

# 2011

## Monroe County Multi-Jurisdictional Hazard Mitigation Plan

Unincorporated Monroe County

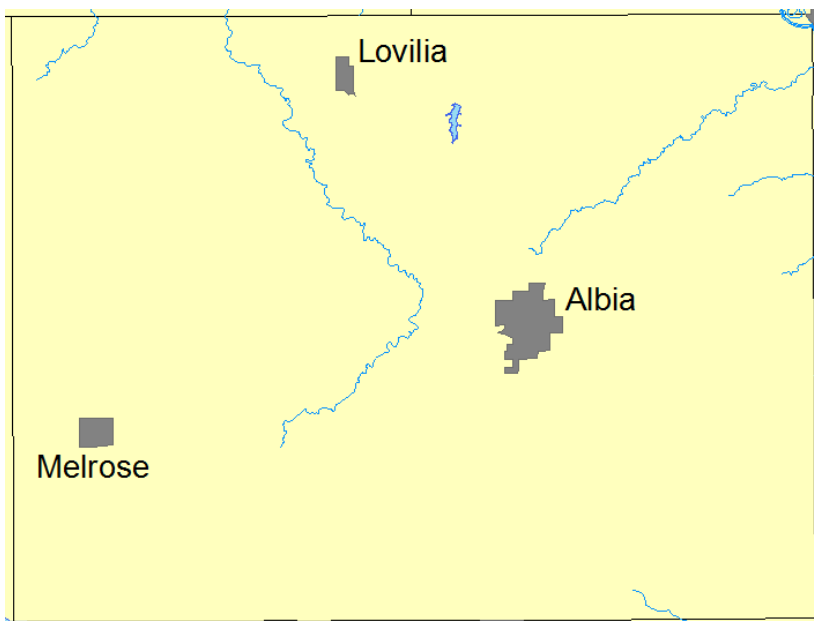
Albia

Lovilia

Melrose

Albia Community Schools

**FEMA approved  
September 30, 2011**



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## 1. Introduction

This chapter addresses the background and purpose of this plan, who was involved, and how it was developed. Combined, these elements are expected to provide an overview of the decision making process on disaster mitigation issues. This document is officially a Multi-Jurisdictional Hazard Mitigation Plan, but for simplicity, it will be referred to as the Monroe Disaster Mitigation Plan in this document.

### A. Adoption

The Monroe County Multi-Jurisdictional Hazard Mitigation Plan was adopted by the following jurisdictions on the dates listed. See *Appendix A: Resolutions Adopting Monroe county Disaster Mitigation Plan*. Adoption is important for the communities to receive the benefits of the plan; if the plan is not adopted by a particular jurisdiction, that jurisdiction is not eligible for certain disaster recovery and disaster prevention programs and funds.

Adoption of plan by respective jurisdictions is pending FEMA and State conditional approval.

Jurisdiction	Adoption date
incorporated Monroe County	5/24/2011
Albia	
Lovilia	
Melrose	
Albia Community Schools	

### B. Purpose and Participation

The purpose of the Hazard Mitigation Plan is to identify steps to prevent or reduce the impact of disasters on the residents and property in Monroe County. This is

accomplished through compliance with the Federal Emergency Management Agency’s (FEMA) Mitigation Planning Regulations under Code of Federal Regulations (CFR), Title 44, Part 201 (Standard 44 CFR 201.4, 44CFR 201.5) Administrative Code 29C 605-7.3(4)(d)(1)(2).

The development of the Monroe County Hazard Mitigation Plan is the result of the input from elected officials, emergency management and other governmental personnel, agency representatives, business people, interested citizens, and the State of Iowa Hazard Mitigation Plan.

