST	ST	C	East Second		105-055-74090
412	E	1ST	ST	C	East Second		105-055-74105
414	E	1ST	ST	C	East Second		105-055-74106
415	E	1ST	ST	C	East Second		105-055-74091
416	E	1ST	ST	C	East Second		105-055-74107
417	E	1ST	ST	C	East Second		105-055-74092
419	E	1ST	ST	C	East Second		105-055-74092
420	E	1ST	ST	NC	East Second		105-055-74108
421	E	1ST	ST	C	East Second		105-055-74093
501	E	1ST	ST	C	East Second		105-055-74094
509	E	1ST	ST	C	East Second		105-055-74095
510	E	1ST	ST	C	East Second		105-055-74109
515	E	1ST	ST	C	East Second		105-055-74096
516-518	E	1ST	ST	C	East Second		105-055-74110
524	E	1ST	ST	C	East Second		105-055-74111
528	E	1ST	ST	C	East Second		105-055-74112
529	E	1ST	ST	C	East Second		105-055-74097
600	E	1ST	ST	C	Elm Heights		105-055-76127
608	E	1ST	ST	C	Elm Heights		105-055-76128
611	E	1ST	ST	C	Elm Heights		105-055-76118
612	E	1ST	ST	C	Elm Heights		105-055-76129
616	E	1ST	ST	C	Elm Heights		105-055-76130

Survey Results By Address

619	E	1ST	ST	C	University Street Bungalow	105-055-75012
620	E	1ST	ST	C	Elm Heights	105-055-76131
702	E	1ST	ST	C	Elm Heights	105-055-76132
704	E	1ST	ST	C	Elm Heights	105-055-76133
710	E	1ST	ST	C	Elm Heights	105-055-76134
711	E	1ST	ST	C	Elm Heights	105-055-76119
714	E	1ST	ST	C	Elm Heights	105-055-76135
717	E	1ST	ST	N	Elm Heights	105-055-76120
721	E	1ST	ST	C	Elm Heights	105-055-76121
800	E	1ST	ST	C	Elm Heights	105-055-76136
803	E	1ST	ST	C	Elm Heights	105-055-76122
807	E	1ST	ST	C	Elm Heights	105-055-76123
810	E	1ST	ST	C	Elm Heights	105-055-76137
816	E	1ST	ST	N	Elm Heights	105-055-76138
820	E	1ST	ST	C	Elm Heights	105-055-76139
900	E	1ST	ST	C	Elm Heights	105-055-76140
904	E	1ST	ST	C	Elm Heights	105-055-76141
905	E	1ST	ST	C	Elm Heights	105-055-76124
912	E	1ST	ST	C	Elm Heights	105-055-76142
915	E	1ST	ST	N	Elm Heights	105-055-76125
918	E	1ST	ST	C	Elm Heights	105-055-76143
1001	E	1ST	ST	N	Vinegar Hill	105-055-77001
1002	E	1ST	ST	O	Vinegar Hill	105-055-77018
1006	E	1ST	ST	C	Vinegar Hill	105-055-77019
1010	E	1ST	ST	C	Vinegar Hill	105-055-77020
1014	E	1ST	ST	N	Vinegar Hill	105-055-77021
1017	E	1ST	ST	C	Vinegar Hill	105-055-77002
1018	E	1ST	ST	C	Vinegar Hill	105-055-77022
1019	E	1ST	ST	O	Vinegar Hill	105-055-77003
1022	E	1ST	ST	C	Vinegar Hill	105-055-77023
1025	E	1ST	ST	O	Vinegar Hill	105-055-77004
1026	E	1ST	ST	C	Vinegar Hill	105-055-77024

1104	E	1ST	ST	C	Vinegar Hill		105-055-77025
1107	E	1ST	ST	N	Vinegar Hill		105-055-77005
1108	E	1ST	ST	C	Vinegar Hill		105-055-77026
1109	E	1ST	ST	C	Vinegar Hill		105-055-77006
1111	E	1ST	ST	N	Vinegar Hill		105-055-77007
1112	E	1ST	ST	C	Vinegar Hill		105-055-77027
1113	E	1ST	ST	C	Vinegar Hill		105-055-77008
1115	E	1ST	ST	C	Vinegar Hill		105-055-77009
1116	E	1ST	ST	O	Vinegar Hill		105-055-77028
1119	E	1ST	ST	O	Vinegar Hill		105-055-77010
1120	E	1ST	ST	C	Vinegar Hill		105-055-77029
1122	E	1ST	ST	C	Vinegar Hill		105-055-77030
1123	E	1ST	ST	N	Vinegar Hill		105-055-77011
1126	E	1ST	ST	NC	Vinegar Hill		105-055-77031
1127	E	1ST	ST	C	Vinegar Hill		105-055-77012
1130	E	1ST	ST	C	Vinegar Hill		105-055-77032
1200	E	1ST	ST	C	Vinegar Hill		105-055-77033
1202	E	1ST	ST	C	Vinegar Hill		105-055-77034
1208	E	1ST	ST	NC	Vinegar Hill		105-055-77035
1212	E	1ST	ST	NC	Vinegar Hill		105-055-77036
1213	E	1ST	ST	N	Vinegar Hill		105-055-77013
1214	E	1ST	ST	C	Vinegar Hill		105-055-77037
1217	E	1ST	ST	NC	Vinegar Hill		105-055-77014
1220	E	1ST	ST	C	Vinegar Hill		105-055-77038
1300	E	1ST	ST	C	Vinegar Hill		105-055-77039
1319	E	1ST	ST	N	Vinegar Hill		105-055-77015
1320	E	1ST	ST	N	Vinegar Hill		105-055-77040
1323	E	1ST	ST	N	Vinegar Hill		105-055-77016
1327	E	1ST	ST	O	Vinegar Hill		105-055-77017
1330	E	1ST	ST	N	Vinegar Hill		105-055-77041
817	W	1ST	ST	C	McDoel		105-055-78005
819	W	1ST	ST	C	McDoel		105-055-78004

821	W	1ST	ST	C	McDoel		105-055-78003
825	W	1ST	ST	C	McDoel		105-055-78002
827	W	1ST	ST	C	McDoel		105-055-78001

2nd

Number	Dir	Street Name	Suffix	Rating	Survey District	Designation	Survey ID
112	E	2ND	ST	C	East Second		105-055-74024
200	E	2ND	ST	C	East Second		105-055-74025
201	E	2ND	ST	C	East Second		105-055-74002
207	E	2ND	ST	C	East Second		105-055-74003
208	E	2ND	ST	NC	East Second		105-055-74026
209	E	2ND	ST	C	East Second		105-055-74004
211	E	2ND	ST	C	East Second		105-055-74005
212	E	2ND	ST	N	East Second		105-055-74027
215	E	2ND	ST	C	East Second		105-055-74006
307	E	2ND	ST	O	East Second	NR; BHD	105-055-74007
310	E	2ND	ST	C	East Second		105-055-74028
317	E	2ND	ST	C	East Second		105-055-74008
321	E	2ND	ST	C	East Second		105-055-74009
324	E	2ND	ST	N	East Second	BHD	105-055-74029
327	E	2ND	ST	C	East Second		105-055-74010
400	E	2ND	ST	NC	East Second		105-055-74030
401	E	2ND	ST	C	East Second		105-055-74011
405	E	2ND	ST	C	East Second		105-055-74012
406	E	2ND	ST	C	East Second		105-055-74031
409	E	2ND	ST	NC	East Second		105-055-74013
412	E	2ND	ST	C	East Second		105-055-74032
416	E	2ND	ST	NC	East Second		105-055-74033
417	E	2ND	ST	N	East Second		105-055-74014
426	E	2ND	ST	C	East Second		105-055-74034
428	E	2ND	ST	N	East Second		105-055-74035
430	E	2ND	ST	N	East Second		105-055-74036
434	E	2ND	ST	C	East Second		105-055-74037

440	E	2ND	ST	C	East Second		105-055-74038
446-448	E	2ND	ST	C	East Second		105-055-74039
514	E	2ND	ST	C	East Second		105-055-74040
518	E	2ND	ST	C	East Second		105-055-74041
520	E	2ND	ST	C	East Second		105-055-74042
521	E	2ND	ST	N	East Second		105-055-74015
600	E	2ND	ST	C	East Second		105-055-74043
604	E	2ND	ST	C	East Second		105-055-74044
607	E	2ND	ST	C	East Second		105-055-74016
608	E	2ND	ST	C	East Second		105-055-74045
611	E	2ND	ST	C	East Second		105-055-74017
613-615	E	2ND	ST	C	East Second		105-055-74018
614	E	2ND	ST	NC	East Second		105-055-74046
710	E	2ND	ST	C	East Second		105-055-74047
712	E	2ND	ST	C	East Second		105-055-74048
714	E	2ND	ST	NC	East Second		105-055-74049
715	E	2ND	ST	C	East Second		105-055-74019
716	E	2ND	ST	C	East Second		105-055-74050
717	E	2ND	ST	N	East Second		105-055-74020
719-719 1/2	E	2ND	ST	C	East Second		105-055-74021
723	E	2ND	ST	C	East Second		105-055-74022
725	E	2ND	ST	C	East Second		105-055-74023
801	E	2ND	ST	C	Elm Heights		105-055-76073
816	E	2ND	ST	C	Elm Heights		105-055-76082
817	E	2ND	ST	C	Elm Heights		105-055-76074
832	E	2ND	ST	C	Elm Heights		105-055-76083
903	E	2ND	ST	NC	Elm Heights		105-055-76075
908-910	E	2ND	ST	C	Elm Heights		105-055-76084
909	E	2ND	ST	N	Elm Heights		105-055-76076
912	E	2ND	ST	C	Elm Heights		105-055-76085
914	E	2ND	ST	N	Elm Heights		105-055-76086
1000	E	2ND	ST	C	Elm Heights		105-055-76087