As the cost of disasters continue to rise, it became evident that more pre-disaster steps are necessary if we expected to reduce the damage that can affect the communities we live in. Hazard mitigation plans are intended to break the cycle of losses from various disasters. ADLM emergency management (providing service to Appanoose (A), Davis (D), Lucas (L), and Monroe (M) counties) secured grant funds from FEMA for the development of a multi-jurisdictional plan for Monroe County. The county then contracted with Chariton Valley Planning and Development Council of Governments to write and aid in the development of their Hazard Mitigation Plan. This plan identifies all of the natural hazards that affect and risks that pose a threat to the county. A hazard analysis, which is a part of this plan, provides a better understanding of each hazard, knowledge of the impacts the hazard could have on the county, and a prioritized list of actions for each hazard identified as a possible threat to the county. By assessing the current mitigation actions already in effect, evaluating alternatives, prioritizing

and outlining a strategy for implementation the hazard mitigation plan has been developed and written.

#### **i. Acknowledgements**

Over the course of the planning process a number of individuals donated their time and efforts toward gathering information, attending meetings, and providing input for the successful completion of the plan. The following is a list of people who participated in preparation of the Monroe Disaster Mitigation Plan, in no particular order:

Jerald Ballenger – Former ADLM Emergency Management Coordinator

Dien Judge – ADLM Emergency Management Coordinator

Bill Milani – ADLM Co-Director

John Wageman – Iowa Hazard Mitigation Officer

Michael Clayton – IDOT District Planner

Richard Turner – Centerville Community School District

Tracy Daugherty – Chariton Valley Planning and Development

Nichole Moore – Chariton Valley Planning and Development

John Dawson – Chariton Valley Planning and Development

Lacey Gilworth – Chariton Valley Planning and Development

Julie Pribyl – Chariton Valley Planning and Development

Jim Armstrong – Former County Engineer, District 5 Local Systems Engineer

Martin Braster – Rathbun Rural Water

Jason Oglesby – Alliant Energy, Strategic Account

Sue Varnell – FEMA Technical Assistance

## ii. Planning Committee Members

The following chart contains the Monroe County Hazard Mitigation Planning Committee members broken down by sub-committees. The Planning Committee was split into two sub-committees according to their expected roles in this process. The Policy Sub-Committee is composed of elected officials or other appointed representatives of the jurisdictions involved in this process that are expected to develop the goals and action steps in this plan. The Technical Advisory Sub-Committee is composed of individuals from the general public, business sector, emergency response, and other stakeholders in this process.

<b>PARTICIPANT NAME</b>	<b>POSITION</b>	<b>Sub-Committee (P)Policy/(T) Technical</b>
Dien Judge	Emergency Management	T
Dan Johnson	Monroe Sherriff/Lovilia	P
Ray Vitko	Albia Fire	T
Dennis Ryan	Co Supervisor /Melrose	P
John Goode	Co Engineer	P
Linda Heller	Albia/Melrose City clerks	P
Richard Clarke	Albia Mayor	P
Justin Kamerick	Melrose	P
Kevin Krall	Albia School	P
Dustin Sample	Insurance Agnt	T
Deborah Morgan	Albia Chamber	T
Brad Leedom	EMT	T
Kathy Welsh	Public Health	T
Dan Tometich	Monroe Economic Dir	T
John Miles	REC	T
Byron Stilley	REC	T
Kelly Freeman	Albia Hospital	T
Renee Powers	City of Albia	P
Jim Coritman		T
Gene Rouze	Eddyville Rep	P
Tammy Shroyes	Ministerial Assc	T
Michael Beary	Co Supervisor	P
Jay Andrews	Albia police	T
John Hughes	Co Supervisor	P
John Pabst	Lawyer	T
Rowland Barnes	City of Albia	P

## iii. Participation

Rosters and summaries of each meeting can be found in *Appendix P: Monroe County Disaster Mitigation Plan Summaries* or a specific attendance list is provided in *Appendix FF: Attendance/Participation*.

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## C. What is a Hazard Mitigation Plan?

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Generally the first question asked when communities begin the process of preparing a Hazard Mitigation Plan is very simply “What is a Hazard Mitigation Plan and what is its intended purpose?” First, it is imperative to define what precisely the term mitigation entails. One definition of the term is stated perhaps most effectively by the Federal Emergency Management Agency (FEMA) and is as follows:

“Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability.” ([www.fema.gov](http://www.fema.gov)).

A mitigation plan is a document that is intended to accomplish several things. First, through the planning process the hazards that pose a risk to the community are identified. Second, an assessment of the hazards is made that takes into account historic occurrence, the number of people impacted, the area of the jurisdictions affected, potential costs that the jurisdictions, individuals, and organization may incur, the likelihood of future occurrence, and the amount of warning time before an event occurs.

Once the assessment is completed, a list of current and historic mitigation efforts are evaluated. Through this discussion, areas that can be improved upon are identified and developed into “action steps”. Early in the planning process meeting attendees identify broad goals that briefly state what the plan should attempt to accomplish. Every action step should, if implemented, work toward one or more of the goals of the plan. An action step may suggest continuing a current mitigation effort or propose a new project altogether.

Finally, once the hazards have been assessed, mitigation steps have been identified, and action steps have been prioritized, the plan makes some suggestions for implementation and makes estimates as to the costs of implementation. Some proposed projects are small in scope and thus relatively low cost. However, other projects are broad in nature and would require more funding than the local community can reasonably provide. Therefore, the final piece of the plan suggests methods to implement the plan, how to keep the public involved, and what steps should be taken by local government to ensure that the concept of hazard mitigation is always a priority.

When implemented appropriately, mitigation projects can save lives, reduce property damage, save public monies, and protect the environment. Mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption.

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## D. The Planning Process

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The Monroe Disaster Planning Committee developed this Disaster Mitigation Plan in conjunction with professional services from Chariton Valley Planning and Development Council of Governments.

The committee met 11 times from February 17, 2009 and November 2010. All meetings complied with the Iowa Open Meetings Law; this simply means all sessions are open to the public and appropriate notifications were present. The initial orientation disaster planning meeting took place February 17, 2009 in Albia. The attendees discussed what a Hazard Mitigation Plan contains, some reasons for having one, the basic process for developing such a plan, and some initial brainstorming of information for the plan and people that should be involved. A brief survey was utilized to help spark conversation about the various types of hazards that might impact Monroe County. At the end of the orientation meeting, blank surveys and informational brochures were distributed to attendees with the request that they share them with others in their respective communities.

The second open meeting took place on April 9, 2009 the committee roles are determined, rules established, draft mission statement and vision statement were proposed and approved by the committee. Members determined which hazards should be addressed by using a survey. Thirteen of the natural hazards were selected and 18 of the 26 human-caused hazards were voted on to be included in the Monroe County plan. (See Appendix P for meeting minute details).

John Dawson, Community Development Planner with Chariton Valley Planning and Development compiled and begin to draft a copy of the Plan. The third through the tenth meetings occurred from May 2009 to August 2010. It took a few extra meetings to adjust to new personnel from the CVPD office to become acquainted with participants and review critical information to include for Monroe County. During these meetings, members worked through activities that helped them to identify critical communities in the county, scoring of the identified hazards, select mitigation strategies and prioritizing them. CVPD staff members, Julie Pribyl and Nichole Moore, also continued to gather community profile information and history to assemble in the document. (See Appendix P for meeting minute details)

In November, the planning committee met to review the draft copy of the Monroe County Hazard Mitigation Plan. Following this meeting, a complete draft of the plan was completed and submitted to committee members. The Monroe Disaster Mitigation Plan was then sent to FEMA and the State for conditional approval prior to being subjected to the adoption process by each incorporated community and the Monroe County Board of Supervisors.

To insure the opportunity for participation public flyers were posted at Chariton Valley Planning & Development in Centerville, Monroe County courthouse, and Albia City Hall. Invitations to the orientation meeting were also sent to numerous individuals ranging from elected officials, local businesses, non-profit organizations, neighboring communities (Centerville, Chariton, Russell & Moravia) and jurisdictions and educational institution of Albia Public Schools.