1004	E	2ND	ST	C	Elm Heights		105-055-76088
1008	E	2ND	ST	C	Elm Heights		105-055-76089
1012	E	2ND	ST	C	Elm Heights		105-055-76090
1100	E	2ND	ST	N	Elm Heights		105-055-76091
1106	E	2ND	ST	N	Elm Heights		105-055-76092
1201	E	2ND	ST	C	Elm Heights		105-055-76077
1203	E	2ND	ST	C	Elm Heights		105-055-76078
1302	E	2ND	ST	C	Elm Heights		105-055-76093
1304	E	2ND	ST	C	Elm Heights		105-055-76094
1307	E	2ND	ST	NC	Elm Heights		105-055-76079
1309	E	2ND	ST	C	Elm Heights		105-055-76080
1310	E	2ND	ST	C	Elm Heights		105-055-76072
1315	E	2ND	ST	C	Elm Heights		105-055-76081
1946	E	2ND	ST	C	Scattered Sites		105-055-90123
2017	E	2ND	ST	C	Scattered Sites		105-055-90122
322	W	2ND	ST	N	Scattered Sites	BHD	105-055-90177
722	W	2ND	ST	NC	Prospect Hill Study Area		105-055-65135
730	W	2ND	ST	C	Prospect Hill Study Area		105-055-65134
800	W	2ND	ST	C	Prospect Hill Study Area		105-055-65133
806	W	2ND	ST	C	Prospect Hill Study Area		105-055-65132
808	W	2ND	ST	C	Prospect Hill Study Area		105-055-65131
812	W	2ND	ST	C	Prospect Hill Study Area		105-055-65130
820	W	2ND	ST	C	Prospect Hill Study Area		105-055-65129
900	W	2ND	ST	C	Prospect Hill Study Area		105-055-65128
904	W	2ND	ST	C	Prospect Hill Study Area		105-055-65127
912	W	2ND	ST	C	Prospect Hill Study Area		105-055-65126
918	W	2ND	ST	NC	Prospect Hill Study Area		105-055-65125
926	W	2ND	ST	C	Prospect Hill Study Area		105-055-65124
930	W	2ND	ST	C	Prospect Hill Study Area		105-055-65123
934	W	2ND	ST	C	Prospect Hill Study Area		105-055-65122
1209	W	2ND	ST	C	Scattered Sites		105-055-90178

3rd

Survey Results By Address

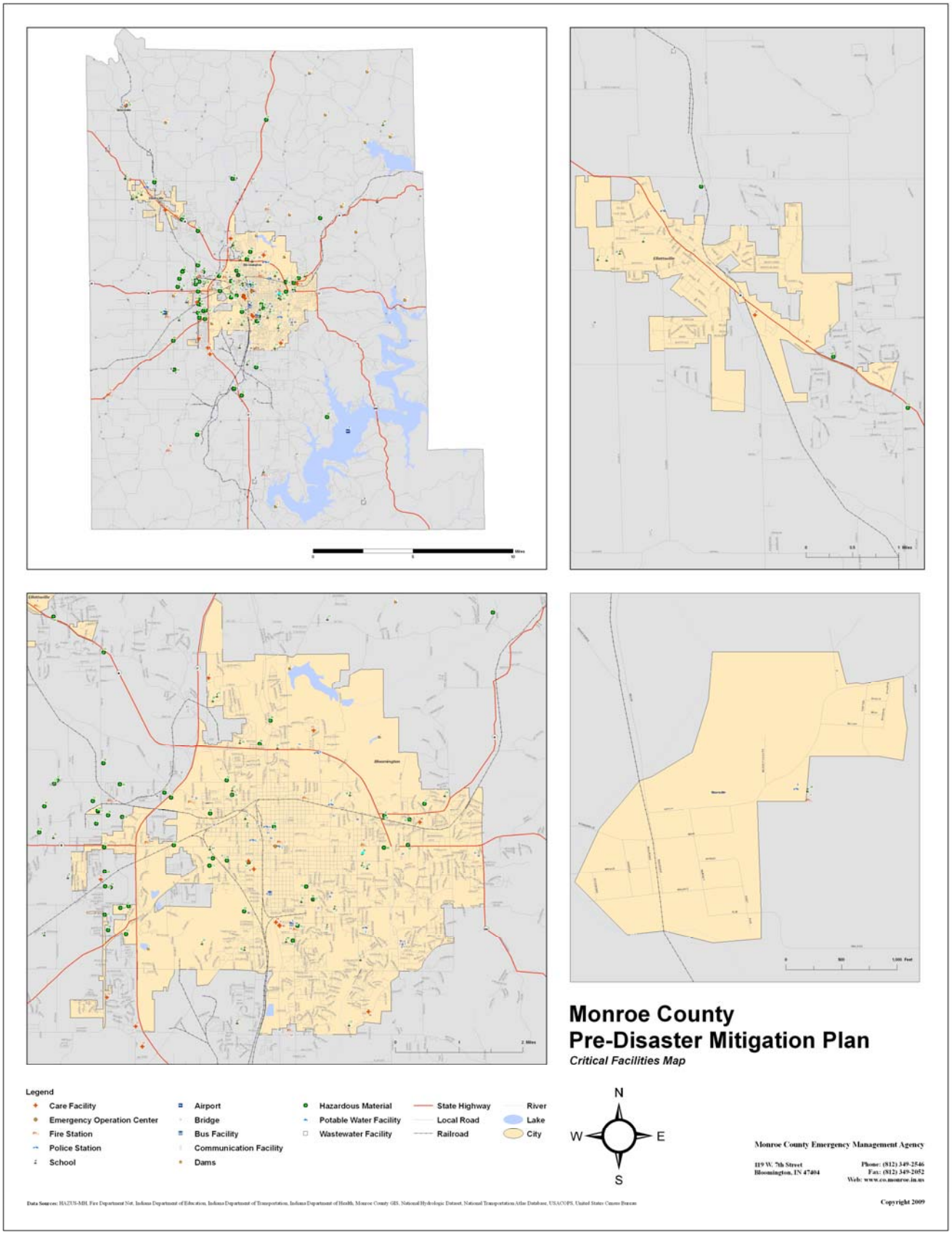
Number	Dir	Street Name	Suffix	Rating	Survey District	Designation	Survey ID
112	E	3RD	ST	C	Scattered Sites		105-055-90067
300	E	3RD	ST	O	Scattered Sites	SR; NR	105-055-90173
420	E	3RD	ST	C	South Dunn		105-055-73001
426-426 1/2	E	3RD	ST	C	South Dunn		105-055-73002
508	E	3RD	ST	C	South Dunn		105-055-73003
514	E	3RD	ST	N	South Dunn		105-055-73004
522	E	3RD	ST	C	South Dunn		105-055-73005
618	E	3RD	ST	N	Scattered Sites		105-055-90074
624	E	3RD	ST	N	Scattered Sites		105-055-90075
630	E	3RD	ST	N	Scattered Sites		105-055-90076
1503	E	3RD	ST	N	Scattered Sites		105-055-90106
1624	E	3RD	ST	C	Scattered Sites		105-055-90107
1708	E	3RD	ST	C	Scattered Sites		105-055-90108
1818	E	3RD	ST	C	Scattered Sites		105-055-90109
1822	E	3RD	ST	C	Scattered Sites		105-055-90110
1834	E	3RD	ST	C	Scattered Sites		105-055-90111
2027	E	3RD	ST	N	Scattered Sites		105-055-90102
2029	E	3RD	ST	C	Scattered Sites		105-055-90103
2031	E	3RD	ST	C	Scattered Sites		105-055-90104
2101	E	3RD	ST	C	Scattered Sites		105-055-90105
409	W	3RD	ST	NC	Prospect Hill Study Area		105-055-65058
411	W	3RD	ST	NC	Prospect Hill Study Area		105-055-65058
508	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66001
511	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66007
515	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66008
516	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66002
522	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66003
524	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66004
525	W	3RD	ST	C	Prospect Hill Historic District	NR; BHD	105-055-66009
608	W	3RD	ST	O	Prospect Hill Historic District	NR; BHD	105-055-66005
610	W	3RD	ST	N	Prospect Hill Historic District	NR; BHD	105-055-66006

616	W	3RD	ST	C	Steele-Dunning and West Third	NR	105-055-63019
618	W	3RD	ST	C	Steele-Dunning and West Third	NR	105-055-63020
704	W	3RD	ST	N	Steele-Dunning and West Third	NR	105-055-63021
706	W	3RD	ST	N	Steele-Dunning and West Third	NR	105-055-63022
708	W	3RD	ST	NC	Steele-Dunning and West Third	NR	105-055-63023
710	W	3RD	ST	C	Steele-Dunning and West Third	NR	105-055-63024
712	W	3RD	ST	C	Steele-Dunning and West Third	NR	105-055-63025
715-717	W	3RD	ST	C	Prospect Hill Study Area		105-055-65057
719	W	3RD	ST	C	Prospect Hill Study Area		105-055-65056
720	W	3RD	ST	C	Prospect Hill Study Area		105-055-65046
724	W	3RD	ST	C	Prospect Hill Study Area		105-055-65045
725	W	3RD	ST	C	Prospect Hill Study Area		105-055-65055
731	W	3RD	ST	N	Prospect Hill Study Area		105-055-65054
811	W	3RD	ST	C	Prospect Hill Study Area		105-055-65053
812	W	3RD	ST	NC	Prospect Hill Study Area		105-055-65044
814	W	3RD	ST	C	Prospect Hill Study Area		105-055-65043
816	W	3RD	ST	C	Prospect Hill Study Area		105-055-65042
822-822 1/2	W	3RD	ST	C	Prospect Hill Study Area		105-055-65041
824	W	3RD	ST	C	Prospect Hill Study Area		105-055-65040
900	W	3RD	ST	C	Prospect Hill Study Area		105-055-65039
904	W	3RD	ST	C	Prospect Hill Study Area		105-055-65038
905	W	3RD	ST	C	Prospect Hill Study Area		105-055-65052
908	W	3RD	ST	C	Prospect Hill Study Area		105-055-65037
910	W	3RD	ST	C	Prospect Hill Study Area		105-055-65036
911	W	3RD	ST	C	Prospect Hill Study Area		105-055-65051
913	W	3RD	ST	C	Prospect Hill Study Area		105-055-65050
914	W	3RD	ST	C	Prospect Hill Study Area		105-055-65035
917	W	3RD	ST	C	Prospect Hill Study Area		105-055-65049
918	W	3RD	ST	C	Prospect Hill Study Area		105-055-65034
923	W	3RD	ST	C	Prospect Hill Study Area		105-055-65048
1005	W	3RD	ST	C	Prospect Hill Study Area		105-055-65047