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## E. Materials Reviewed

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In the preparation of the Monroe Disaster Mitigation Plan, various materials were reviewed that provided which informed the development of this plan. Important documents among these include various FEMA 386 “How to” guidebooks, Iowa’s *Hazard Analysis and Risk Assessment: 2007 Local Guide*, and *Iowa Hazard Mitigation Plan: Iowa Comprehensive Emergency Plan September 2007*.<sup>1</sup> Other sources of information include: Iowa Department of Natural Resources, Iowa Department of Transportation, the U.S Census Bureau, the Environmental Protection Agency, United States Geological Survey, Federal Emergency Management Agency, ADLM Emergency Management Agency, National Weather Service, National Climatic Data Center (NCDC), Iowa Homeland Security and Emergency Management Division. Wikipedia, Sperling’s Best Places, and community websites were used along with past newspaper clippings for an overview of communities and their histories. Other materials were consulted and utilized in this plan as well, most of which indicated in the sections where they were used.

Local Community plans, ordinance books and/or Policies were also reviewed throughout the process. The results that pertain to the jurisdictions and the plan are illustrated in Appendix CC: Community Plans/Ordinances/Policies.

Spatial Hazard Events and Losses Database for the United States (SHELDUS) from the University of South Carolina

[http://webra.cas.sc.edu/hvriapps/sheldus\\_setup/sheldus\\_login.aspx](http://webra.cas.sc.edu/hvriapps/sheldus_setup/sheldus_login.aspx)

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<sup>1</sup> This document can be found on either of the following websites;  
<http://www.iowahomelandsecurity.org/AboutUs/SecuringCommunities/Mitigation/tabid/98/Default.aspx> or  
<http://www.iowahomelandsecurity.org/Partners/CountyCoordinators/Planning/tabid/108/Default.aspx>

## 2. Community Profiles

Each community in Monroe County and the County itself will be addressed separately in this section to ensure that the needs of each are adequately covered. The following profiles are divided into official jurisdictions; incorporated communities are lumped into Monroe County as the county is the most direct level of government for them. Some of the Census numbers may not be the same between tables due to statistical and sampling methods used and the originating table from the American Factfinder website.

### A. Incorporated Monroe County

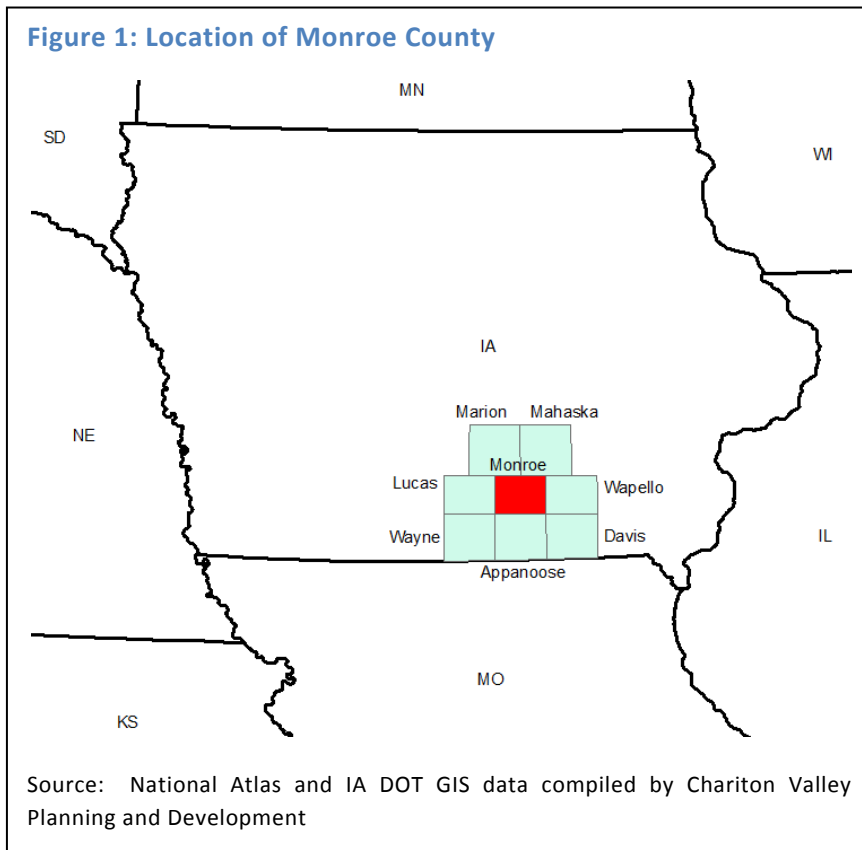
Monroe County is located in the southern tier of counties in Iowa one county from the Missouri border. There are twenty-three unincorporated communities in Monroe County and four incorporated cities. See *Appendix B: Monroe County Communities* for a map showing location of each incorporated community in the county. Eddyville has only about one acre of land in Monroe County and is covered under Wapello County’s Hazard Mitigation Plan. For these reasons, Eddyville is not addressed in this plan.