Information in Survey Results By Address

Webpages
- A-D
- E-H
- Eighth to Tenth
- Eleventh to Fifteenth
- Fourth to Seventh
- I-L
- M, O-P
- R-S
- U-V
- Waldron - Walnut
- Washington - Wylie

Appendix G – Map of Critical Facilities


Monroe County
Pre-Disaster Mitigation Plan
Critical Facilities Map
Legend
Care Facility
Emergency Operation Center
Fire Station
Police Station
School
Airport
Bridge
Bus Facility
Communication Facility
Dams
Hazardous Material
Potable Water Facility
Wastewater Facility
State Highway
Local Road
Railroad
River
Lake
City
N
W
E
S
Monroe County Emergency Management Agency
119 W. 7th Street
Bloomington, IN 47404
Phone: (812) 349-2546
Fax: (812) 349-2052
Web: www.co.monroe.in.us
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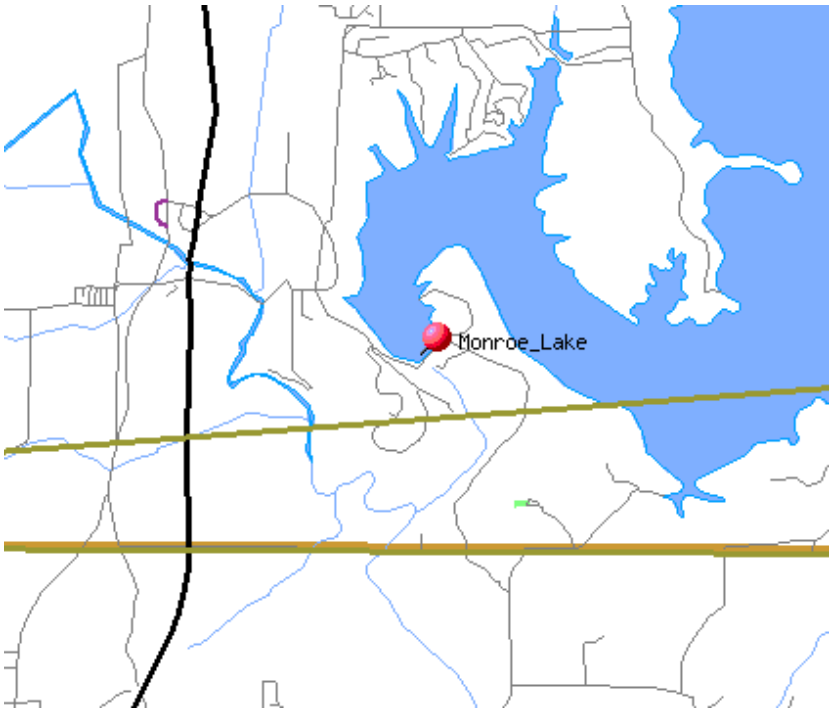
Appendix H – Recorded NOAA Flood Data: USGS Stream Gauge Data

The following gauge information was obtained from The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service website (www.weather.gov/ahps/). For Monroe County, data is provided for one point: Monroe Lake.

Monroe Lake



Flood Categories (in feet)

Major Flood Stage: 556

Historical Crests
(1) 556.25 ft on 05/15/2002
(2) 555.03 ft on 04/13/2008
(3) 554.95 ft on 05/16/1996
(4) 553.40 ft on 05/18/2008
(5) 551.55 ft on 05/17/1983
(6) 551.39 ft on 01/18/2005
(7) 551.27 ft on 06/25/1998
(8) 551.10 ft on 01/24/2007
(9) 550.60 ft on 05/02/1973
(10) 549.92 ft on 06/04/1995
(11) 549.76 ft on 04/10/1989
(12) 549.30 ft on 04/02/1975
(13) 549.19 ft on 12/14/1985
(14) 549.10 ft on 03/25/1982
(15) 548.60 ft on 04/19/1979
(15) 548.60 ft on 02/10/1969
(17) 548.34 ft on 05/28/1990
(18) 547.82 ft on 12/08/1993

Historical Crests
(19) 547.70 ft on 06/03/1968

Feet	Flood Impacts
574.0	Top of Dam.
556.0	Flood Pool Elevation. South Dam access road closed.
555.0	Lake Monroe Sailing Association, visitor parking lot, service road to Area D, campsites in Area B, Area C and Area H at Paynetown flooded. Brummett Creek Road and Old State Road 46 begin to flood. Brummett Creek Road often flooded by Salt Creek and not the dam.
554.0	Playground at Paynetown campground flooded.
553.3	Campsites in Area A of Paynetown Campground flooded.
551.5	Cutright access road goes underwater near the main boat ramp. Access to ramp, picnic areas and PleasureCraft Marina is unavailable by vehicle.
551.0	Lower end of Moore's Creek Road flooded.
550.0	Approach road to Hardin Ridge Beach closed. IDNR storage building at Crooked Creek, boat storage at Lake Monroe Sailing Association, Allen's Creek Road, Pine Grove ramp access road and Crooked Creek ramp flooded. Cutright highwater gravel access ramp begins to flood.
548.0	Approach road to Paynetown docks flooded.
546.0	Fairfax and Cutright ramps flooded.
545.0	Fairfax and Hardin Ridge beaches closed.
544.0	Friendship, Stipp, and upper end of Moores Creek roads closed.
543.0	Paynetown beach and McGowan road to Northfork flooded.
541.0	Drainage for marshes stopped. Many crop lease fields flooded.
540.0	Lake Monroe Sailing Association jib cranes flooded.
538.0	Year Round Pool Elevation.
537.0	Courtesy Dock adjusted.
536.0	Crooked Creek ramp closed.
535.0	Upper end of lake and east of causeway difficult to use.
534.0	Low lake level affects many areas around Monroe Lake. Allens Creek and Pinegrove ramps are closed. Nine slips on courtesy dock for campers impossible to use at Paynetown. Beach at Paynetown is down to mud. Left side of Paynetown launching ramp is closed. Impossible to launch boats with keel at Sailing Assoc. Boat docks difficult to use at Sailing Assoc. Difficult to launch boats with jib crane at Sailing Assoc. Problems with buoy fields at Fairfax Marina. Community Group Docks have to be adjusted.
515.0	Minimum Pool.

Ord 10-14

To Amend Title 2 of the Bloomington Municipal Code Entitled "Administration And Personnel" - Re: Amending BMC 2.04.380 (Order of Business for Regular Sessions)

Materials in this Packet

- Am 01 – Combining Instructions Regarding Public Comment
- Annotated Changes to Ordinance

*** Amendment Form ***

Ordinance #: 10-14
Amendment #: 01
Submitted By: Council Office
Date: September 10, 2010

Proposed Amendment:

1. Ord 10-14, Section I shall be amended by deleting the following words in 2.04.380(4)(D) "(During the two parts of the agenda set aside for Reports from the Public, speakers may speak only once, for no more than five minutes, on matters of community concern not on the agenda. The Presiding Officer may reduce the individual time limits to accommodate an excess of speakers.)." The words shall be replaced with an asterisk such that 2.04.380(4)(D) shall read as follows:

(D) Public*;

2. Ord 10-14, Section I shall be amended by adding an asterisk to the word "public" in 2.04.380(8) and deleting the words "See also (4)(D) above" such that 2.04.380(8) shall read as follows:

(8) Additional Reports from the Public***** (A maximum of twenty-five minutes is set aside for this section of the agenda).

3. Ord 10-14, Section I shall be amended by adding the following paragraph to the end of the entire 2.04.380 provision:

* Members of the public may speak on matters of community concern not listed on the agenda at one of the two *Reports from the Public* opportunities. Citizens may speak at one of these periods, but not both. Speakers are allowed five minutes; this time allotment may be reduced by the presiding officer if numerous people wish to speak.

Synopsis

This amendment makes a few stylistic changes in the interest of clarifying the public comment requirement. It deletes the parenthetical public comment rules that were previously cited in both sections 2.04.380(4)(D) and 2.04.380(8) and moves the rules to one section at the end of the Agenda, noted in the aforementioned provisions by way of asterisk. This amendment also slightly rewords the public comment rules.

9/15/10 Committee Action: None
9/22/10 Regular Session Action: Pending

September 10, 2010

~~strike~~ – proposed deletion
bold – proposed addition
► -- relevant section

ORDINANCE 10-14
TO AMEND TITLE 2 OF THE BLOOMINGTON MUNICIPAL CODE ENTITLED "ADMINISTRATION AND PERSONNEL"
Re: Amending BMC 2.04.380 (Order of Business at Regular Sessions)

WHEREAS**,** on August 4, 2010, the Common Council adopted a Report of the Rules Committee which, in part, recommended that the Council amend Bloomington Municipal Code 2.04.380 (Order of Business) to reflect the Committee recommendations; and

WHEREAS, while most of these recommendations do no more than reflect current practices, some offer changes; and

WHEREAS, those changes limit speakers wishing to comment upon items not on the agenda to one, rather than two, opportunities to address the Council in order to avoid repetition and to shorten meetings; and

WHEREAS, those changes also rename the "Privilege of the Floor" section on the agenda to "Additional Reports from the Public," in order to make it clear that the public may address the Council at that point on the agenda; and

WHEREAS, in addition, while reviewing the section, staff identified and recommends further changes; and

WHEREAS, these changes add a section entitled "Appointments to Boards and Commissions" to the agenda to reflect existing practice and add a section entitled "Council Schedule" in order to simplify the actions necessary for the Council to amend or approve its schedule; and

WHEREAS, these changes also delete part (b) of BMC 2.04.380, which expressed a preference for the Presiding Officer to recognize a speaker who intended to address the previous speakers comments, because it would neither comport with existing practice nor improve Council deliberations;

NOW, THEREFORE, BE IT HEREBY ORDAINED BY THE COMMON COUNCIL OF THE CITY OF BLOOMINGTON, MONROE COUNTY, INDIANA, THAT:

SECTION 1. Title 2 of the Bloomington Municipal Code entitled "Administration and Personnel" shall be amended by deleting Section 2.04.380 entitled "Order of Business" and replacing it with the following, entitled 2.04.380 "Order of business at Regular Sessions." This new name for the section shall also replace the old name as it appears in the table of contents for this Chapter. The new section shall read as follows:

2.04.380 Order of business at Regular Sessions.

The council shall transact its business in the following order, but it may by majority vote amend the normal order of business and time limits set forth below:

(1) Roll call;

(2) Agenda summation;

(3) Approval of minutes;

(4) Reports (A maximum of twenty minutes is set aside for each part of this section.):

(A) Council members,

(B) The mayor and city offices,

(C) Council committees, and

► (D) Public* ~~(During the two parts of the agenda set aside for Reports from the Public, speakers may speak only once, for no more than five minutes, on matters of community concern not on the agenda. The Presiding Officer may reduce the individual time limits to accommodate an excess of speakers.)~~;

(5) Appointments to Boards and Commissions;

(6) Legislation for second readings and resolutions;

(7) First readings;

► (8) Additional Reports from the Public* (A maximum of twenty-five minutes is set aside for this section of the agenda. ~~See also (4)(D) above~~.);

(9) Council Schedule;

(10) Adjournment.

► * **Members of the public may speak on matters of community concern not listed on the agenda at one of the two *Reports from the Public* opportunities. Citizens may speak at one of these periods, but not both. Speakers are allowed five minutes; this time allotment may be reduced by the presiding officer if numerous people wish to speak.**

SECTION 2. If any sections, sentence or provision of this ordinance, or the application thereof to any person or circumstances shall be declared invalid, such invalidity shall not affect any of the other sections, sentences, provisions, or applications of this ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this ordinance are declared to be severable.

SECTION 3. This ordinance shall be in full force and effect from and after its passage by the Common Council of the City of Bloomington and approval of the Mayor.

PASSED AND ADOPTED by the Common Council of the City of Bloomington, Monroe County, Indiana, upon this _____ day of _____, 2010.

_____
ISABEL PIEDMONT-SMITH, President
Bloomington Common Council

ATTEST:

_____
REGINA MOORE, Clerk
City of Bloomington

PRESENTED by me to the Mayor of the City of Bloomington, Monroe County, Indiana, upon this _____ day of _____, 2010.

_____
REGINA MOORE, Clerk
City of Bloomington

SIGNED and APPROVED by me upon this _____ day of _____, 2010.

_____
MARK KRUZAN, Mayor
City of Bloomington

SYNOPSIS

This ordinance amends BMC 2.04.380 entitled "Order of Business," which sets forth the order of items on the Council's Regular Session agenda. It implements recommendations made in the Report of the Rules Committee adopted by the Council on August 4, 2010 and also recommendations made by staff after reviewing the current section. In general, these changes reflect existing practices, many of which were adopted by the Council through Reports from the Rules Committee. One change is new and would allow speakers who wish to make a Report from the Public only one opportunity to address the Council rather than two. It was proposed in order to avoid repetition and to help shorten the length of the meetings.

In the Council Chambers of the Showers City Hall on Wednesday, August 4, 2010 at 7:30 pm with Council President Isabel Piedmont-Smith presiding over a Regular Session of the Common Council.

COMMON COUNCIL
REGULAR SESSION
August 4, 2010

Roll Call: Mayer, Piedmont-Smith, Rollo, Ruff, Sandberg, Satterfield, Sturbaum, Volan, Wisler
Absent: none

ROLL CALL

Council President Piedmont-Smith gave the Agenda Summation

AGENDA SUMMATION

The minutes of March 3, 2010 and July 14, 2010 regular session meetings were approved by a voice vote.

APPROVAL OF MINUTES

REPORTS:
COUNCILMEMBERS

Tim Mayer noted the recent passing of former city council member Sherwin Mizell.
He commented that the temperature on his thermometer was 100 today, and advised citizens to make sure any outdoor pets were attended to.

Mike Satterfield noted that the air conditioning was working well in City Hall.

Andy Ruff reminded citizens that it was time for citizens to make their feelings about the proposed I-69 highway known to INDOT. He said the portion that would go through western Monroe County was particularly problematic locally, adding that when the community had car washes to fund public education programs while billions of dollars were spent on an unneeded highway, a travesty was committed. He noted that there were major corridors and bridges in the state that were closed because of lack of funding for repairs and maintenance. He advocated upgrading US 41 at a fraction of the cost and with less negative impact, and use the remaining money to repair roads and bridges in need of repair.
He also said, that despite his practice of biking everywhere, even in the summer, the recent heat wave made him more aware of what people around the world who have no access to air conditioned environments must feel.

Susan Sandberg congratulated Tina Peterson, Executive Director of the Foundation of the Monroe County Community Schools for work on the All for All campaign that helped restore the extra curricular activities in the school system. She said the campaign was a monumental effort of the entire community. She noted that extra curricular activities were not "extra," but basic to teaching critical thinking skills, working in groups, finishing projects and putting imaginations to work.
Sandberg noted Arts Week 2011 was accepting grant applications for innovative collaborative projects with a deadline of September 10, 2010. She said the theme for 2011 was Arts Teach and noted the irony of speaking of this in the same report as the All for All campaign mentioned above. She gave the website: artsweek.indiana.edu.

Brad Wisler noted that Bloomington was the hot spot for technology and start-up culture in the Midwest, because 'geeks' from across the country would be in town from September 9th – 12th to attend The Combine, an event that would bring together folks in creativity, community, culture, capital and code to learn, network and be inspired with talks and workshops related to entrepreneurship, product development, design, marketing, social media, blogging, coding, personal branding, business development and community. He said tickets were available as well as sponsorships and volunteer opportunities. He said the website was: thecombine.org.

COUNCILMEMBER Comments *(cont'd)*

Dave Rollo reported that global petroleum resource limits, peak oil and many more limits are becoming apparent, so it was not enough just to switch to alternative energy, because there would ultimately be failure unless the human impact on the biosphere was reconciled with global limits.

He said there were several articles which illustrated this: The Impending Peak and Decline of Petroleum Production: an Underestimated Challenge for Conservation of Ecological Integrity in *Conservation Biology*, was a call to ecologists to include peak oil within their analyses that said, "presently most widely used global scenarios of environmental change do not incorporate resource limitations including those of millennium eco assessment and the IPPC on climate change… the development of resource constraint scenario should be addressed immediately. We urge politicians, corporate chief executives, thought leaders, and citizens to consider this problem seriously because it is likely to develop into one of the key environmental issues of the 21st century."

Also, he said that Lloyds of London reported Sunday, July 11, 2010 in The Guardian Newspaper that Lloyds insurance market and highly regarded Royal Institute of International Affairs known as the Chatham House said "Britain needs to be ready for peak oil and disrupted energy supplies at a time of soaring fuel demand in China and India." It repeated warnings from professor Paul Stevens, a former economist from Dundee University that "lack of oil by 2013 could force the price of crude above $200 per barrel." It is currently about $80.

Finally, Rollo said that Bill McKibben in the journal *Nature*, determined that a 40% decline in phytoplankton over the past century was attributable to global warming and that there was an urgency for policy makers, and provided the context for decisions that were made here in this body as well as every level of government. Phytoplankton is the basis of the food chain, and 40% decline is hugely significant. It was attributed to stratification of the ocean, meaning there was not adequate mixing, therefore there were not enough nutrients upwelling from the deep ocean. He said he was sure there would be more about this in the future. It seemed to jive well with the policies of interest to the council regarding sustainability, peak oil, and climate change.

MAYOR and CITY OFFICES

There were no reports from the Mayor or other city offices.

COUNCIL COMMITTEES

- Rules Committee

It was moved and seconded to adopt the report from the Rules Committee.

Chair of the Rules Committee Tim Mayer summarized the charge of the committee along with providing the outline of the meetings, names of committee members and the overall activities of the committee. He said the main topic was to explore how the council might regulate public comment during regular session meetings on non-agenda items. He noted that Bloomington was a very forward thinking community and that government officials wanted to hear from the public, and valued public comment and first amendment rights. He said that staff researched what other city councils in the state and nation do with regard to non-agenda public comments. He said about half have comments at the end of the meeting only. He noted that there was no statute that would require public non-agenda comments at meetings, but it had been the Bloomington city council's intention to provide for comments at both early and later parts of the meeting. He said the proposal of the rules committee was that the council would continue the practice of allowing the public to speak at the beginning or at the end of the meeting. He added that there would be only one opportunity per person, either at the beginning or the end, and the time would be apportioned by the council president.

Rules Committee Report *(cont'd)*

He asked Council Attorney/Council Administrator Dan Sherman to discuss "Reports from the Public: Making Comment on Non-Agenda Items" and some of the reasoning and statutes that formed the basis for that document. Sherman said the document would be available online and to the public at meetings and would articulate existing practices for public comment. He asked that the council adopt the guide to public comment. He said it would prohibit disruptive behavior that would prevent the orderly conduct of council business. He noted staff suggestions were incorporated into the guide, which included the standard of 'matters of community concern,' an explanation of what was meant by disruptive speech, noted that the comment section was not a give-and-take session and the consequences of not following these rules. He noted that there was no mention of profanity, as he said that profanity coupled with political speech was protected speech, but said that that the chair could guide the speaker. He noted, too, that threats that were focused toward the future were not immediate and therefore not a basis for prohibition.