#### i. Geography

Monroe County is located in the south-central sector of Iowa at coordinates 41° 1’ 42” N, 92° 52’ 12” W. The counties surrounding Monroe are as follows; Marion, Mahaska, Wapello, Davis, Appanoose, Wayne, and Lucas, see Figure X: Location of Monroe County. Monroe County encompasses an area of 434 square miles with a population density of 18 people per square mile according to the 2000 Census.

Rathbun Lake is located primarily in Appanoose County, but extends into Monroe County covering a

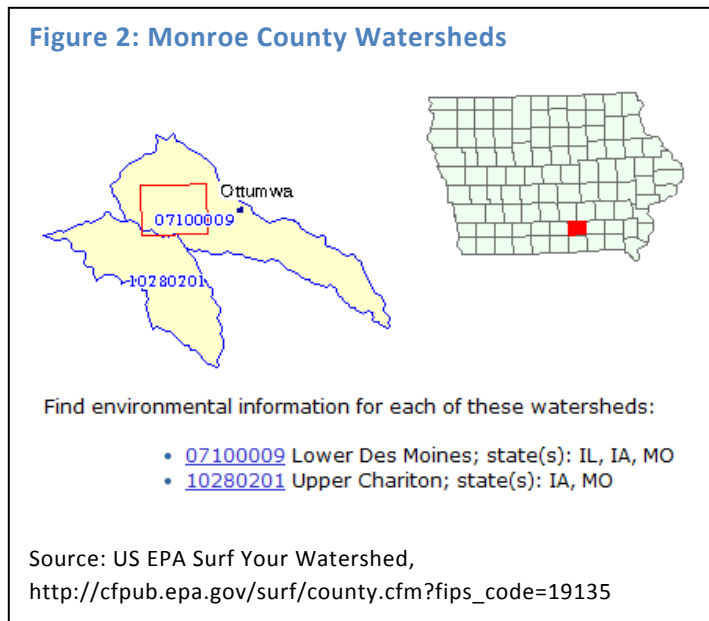
total area of 12,040 acres across four counties. Rathbun Lake is the second largest water body in Iowa. Seven creeks cross through Monroe County, the most significant of which is Cedar Creek





which stretches from south to north, west of Albia (see *Table 1: Monroe County Rivers and Creeks* and *Appendix C: Water Bodies in Monroe County*). Monroe County’s terrain is predominantly undulating topography that characterizes the rolling hills of the Southern Iowa Drift Plain (see *Appendix D: Hillshade Image of Monroe County*).

Monroe County is located in 2 different watersheds, all within the Mississippi Basin. The majority of Monroe County is located in the Lower Des Moines watershed. See *Figure 2: Monroe County Watersheds* and the US EPA “Surf Your Watershed” website for more information.



**ii. Climate**

The climate in Monroe County is of a continental character much like other parts of the Midwest. Four distinct seasons are experienced in the area. On average, Monroe County receives about 36 inches of rain annually and 25 inches of snow annually. There are 199 sunny days per year with 103 days of measurable precipitation on average. July tends to be the hottest month with highs around 87 degrees and January tends to be the coldest month with lows around 14 degrees on average.

There are seasonal variations in weather patterns and there are extremes that can pose risks to residents. Climate projections by the Union of Concerned Scientists, the US EPA, the USDA, and International Panel of Climate Change suggest that Monroe County and the mid-west overall will experience more extreme and more frequent weather fluctuations in the near future.