Rules Committee Report
REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS

It was moved and seconded that the council accept the guidelines for public comment as presented at this meeting.

Piedmont-Smith asked for questions for the rules committee members or Sherman.

Mayer asked if the Report was enforceable at the meeting where it would be adopted. Sherman said that a few minor changes would need to be made to the Bloomington Municipal Code, but the majority could be enforced at that meeting.

Rollo said that he was surprised that profanity was protected speech. Sherman said it was protected when coupled with political speech. He said that members of the public could address the council on matters of community concern and that was inherently political speech. Rollo asked about the fact that the meeting was broadcast live. Sherman said that the meeting was a limited public forum, and that the comment from the public was part of that agenda, and that if there was a need to make profane statements in that regard, they could. He said it could not be prohibited, but the chair could guide the person into another way of phrasing the comment.

Sandberg was concerned about pejorative language against any group and asked if that was protected speech. Sherman said it was protected.

Sturbaum asked about a statement, "I don't like what you're doing and I'm going to shoot you." Sherman noted questions to be asked as to protection: Is it going to disrupt the forum? Does it amount to a clear and present danger? Is it likely to occur? Is it imminent? He said that public officials have to have a thick skin, and unless a threat as Sturbaum stated was likely to occur or imminent, it was considered protected. Sturbaum inferred that it was a judgment call. Sherman said that the elements of that judgment were 'likely' and 'imminent.'

Ruff asked if the rules were intended to prevent disruption, how speech that could be disruptive might be considered protected. He specifically asked about comments that might be directed against a group of people. He also asked why, when trying to create a safe, comfortable, civil environment to conduct business, the council had to wait until a disruption happened to take action. Sherman said that the purpose of the rules was to balance the council's interest in conducting efficient, orderly and dignified meetings with the rights of those who wish to speak before the council. Sherman added that the barring of speech only could happen when it was actual, and not just anticipated.

Rules Committee Report *(cont'd)*

Ruff asked if, when speech led to an actual disruption, at a subsequent meeting the same situation started to devolve, did the council have to wait for the actual disruption to occur before taking action. Sherman said yes. He said that speakers could not be barred from speaking based on a past disruption and it was considered a form of prior restraint.

Ruff noted that other communities' public comment segments allowed much less than five minutes to speak. Sherman said that was correct. Ruff noted also that the major change of substance considered in this report and guide was the limiting of one period with a maximum of five minutes to any one speaker per meeting. Sherman agreed.

Piedmont-Smith asked if a person was removed from the chambers for violating the rules in the scenario that Ruff had described, and the next week the same person started along that same path, the council had to wait for the actual disruption before action could be taken. She said she thought that was overly cautious. Sherman said that unless the council was presented with a clear and present danger, the speech would be protected. He said that the disruption could trigger the chair asking for the removal of the person. He said that if this continued for a number of times, the chair might consider offering the opportunity for the police to arrest the speaker for the crime of 'disrupting a lawful assembly.' He said he didn't think that crime had been applied to a city council meeting, but that would be shifting the issue to the courts. He said the basis for the arrest would be a Class B Misdemeanor.

Sherman noted that the chair had responsibility for preserving decorum and in the above instance could tell the speaker their words could lead to violence and to stop. He said it should then be announced that if they continued on that line, the chair would ask the sergeant-at-arms to remove them from the chamber. Piedmont-Smith clarified that there didn't have to be an actual fight to say something that would incite an immediate breach of the peace. Sherman agreed, but again reiterated that there had to be likely and imminent, a clear and present danger.

Mayer added that the comparative review of public comment indicated that some communities only allowed three minutes of public comment, asked speakers to sign in at the beginning of the meeting, or pre-register ahead of time. He said Bloomington offered ample opportunity for citizens to address the council, with respect to first amendment rights.

Sandberg noted the council had always had a call for respectful discourse. She wanted to make sure that citizens understood this change was not about not criticizing the council, decisions made by the council or problems in the city. She reiterated that what was being changed at this meeting was that a person speaking on non-agenda items would get one and only one opportunity to do so, even though there were still two comment periods during the meeting.

Sherman said she was correct on the change. He reiterated again that the council meetings were considered a limited public forum, a classification by the law that determined what type of speech was allowed and what regulations applied. He said when defining the boundaries of the forum or rules of the council, they must be viewpoint neutral and reasonable in light of the purpose of the forum.

Sandberg noted that the council expected speakers to be courteous and respectful of the opinion of others, and asked if that was not part of the new guidelines. Sherman said that the rules called for a civil forum and also at what point speech would be prohibited, and that there was a difference between the two issues.

It was moved and seconded that Item 6 in the document REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS be amended.

Piedmont-Smith read changes to guidelines for speaking at council meetings she would like considered.

Sturbaum asked if Piedmont-Smith would consider putting in the words 'threatening language.' She said that would need to be another amendment to be addressed separately.

Satterfield asked Sherman if he removed the words "threatening language' for a reason. Sherman said he did. Satterfield asked if that reasoning would apply to the word "obscenity.' Sherman said it wouldn't.

Piedmont-Smith said that obscenity was defined as (1) language that the average person, using the standards of the community in which the expression is made, would find that it appealed to a morbid or shameful interest in sex, (2) language that depicted or described sexual conduct in a patently offensive manner and (3) language that lacked serious literary, political, artistic or scientific value. She added that this had been determined by the Supreme Court as something that can be limited. Sherman agreed.

Wisler asked if each clause should begin with a verb. Piedmont-Smith suggested adding a semicolon and re-read the amendment.

Mayer asked if undue repetition would include a repetition of a website address within one comment period or in repeated meetings. Piedmont-Smith said it would have to be repetitive within one comment period.

Piedmont-Smith asked if comments on reports were subject to the same time limits as public comment on legislation. Sherman noted that some other reports such as the sidewalk report or the Jack Hopkins funding came from committee reports and had public comment, but said it was the call of the chair, and suggested that due to the nature of the report, it might be warranted.

Volan said, while it might not be in order to take public comment on a report, it would be ironic to not have comment on a report about public comment. He suggested opening the floor to public comment on the amendment and the report.

Piedmont-Smith called for public comment on the amendment to the REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS. She asked the clerk to make copies of this change to distribute to the public.

Marc Haggerty said he didn't mind signing in. He said that the wording 'encouraging' and 'requesting' was fine with him.

The amendment received a roll call vote of Ayes: 9, Nays: 0.

Piedmont-Smith called for public comment on the document REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS as amended.

Marc Haggerty spoke of the history of the council public comment period during meetings. He spoke of *Hess v. Indiana,* 414 U.S. 105 (1973) in which a City of Bloomington court decision was overturned by the US Supreme Court in an issue of free speech, although the speech

Amendment to REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS. The City Council encourages civility in public discourse and requests that speakers refrain from language which would incite an immediate breach of the peace; refrain from undue repetition, extended discussion of irrelevancies, obscenities and personal attacks against private individuals unrelated to the operation of the City.

REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS *(cont'd)*

occurred on the street, not in the council chamber. Haggerty said he had been a victim of some charges made by citizens in the public comment segment of the council meetings, but preferred to not prohibit speech. He spoke of the PCB discussions of the 1980s and said the discussion was swayed considerably by citizen disruptions during meetings of the Bloomington City Council.

Mayer thanked the committee for its work. He specially thanked the staff for their considerable work and extensive research. He said the first amendment and freedom of speech was a prickly issue as some may be offended by any speech.

The motion to adopt the guidelines REPORTS FROM THE PUBLIC: MAKING COMMENT ON NON-AGENDA ITEMS as amended received a roll call vote of Ayes: 9, Nays: 0.

Adoption of the Rules Committee Report.

It was moved and seconded that the report from the Rules Committee be accepted.

Marc Haggerty noted that this might be a question to continue to another meeting given interest by the public.

Ruff noted he had always voted against the limiting of public comment when instances arose during controversial issues. He said he was confident that the adoption of this report and guidelines would not unduly limit the public's ability to speak at council meetings.

Mayer noted that at one time there was only one comment period at council meetings, either at the beginning or at the end of the meeting. He said that two periods were now the norm, but that this rule change would not affect the number of opportunities for the public to speak, but limit the number of times a person could speak at one meeting. Piedmont-Smith thanked Haggerty for his recall of the social justice issue. She said that the rules would not be a hindrance to the exercise of free speech in Bloomington.

The motion to accept the Rules Committee report was approved by a voice vote.

PUBLIC INPUT

David R Grubb spoke of his long time interest in community growth and protection of the environment.

Marc Haggerty suggested that the Criminal Justice Coordinating Council have public comment at their meetings. He said at present they did not, and there was no way to speak to judges in a public manner at this time such as the city council. He said they should listen to citizens' concern about running the jail and the justice system.

BOARD AND COMMISSION APPOINTMENTS

It was moved and seconded that Chad Roeder and Michael Wallis be appointed to the Bloomington Platinum Bike Task Force. The motion was approved by a voice vote.

It was moved and seconded that Kent McDaniel be reappointed to the Public Transportation Corporation.

Volan moved and it was seconded that the above appointment be tabled. Piedmont-Smith asked Volan to explain his motion. Volan said he had talked to Mr. McDaniel earlier in the day, but that at least one other committee member had not had time to talk with him about his work on the Public Transit Board. Volan also said he had more questions and concerns to discuss.

APPOINTMENTS *(cont'd)*

Council Attorney Sherman, when asked, said this motion was not in violation of the rules of the council and that it was not debatable.
The motion to table received a roll call vote of Ayes: 4 (Wisler, Ruff, Piedmont-Smith, Volan), Nays: 5 (Rollo, Sandberg, Satterfield, Sturbaum, Mayer) and was not tabled.

Volan moved and it was seconded that the appointment of Kent McDaniel be postponed until the next council meeting.

Council Attorney Sherman said, when asked, that there was a difference between postponing and tabling. He said this motion was to defer to a certain time, the next meeting. He said this was enough of a difference to warrant a vote.

Volan asked Sherman if the motion to postpone was debatable, to which Sherman replied that it was, but on the issue of postponement, not on the merits of the appointment.

Volan said he felt the reappointment should not be done at this time, and as a member of the interview committee for the Public Transit Board, he asked the other members tonight at their meeting to postpone the decision. He said he moved to postpone to have more time to explain his reasons more clearly.

Rollo said he would like to hear from other members of the committee.

Sturbaum, another member of the committee, said that members of the committee had a month to comment on the appointment, but had received no communication from council member Volan on this issue. Sturbaum noted that there were two other applicants, but Volan had not commented on them either.
Sturbaum said he and Mayer had discussed this over email with no response from Volan, so they thought there was consensus on this appointment. He further said that had Volan wanted to, they could have set up interviews, but that they did not hear the objection until the interview committee meeting that was held immediately before the council meeting. Sturbaum said that the process and appointees were disrespected by Volan's silence. Sturbaum said that the rest of the committee didn't think Volan's objection was important enough to hold up the reappointment process.

Mayer said he heard from Volan at 7:15 pm. He said that applications had been reviewed by email and there had been no response by council member Volan. He said that the candidate was extremely qualified.

After being cautioned that the debate should be limited to the issue of appointment and not the merits of the candidate, Sturbaum noted that Mayer's extensive work in asking for a review of a concern regarding this candidate indicated that there had been enough time and effort taken on the issue to warrant a reappointment at the meeting.

Mayer said questions had been asked and answered to his satisfaction from staff and the candidate.

Piedmont-Smith asked the date of the expiration of the current term. Volan said that the date was July 31, 2010, which had already passed.

Piedmont-Smith asked Clerk Moore if the default for later appointments was that the incumbent continue to serve on the board or commission until an appointment was made. Moore said that was the practice in the past but that Sherman could speak to the legalities of the issue. Moore added that in anticipation of the expiration of this term, and according to

APPOINTMENTS *(cont'd)*

the code, a press release was issued and applications sought. She said the closing date for applications was July 29th with the news release sent out on July 15th.

Sherman said that appointments could be made no sooner than 15 days after the submission of the notice to the media, which had occurred.

Volan said he had not had enough time to fully understand the impact of this nomination, and noted that he had three interview committee meetings before the council meeting. He said the issue was complicated, and that he didn't make the motion to postpone lightly. He asked consideration from other council members.

Satterfield asked about the interview committee vote on the nomination of McDaniel. Mayer said that he and Sturbaum voted to nominate the candidate, while Volan did not. Mayer said that tradition was that the majority ruled on forwarding nominations to the council. Satterfield noted that unanimity was not required and the majority opinion was respected. Sherman agreed.

Volan asked Sherman if the council had an obligation to accept the vote of the interview committee. Sherman said no. Volan asked if the interview committee's recommendation was ever not taken by the council. Sherman said he didn't remember any instance. Moore said she didn't recall one either.

Mayer said he could remember only one instance in the mid-1980s when a recommendation was challenged.

Wisler asked what would happen if the appointment was postponed. He asked if the incumbent would stay on the board until the appointment or reappointment was made. Sherman said he would. Wisler reiterated that there would be no change in the commission whether an appointment was made immediately or next month.

Ruff said that with that information, and while respecting traditions of the council, the respect he had for the legitimate concerns of one council member outweighed the traditional procedure in this instance. He said it was not whether he agreed with or shared Volan's concerns, but rather that he wanted more time to carefully consider an action that might be taken. He said despite his high regard for this citizen nominee, he would vote against making the reappointment at this meeting.

Sturbaum reminded the council that two council members reviewed the applications, weighed the opportunity to make a reappointment and decided that there was no need to interview the two new applicants. He said they did not have the intention of wasting council time and wanted to streamline the process. He suggested making the reappointment, noting the excellent credentials of the nominee. He said the nominee had been on the Transit Board for a long time, and that he had a positive influence. He said he saw no reason to continue the discussion.

Volan wanted to make sure if council members had any questions that they could still ask them. Piedmont-Smith noted that the questioning and comment periods were comingled for this procedural discussion.

Rollo, saying he understood and respected their position, asked Sturbaum and Mayer what hardship would exist if the reappointment was postponed.

Sturbaum said schedules were busy and that they didn't think it was necessary to interview candidates in this case. He said it would take

APPOINTMENTS *(cont'd)*

personal time to come back to go over this again. He said that he and Mayer had judged that it wasn't necessary to do that, and stand by that position. He said Volan would like to ask McDaniel questions and the reappointment would not preclude him doing so.

Mayer said he reviewed the applications for the three candidates (that included the incumbent) and said clearly McDaniel was the best candidate for the position. He also said he spoke to McDaniel who told Mayer he had a 45 minute conversation with Volan by telephone. Mayer said that there had been a lot of opportunity to discuss issues, and felt that an interview had been conducted with the candidate by Volan.

Volan said that other interview committees had interviewed candidates. He said his conversation with the nominee had raised questions that he wanted to bring to the attention of the council and that they dealt with larger issues that the Public Transit Board and the council faced. He said he was simply asking for more time to make the decision and to look at the larger issues that this seat opening raised. He said he didn't really want to get into details, but said he thought the issue transcended the current holder of the seat, the applicants, and concerned questions that the council needed to think about before making another appointment to this board. He emphasized that none of the three applicants were interviewed, but said it would be easy to do so. He also encouraged other members of the council to attend any interviews that might be set up. He said it was his respect for the nominee that caused him to delay the decision, but, he said, his colleagues were forcing the issue. He said that it was irresponsible to not speak up about the issues that this open seat and the greater issues involved. He said it would harm nothing to have more study and more eyes on the issue and postpone the appointment until the next meeting in September. He said there was no disrespect to anyone in the postponement.

Ruff noted that Wisler had an interest and had taken a step in meeting with McDaniel, but had been traveling on business and was unable to arrange this. Wisler said he had just gotten back into town, and had gotten an email from McDaniel a couple of weeks ago with a request to meet. He said he would vote in favor of postponement, and said he would like to talk to the other applicants as well.

Sandberg asked if the vote was to postpone to a specific date. Sherman said the motion was to postpone to the next meeting, September 1, 2010.

The motion to postpone the appointment to the next council meeting received a roll call vote of Ayes: 6, Nays: 3 (Satterfield, Sturbaum, Mayer).

LEGISLATION FOR SECOND READING

Resolution 10-13 To Approve an Interlocal Cooperation Agreement between the City of Bloomington and Monroe County, Indiana in Regards to 2010 Edward Byrne Memorial Justice Assistance Grant (JAG) (To Purchase Two Vans for the Critical Incident Response Team)

It was moved and seconded that Resolution 10-13 be introduced and read by title and synopsis. Clerk Moore read the legislation and synopsis, giving the committee recommendation of Do Pass 8-0.
It was moved and seconded that Resolution 10-13 be adopted.

Patricia Mulvihill, Assistant City Attorney, noted that the county sheriff and Bloomington Police Department share the money in this grant, but it was decided that this expenditure to purchase two 15 passenger vans to be used by the Critical Incident Response Team (CIRT) would be funded entirely by the Bloomington Police Department. She said that the local sheriff's department was a member of the CIRT and would be able to use them too. She added that in order to get the money from the federal government, the city had to enter into an agreement with county government about how the funds would be used. She said that the commissioners had already approved the agreement, and that the county council would consider it on August 10th.

Resolution 10-13 *(cont'd)*

Mulvihill addressed two questions that had been raised at the committee meeting. One had questioned the cost of $43,446 for two vans. She said that that number would be about $2500 short. She said that municipal pricing was being used to purchase each van for $23,000. She said the police department was making up the shortfall. In noting the other question of fuel efficiency of the new vans she said that the present van got 6.8 mpg, where the new vans will get 14 mpg. She said the current van was lacking air conditioning and heat, was burning oil and antifreeze, and sometimes would not start.

There were no questions from the council members and no comments from the public.

Mayer thanked Mulvihill for her work on this issue.

Resolution 10-13 received a roll call vote of Ayes: 9, Nays: 0.

Ordinance 10-08 To Amend the Bloomington Zoning Maps from Quarry (QY) to Residential Medium-Density (RM) – Re: 3020 and 3040 S. Rockport Road (Rockport Road Trust LLC, Petitioner

It was moved and seconded that Ordinance 10-08 be introduced and read by title and synopsis. Clerk Moore read the legislation and synopsis, giving the committee recommendation of Do Pass 0-3-5
It was moved and seconded that Ordinance 10-08 be adopted.

James Roach, Senior Zoning Planner, and Patrick Shay, Development Review Manager, Planning Department, presented the ordinance and background information that would rezone the property in the Area Intended for Annexation (AIFA). Shay said that the main reason for the request was to resolve two outstanding zoning violations and record a zoning commitment concerning future site development constraints on the property that contained a historic house, a barn with apartment and a three unit structure. He noted that the barn apartment was done without zoning approval and the three unit structure was actually approved for a single family residence under a use variance. Shay noted that the Plan Commission reviewed the request in March and June of 2010 and voted 10-0 to forward a negative recommendation on this item to the Council.

Shay addressed questions raised in the committee meeting.

In answering a previous question concerning 'concurrency' and the Growth Policies Plan (GPP), Shay said that the term itself was not used in the GPP, but the policies of services being provided to properties prior to their development was a policy of the GPP. He gave some particulars about the property that would include agreements about new septic systems, the density of units being less than that allowed in a general RM district, commitments for right-of way connections through the property and along Rockport Road, water main easements, sidewalk construction, and preservation of trees and karst features with a conservation easement. He also had a schema of development on the property.

In answering a question about nearby sanitary sewers he showed a map with that information highlighted along Country Club Road.

In answering a question about future connectivity to Adams and the driving range, he again showed a map with this information.