**iii. Vegetation**

Initially the county was predominantly forest and prairie land. This land cover has been transformed into various cropland uses over the last one hundred and fifty years. Substantial stands of deciduous forest remained despite the vast changes, more-so than may be found elsewhere in Iowa. See *Appendix E: Changes in Vegetative Cover* for a graphic comparison.

**iv. Soils Information**

According to the Natural Resource Conservation Service (NRCS), Monroe County is located in three soil regions; Loess Ridges / Glacial Till Sideslopes, Loess, Shale, and Glacial Till, and Loess Ridges /

**Table 1: Monroe County Rivers and Creeks**

CEDAR CR
COAL CR
MID AVERY CR
MILLER CR
N AVERY CR
N CEDAR CR
S AVERY CR

Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

Glacial Till – SE Iowa. Most of Monroe County is composed of the first soil type. Loess is fine, loamy, wind-blown sediment that is typically yellowish or brownish in color that is unstratified (Dictionary.com). Geologically, Loess is highly erodible, but in terms of the human life-span it is relatively stable soil. Loess soils tend to become very rich soil after it accumulates over time. See *Appendix H: NRCS Iowa Soil Regions Map*.

None of the incorporated communities in Monroe County have Karst soils underlying them, however some area of Karst soils are in the northeast corner of the county. Karst soils are soil compositions that contain rock that can be dissolved by water thereby creating a gap in the soil which can collapse and cause subsidence (see *Appendix I: Karst Soils in Relation to Monroe County*).

**v. History / Development Trends**

Monroe County, originally called Kishkekosh County after a Fox Indian chief, is named after the author of the Monroe Doctrine and fifth president of the United States James Monroe.

The county was established in 1843. When the county was being settled, there was considerable controversy over the location of the county seat. The battle was between the towns of Princeton (now Albia) and Clark's Point (Clarksville). On August 5, 1845 a committee appointed to choose the county seat selected Princeton as the county seat. In 1846 the Iowa Legislature changed the name of Princeton to Albia, because there was already a Princeton in Iowa.

The first courthouse of Monroe County was a small log cabin, which was rented out for \$1 a month when court was not in session. This courthouse was 20-foot x 20-foot and one and one-half stories high. The contractor was paid \$75 when it was completed in 1846. This courthouse was used until 1858 when it was replaced by the second Monroe County courthouse. This building was built of brick at a cost of \$10,900 and located in the center of the town park.

The present courthouse replaced the second one on October 26, 1903. The original price tag of this building was to be \$75,000 but the actual price ended up being \$93,000. The Renaissance style building is built from stone and brick. The architect was O. O. Smith and the contractor was James Rowson & Sons.

**vi. Population and Projections**

As of the 2000 Census, the total population of Monroe County was 8,016 with a total of 3,222 households. This is down 98 persons since the 1990 Census count of 8,114 people; a total decline of 1.2%. In 1990 there were 3,180 households. According to Iowa State University’s Regional Capacity Analysis Program<sup>2</sup>

Census	Population	Households
<b>2000</b>	8016	3222
<b>1990</b>	8114	3180

Source: US Census Bureau

<sup>2</sup> Historic Population Census data is available for the State of Iowa through ReCAP at the following website; <http://www.recap.iastate.edu/atlas/population/population-historical.php>.

(ReCAP), Monroe County has faced nearly a century of decline starting around 1910. The decline has been evening out in recent decades with the smallest amount of population loss between 1990 and 2000. The 2000 Census population of Monroe County is below the population of the county in 1860 but significantly higher than the population was in 1850.

The population of the unincorporated county is nearly one-half of the total population of the county. The proportion of households increased between 1990 and 2000 in relation to the total county numbers by a little more than three percent (3.04%). Likewise the total unincorporated population has increase by more than two percent (2.18%) suggesting that while both are increasing, households are smaller than they once were.

**Table 3: Unincorporated Population and Proportion of Total Population**

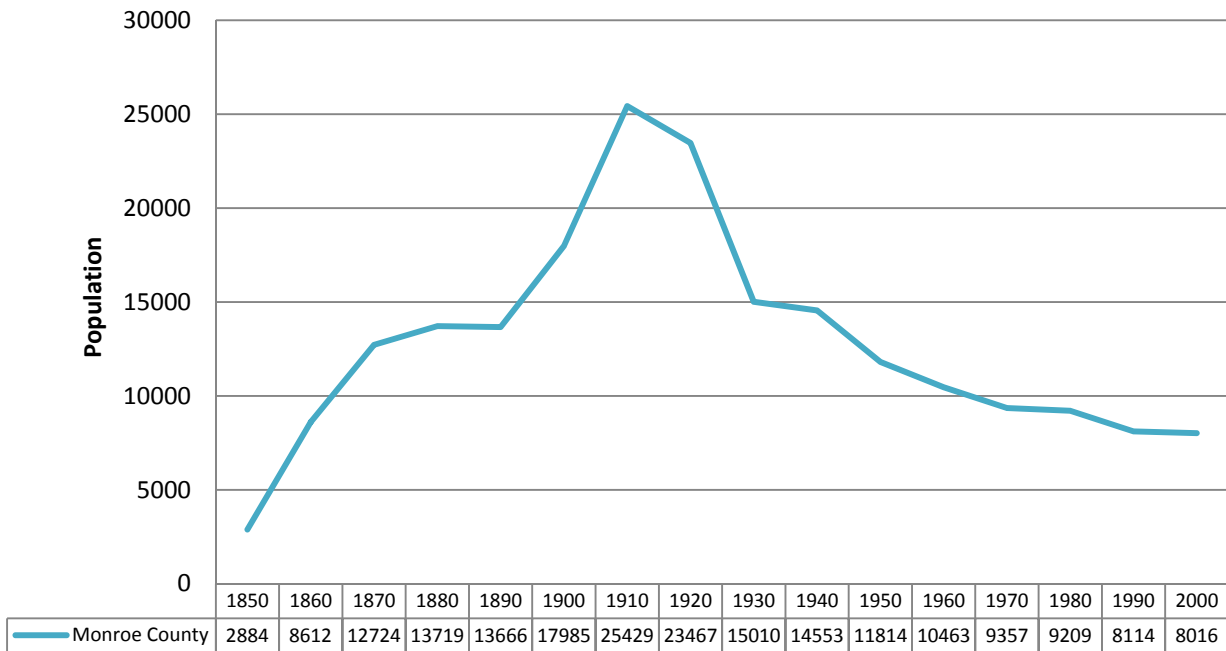
	Population	Households
<b>2000</b>	3675	1411
<b>1990</b>	3543	1296

	Population	Households
<b>2000</b>	45.85%	43.79%
<b>1990</b>	43.67%	40.75%

Source: US Census Bureau

**Figure 3: Monroe County Historic Population**



Woods and Poole Economics, Inc. provided population projections for each of the counties in Iowa in 2007 for 2010 through 2030.<sup>3</sup> Monroe County is projected to lose population into 2010 however slight gains in population are anticipated, increasing through 2030. Cumulative projected change for Monroe County is a loss of 13.19% suggesting that by 2030 the county’s population could be down to 7,064. See Table 4 for the Woods and Poole population projection for Monroe County.

**Table 4: Woods & Poole Population Projection for Monroe County**

Area	2000	2005	2010	2015	2020	2025	2030
<b>Monroe</b>	7,996	7,798	7,591	7,428	7,285	7,161	7,064
<b>Percent Change</b>	-	-2.54%	-2.73%	-2.19%	-1.96%	-1.73%	-1.37%

Source: Iowa State Data Center, <http://www.iowadatatcenter.org>

**vii. At Risk Groups**

The elderly are often identified as an “at risk group” for various reasons including potential health frailties and mobility challenges. Likewise younger populations are at potential risk due to lack of familiarity with disasters and especially with actions to take following a disaster. However, young

**Table 5: Potential At Risk Population in Monroe County**

	under 5	under 18	65+	Linguistically Isolated: 2000
<b>Total County</b>	520	2037	1574	13
<b>Unincorporated County</b>	176	869	674	0

Source: US Census Bureau

people may also have more education and more current education due to school drills that may not be as well known among populations over the age of 18. The elderly

population of unincorporated Monroe County was about 8% (674) of the total county population as of the 2000 Census. Nearly 43% of the elderly population in Monroe County resides in unincorporated areas. Young people in the unincorporated county comprised about 11% (869) with only about 2% (176) of those young people under age 5.