In summation, Shay said that the property had been developed without the proper permits, approvals and sanitary sewer service, that the petition made no commitment to provide sanitary sewer to future units and the continuation of septic systems in a heavy karst area with multifamily use was most undesirable.

Ordinance 10-08 *(cont'd)*

Piedmont-Smith questioned the use of the term Residential Medium-Density, saying that it was not a category in our code. Dan Sherman, Council Attorney/Administrator, said that this amounted to a clerical error and that the courts would read it correctly should it come to that. Piedmont-Smith said she would contemplate a change in wording.

Mayer asked about sewer and road connectivity from the site to surrounding infrastructure. Maps were shown with this information.

Volan asked how much it would cost to install sewers in this area. Shay said it would be more than average cost because of the karst area, and considering that it had a small number of family units.

Volan asked if the staff would have supported the change in zoning if the petitioner had offered to install the sanitary sewers. Shay said that was not the only service missing from the proposal. Jim Roach said that it would be a much different discussion as there was a substandard road at Rockport, a substandard intersection at Country Club, but the GPP did not rule out multifamily in this area.

Volan asked the petitioner's representative if they had looked into putting a sanitary sewer on this property. Mike Carmin, the attorney for the petitioner said that they had not, and he had not seen this done on a property with less than twenty dwelling units. Volan asked if this project would be in the six figure range. Carmin said it would because it was almost guaranteed to encounter rock excavation costs.

Wisler asked if there was a quarry on this property. Roach said it did not have a quarry near there, but was at one time part of a large quarry holding by the Borland family. Roach added that the zoning had included Rockport Road to 37 to Gordon Pike to Allen Street. He asked why the council wasn't considering a PUD for the property. Roach said it wasn't brought to the Planning Department, but that the petition would bring forth the same issues. Shay said that some of the development had already occurred, and that it was part of the issue, also.

Wisler asked what would happen if the petition was denied. Roach said the apartment above the barn would be removed, and the structure with three units – with three kitchens and three entrances -- would need to be converted back to one single family house. Shay said it wasn't an unusual situation.

Piedmont-Smith asked if there had been fines levied, and at what level. She asked if there had been no fines levied to this point, what fines could be levied. Shay said that the planning department informed owners of issues and what they needed to do to be in compliance or approval. He said that the fines were not levied during the period of seeking approval. He said the fines varied depending on the issue involved. Piedmont-Smith asked if the petition was not granted, and the owner did not come into compliance with the barn and three-unit apartment building, what the fine would be. Shay said the legal department would determine what the fine would be and remedy the situation through the court system if necessary. He said there was a table that listed fines, but the maximum fine was not usually sought. Piedmont-Smith noted that the object was working towards compliance more than fining. Shay agreed.

Sandberg asked about the current tenants and what time frame they would have to leave the property. Carmin said that not all units were currently occupied; the units were leased month to month and occupants had been alerted to the situation.

Wisler said there was a difference between having three units on a septic system and having thirteen units on the system. He asked if there was a way to allow the current use without additional units. Roach said that the proposal was that the existing five units would be on septic and the sewer wouldn't be built until the additional eight units were built. He noted that 56 units were permitted by the RM district. He said that just keeping the existing five units on septic and never building any more was not the proposal, and that if it was proposed, it would need to be reviewed by the Plan Commission.

Piedmont-Smith asked if there were water lines on the property. Roach noted that the historic house and the barn used a well, while the three-unit structure was connected to the public water system. He added that part of the commitment would include an easement for a 16 inch water main along Rockport Road. Carmin added that a stub for future water connections along with a meter for the historic house would be added. Piedmont-Smith asked if the easement would still be granted if the petition was denied. Carmin said the issue had been discussed, but he could not report a definitive answer to her question.
Piedmont-Smith asked staff if the developer to the south of the area in question would need to put in the water line if this petition was not granted. Roach said he would want to continue negotiations in the future no matter what. He said those negotiations would be between Richland Development, the county highway department and the City Utilities Department. Piedmont-Smith asked how many mature trees would be affected by this. Roach said there would be about a dozen considerably sized trees that were very close to the roadway.

Ruff asked where the units fell on the scale of affordability. Carmin said that depended on what costs the developer incurred including waterlines and roads. He said the current units were rented by divorced fathers who were able to be close to their children.

Volan asked if the petitioner would sell the easement area to another developer. He asked if there was benefit to other property owners if the easement was granted in the petition. Carmin said the water line would go in no matter what. If the easement was granted it would go behind the trees at the edge of the roadway. If it was not granted, the trees in the public right of way at the edge of the road would have to be removed. Roach said the last option would be to place the water main in the roadway itself, and that was a decision that the county highway department would make.

Piedmont-Smith asked if the karst conservancy area and tree preservation areas were more than required by the UDO. Roach said that the UDO required 2.86 acres and the petition was proposing 4.08 acres.

Piedmont-Smith asked about the possible road extension to the west, and wondered if it would cut through the karst conservancy area. Roach showed a map that indicated the road was south of the karst.

Carmin added some comments regarding the petition. He said the surrounding properties were going to be developed more densely than the petition for this property asked for, and that the GPP supported the density here. He said the right-of-way dedication and water line easements were agreed to, and that the sewer could be connected in the future. He noted the argument regarding public transportation in the area was not as persuasive as the lack of it, but didn't stop 400 other units from being developed. He used the same argument for the substandard nature of the intersection near the petition site, and added that improvements would be made in the area within the next two years.

Ordinance 10-08 *(cont'd)*

He reiterated that the GPP supported this petition, although this was in a slightly different manner. He asked the council to think of this in the perspective of concurrency tied to development that was there. He said that this was a development petition where the development was a known factor, rather than something to be imagined in the future. He reiterated that the three unit structure had the look of a single family style home. He said the petition provided exactly what the GPP asked for and asked for approval of the council for the petition.

Wisler asked if there was a reason given as to why the development took place before approvals. Roach said it was hard to answer because the person who did most of the work was now deceased. Carmin said that the current owner's former husband had approval for a single family home, got divorced and then began to convert the home to three apartments, one for himself and two to lease. He subsequently left the area. The present owner finished the conversions of the house and apartments. He said the original owner chose to ignore the requirements and the current owner assumed that the appropriate permits had been granted.

Piedmont-Smith asked if the commitments would remain if the property was sold. Roach said the commitments would be recorded with the deed and would stay with the property in the future. Piedmont-Smith asked about the commitment to build a sidewalk on Rockport Road. Roach said it was one of the commitments that would need to happen sooner rather than later, after the waterline was built. Piedmont-Smith asked if they had considered a side path rather than a sidewalk. Roach said the issue didn't come up with the bicycle and pedestrian planner or in consultation with the Greenways Plan.

Volan asked if there was precedence for this petition. Roach said illegal apartments had been created out of houses frequently. Shay said there was a possibility that others may also ask for forgiveness rather than permission. Volan asked if there were similar cases to this. Shay said that there were Board of Zoning Appeals cases where the petitioner had sought approval and received it after the fact. He said that it was a little different here, because this wouldn't have been approved in the first place. Volan asked if the petitioner had the option to go to the BZA if the petition was not approved. Roach said they would have the option to appeal.

It was moved and seconded to adopt Amendment #1 to Ordinance 10-08.
There were no council questions, public comments or council questions regarding this amendment.

Amendment #1 This amendment is sponsored by Councilmember Piedmont-Smith and corrects the name for the Residential Multifamily (RM) designation throughout the ordinance.

Amendment #1 to Ordinance 10-08 received a roll call vote of Ayes: 8, Nays: 0 (Volan out of room).

There were no comments from the public on Ordinance 10-08 as amended.

Ordinance 10-08 as amended

Sturbaum noted that the Plan Commission had voted against the petition, and that he would, too.

Ruff said he respected the positions of the Planning Staff, Plan Commission, and the Environmental Commission on this petition. He noted that the council's role in this issue was broader than any of those above. He said that he had no sympathy for scofflaws, and this was a violation of so many code requirements and regulations, and said he had no motivations for any spirited defense of the petition. He added that while the road was substandard at this point, he was confident that at

Ordinance 10-08 as amended *(cont'd)*

sometime in the future it wouldn't be an issue. He said he disagreed, but barely disagreed, with the findings of the Plan Commission. He said that unless persuaded by other council members' comments, he would support this petition.

Volan said that he was glad for the time between the committee meeting and the present meeting to more fully understand the details of the petition. He noted that the merits of the case included that there would be over an acre of land preserved above and beyond what the UDO called for, that trees would be preserved, but that the precedent set by the approval of this petition was not a good one. He said the council should reject the petition, but that the BZA should hear the case, as it was charged to deal with exceptions such as this one. He noted the unusual circumstances, and said it was not unusual or precedent setting if the BZA approved the issue.

Wisler said he came to the meeting with the opinion of not rewarding behavior that went against codes. He noted Ruff's mention of the broader scope of the council decision, and added that even if the petition was approved, he felt that the petitioner should be fined for past violations. He said the proposal was an acceptable use of the property with an appropriate density, although problematic septic arrangement. He said there was nothing so out of place that it should be torn out. He said he agreed with Andy and said he didn't understand what was so out of place that it should be removed. He said he would vote yes.

Piedmont-Smith said she discussed this at her monthly constituent meeting where the gathering said the only thing they cared about was preserving trees on Rockport Drive. She said she listed the pros and cons which she read. There were more pros in her list than cons. However, the biggest con was that the property owner had been in violation for ten years. Even so, she said she agreed with Wisler and Ruff that the Council was not in the enforcement business. In the best interest of the community she said she would support the ordinance.

Ordinance 10-08 as amended received a roll call vote of Ayes: 3 (Wisler, Ruff, Piedmont-Smith), Nays: 6 (Rollo, Sandberg, Satterfield, Volan, Sturbaum, Mayer). The motion failed.

LEGISLATION FOR FIRST READING

There was no legislation to be introduced at this meeting.

PUBLIC INPUT

There was no public input.

ANNOUNCEMENTS

Piedmont-Smith announced that upon adjournment of this meeting, the Council would enter its August recess and would not reconvene until September 1st.

The following meetings were scheduled to be held during the recess: The Council Sidewalk Committee on Friday, August 6th at 10:00 am and an Internal Work Session on Friday August 27th at noon.

ADJOURNMENT

The meeting was adjourned at 10:55 pm.

APPROVE: ATTEST:

Isabel Piedmont-Smith PRESIDENT
Bloomington Common Council

Regina Moore, CLERK
City of Bloomington

In the Council Chambers of the Showers City Hall on Wednesday, September 1, 2010 at 7:30 pm with Council President Isabel Piedmont-Smith presiding over a Regular Session of the Common Council.

COMMON COUNCIL
REGULAR SESSION
September 1, 2010

Roll Call: Mayer, Piedmont-Smith, Rollo, Ruff, Sandberg, Satterfield, Sturbaum, Wisler
Absent: Volan

ROLL CALL

Council President Piedmont-Smith gave the Agenda Summation She said that council rules that were adopted on August 4, 2010 would be in effect for this meeting and noted that the rules allowed citizens to speak at either the first or second segment for public comment on the agenda, but not at both.

AGENDA SUMMATION

There were no minutes to be approved at this meeting.

APPROVAL OF MINUTES

REPORTS:
COUNCILMEMBERS

Tim Mayer noted the passing of Paul Grudis who was the first director of the Boy's Club in Bloomington. Mayer said he was motivated to enter public service because of Grudis' example.

Chris Sturbaum welcomed Indiana University and IVY Tech students back to Bloomington and wished them luck as they worked to change their lives.

Mike Satterfield cautioned students about driving in Bloomington and reminded them to pay attention to new pedestrian crosswalks on campus.

Dave Rollo reported on the energy predicament, and said it was important for representatives of local government to anticipate the future and plan for it. He said it was especially important to do so now before problems of scarcity, high prices and shortages arose.

Rollo said he was grateful to Mayor Kruzan and city department heads for using the Peak Oil report as a framework for the 2011 budget. He said he received an email from his friend, Paul Nellen in Hamburg, Germany who wrote that the German army had composed a report on Peak Oil. They concurred that the peak was now and would continue to have a severe impact on Germany, as well as all nation states.

Rollo noted that the team of authors, led by Lieutenant Colonel Thomas Will, warned of shifts in the global balance of power, of the formation of new relationships based on interdependency, of a decline in importance of the western industrial nations, of the "total collapse of the markets and of the serious political and economic crises."

Rollo said the *Guardian* newspaper recently reported that the British Department of Energy and Climate Change (DECC), the Bank of England, and the British Ministry of Defense were working alongside industry representatives to develop a crisis plan to deal with possible shortfalls in energy supply.

He said the authors painted a bleak picture of the consequences resulting from a shortage of petroleum. "As the transportation of goods depends on crude oil, international trade could be subject to colossal tax hikes. Shortages in the supply of vital goods could arise as a result, for example in food supplies. Oil is used directly or indirectly in the production of 95% of all industrial goods. Price shocks could therefore be seen in almost any industry and throughout all stages of the industrial supply chain. In the medium term the global economic system and every market-oriented national economy would collapse."

Rollo said constituents needed to be informed, and that urgency needed to be added to strategies such as those described in the *Redefining Prosperity* report to insure that there was adequate

Reports from Councilmembers *(cont'd)*

preparation for the coming oil scarcity and the disruptions that would occur.

Susan Sandberg noted that the Community and Family Resource Commission will sponsor another event in the "No Place Like Home" series on October 5, 2010. She said it would cover Section 8 housing and would be targeted to housing providers and landlords.

Sandberg noted that Cardinal Stage was producing John Steinbeck's *Grapes of Wrath* starting on September 2, 2010. She noted their outreach and educational programs that would allow local students to attend performances.

She reminded folks of the 4th Street Arts Festival, and called it one of the best things Bloomington, and also noted the Women of Lotus Concert on September 16th.

Piedmont-Smith spoke about ballot questions in the fall election. She noted that Public Question #1 on the ballot would be an amendment to the Indiana Constitution that would cap property tax percentages at current levels. She said that these percentages were already law, had been in effect for two years and the effects had not been good as it had caused local governmental units across the state to struggle to pay for basic services such as fire and police protection. It also proposed to exempt two counties from this cap until 2019.

She said specific fiscal policy should not be included in the state constitution, especially when the policy was new and had been shown within a small amount of time to be so detrimental to fiscal health. She noted that such caps really benefit those at the upper income levels and with more expensive homes. She encouraged folks to vote no on this item.

Piedmont-Smith noted that Public Question #2 was a request from the Monroe County Community School Corporation for additional funding for public schools. She noted schools, which used to be funded through property taxes, were now funded through state sales and income taxes; both sources of revenue have been reduced due to the recent economic downturn. She listed outcomes of this funding reduction, and said that there was a need to restore lost positions, reduce class sizes and restore programs for at-risk youth. She noted that the referendum asked approval for a tax levy of $.142 per $100 of assessed property value. She asked citizens to support the referendum and vote 'yes' on this question.

MAYOR and CITY OFFICES

There were no reports at this meeting from the Mayor.

COUNCIL COMMITTEES

Mayer reported that the Utilities Services Board met recently and approved a Memorandum of Understanding with the city Parks Department and Housing and Neighborhood Development Department for restoration work at Griffy Lake. He said that work would include the evaluation and repair f the Griffy Lake Dam, evaluation and repair of the Griffy Lake Dam Outlet Works, evaluation and repair of the Griffy Lake Sluice Gate, shoreline restoration, and evaluation and relocation of siltation in Griffy Lake.

He said the State approached the Utilities and Parks Departments because they had money for restoration of the dam and to prevent erosion and deterioration. He added that the $2M grant had an excellent chance of being secured.

He said they also approved a ground lease between the Utilities Department and the Monroe County Solid Waste Management District at the Dillman Road Wastewater Treatment Plant for a recycling site there. He said this was a good relationship with no money exchanging hands.

PUBLIC INPUT

Piedmont-Smith read the council rules for Public Comment.

Public Input *(cont'd)*

David Keppel, member of the Green Sanctuary Task Force on Global Climate Change of the Unitarian Universalist Church, noted the trees that had been felled for the widening of the SR 45/46 Bypass. He said it was too late for these trees, but hoped that the state could agree to modify the plan so that it would be more consistent with Bloomington's goals of having a more diversified transit mix along this corridor.

He also noted the problems with inattention to driving when texting while driving. With this in mind, he said that perhaps speed limits could be reduced on some roads within the city to reduce accidents. He also recommended that a ban on texting while driving should be investigated.

Buff Brown talked about an upgrade to the intersection of 17th and Jordan Avenue. He said that intersection improvements might actually make it easier to speed through this area and that speed humps or bump outs should be considered to slow traffic and make it safer for pedestrians. Brown also apologized for any past incivility on his part while speaking to the council.

Gabe Rivera spoke of heaven on earth, and the need to end the war on drugs.

Greg Alexander, talked about the merge between Bloomington transit and IU transit. He said a business professor had students study what would happen if the two systems merged and became the largest in the State of Indiana. He said the formula for funding would add $2M a year for this combined system and could fund Sunday service or express routes. He was, however, concerned about a change in that formula based on pressure from other bus systems in the state, and said that the group that would lobby the state legislature for a change was the Indiana Transportation Association.

He said that the executive director of that group was up for reappointment to the Bloomington Public Transit Board. He said that these two positions created a conflict of interest and urged the council to find another PTC board member.

BOARD AND COMMISSION APPOINTMENTS

There were no appointments to boards or commissions at this meeting.

LEGISLATION FOR SECOND READING

There was no legislation for final action at this meeting.

LEGISLATION FOR FIRST READING

It was moved and seconded that the following legislation be introduced and read by title and synopsis only. Clerk Moore read the legislation by title and synopsis.

Appropriation Ordinance 10-02

Appropriation Ordinance 10-02 An Ordinance for Appropriations and Tax Rates (Establishing 2011 Civil City Budget for the City of Bloomington)

Appropriation Ordinance 10-03

Appropriation Ordinance 10-03 An Ordinance Adopting a Budget for the Operation, Maintenance, Debt Service and Capital Improvements for the Water and Wastewater Utility Departments of the City of Bloomington, Indiana for the Year 2011

Ordinance 10-09

Ordinance 10-09 An Ordinance Fixing the Salaries of Officers of the Police and Fire Departments for the City of Bloomington, Indiana, for the Year 2011

Ordinance 10-10

Ordinance 10-10 An Ordinance Fixing the Salaries of Appointed Officers, Non-Union and A.F.S.C.M.E. Employees for All the Departments of the City of Bloomington, Monroe County, Indiana, for the Year 2011

Ordinance 10-11 To Fix the Salaries of All Elected City Officials for the City of Bloomington for the Year 2011 — Ordinance 10-11

Ordinance 10-12 An Ordinance Reviewing and Adopting the Budget of the Bloomington Public Transportation Corporation for the Year 2011 — Ordinance 10-12

Ordinance 10-13 To Amend Title 2 Entitled "Administration and Personnel" (Changing the Name of Chapter 2.22 from "Employee Services Department" to "Human Resources Department" and Reflecting this Change in Various Other Sections of that Title) — Ordinance 10-13

Legislation for First Reading (cont'd)

Ordinance 10-14 To Amend Title 2 of the Bloomington Municipal Code Entitled "Administration and Personnel" Re: Amending BMC 2.04.380 (Order of Business for Regular Sessions) — Ordinance 10-14

There was no public comment at this point. — PUBLIC INPUT

The meeting was adjourned at 8:18 pm. — ADJOURNMENT

APPROVE: ATTEST:

Isabel Piedmont-Smith PRESIDENT
Bloomington Common Council

Regina Moore, CLERK
City of Bloomington