Like with elderly populations, about 43% of the young people in Monroe County were in the unincorporated county as of the 2000 Census.

**Table 6: Median Household Incomes in Monroe County**

	1999	1989
<b>Total County</b>	\$34,877	\$20,745
<b>Albia</b>	\$31,728	\$18,648
<b>Lovilia</b>	\$35,577	\$21,184
<b>Melrose</b>	\$34,583	\$14,318

Source: US Census Bureau

Another population that is often identified as an “at risk group” are those that are deemed “linguistically isolated” in the Census. This designation for households is defined as all members of the household over age 5

<sup>3</sup> The Iowa State Data Center has made these projections available to the public reprinted with permission from the document “2007 State Profile: Iowa”; <http://www.iowadatatcenter.org>.

speaking little or no English, or speak English “not very well.” The reason for this population as an “at risk group” is the concern that they may not understand storm warnings or information provided by law enforcement or emergency responders. There are no linguistically isolated populations in unincorporated Monroe County as of the 2000 Census.

**viii. Income**

In the 2000 Census, median household income for Monroe County was \$34,877, up from \$20,745 in the 1990 Census. Nearly one-third of the households in unincorporated Monroe County (28.14%) had incomes under \$25,000 annually. In 2000, 319 people in Monroe County were determined to be under the Federal Poverty Guidelines in 1999 comprising about 9% of the unincorporated population.

	<b>under \$25,000</b>	<b>\$25,000 to \$44,999</b>	<b>\$45,000 to \$74,999</b>	<b>\$75,000 +</b>
<b>Households</b>	397	470	359	185
<b>Proportion</b>	28.14%	33.31%	25.44%	13.11%

Source: US Census Bureau

**ix. Major Employers**

Ten major employers are identified in Monroe County by the Location One Information System (LOIS) website.

AYM Inc.	Albia High School
First Iowa State Bank	Hawkeye Molding Co
Hy-Vee	Lincoln Middle School
Monroe Care Ctr	Monroe County Hospital Home
Oakwood Nursing & Rehab Ctr	Quicktron

**x. Housing Information**

Private homes are an important element in disaster mitigation as they represent not only a place of residence but one of the most significant investments that Americans own. Even with declines in the housing market, private homes retain their status as a significant personal investment. Lack of protection of homes or loss of homes can have devastating impacts on their owners in many ways, not the least being economically and psychologically.

There is a cluster of seasonal homes share property joining to Lake Rathbun in nearby Appanoose County. LA-Z-DAZ Ranch, LA-Z-DAZ Estates and Green Acres are comprised of about 150 acres of mobile homes, trailer houses, and campers on the very southwest corner of Monroe County. It is estimated that during peak attendance there could be a combined total of 350 residents at these locations. This is not an incorporated community and has a very unpredictable population throughout the year because they are vacation homes. The residents of this area are beginning to

work for improvements to this region, including possible a sewer system and are entertaining the thoughts of needing a storm warning system in the future.

**a. Age of Housing**

More than one-third of the housing stock (37.05%) in Monroe County was constructed before 1940 suggesting that the structural integrity of the buildings likely does not meet newer building codes designed to ensure the safety of residents. These structures are likely the most vulnerable to various hazards due to their age and the changes in construction techniques which have improved in many ways since they were built. A larger proportion of the older housing stock is found in incorporated communities in Monroe County however. Median year built of the homes in Monroe County is 1948, meaning that half of the homes were built before and half after this year. The median age of housing is earlier for all three of the incorporated communities in this plan.

	<b>Built 1939 or earlier</b>	<b>Built 1940 to 1949</b>	<b>Built 1950 to 1959</b>	<b>Built 1960 to 1969</b>	<b>Built 1970 to 1979</b>	<b>Built 1980 to 1989</b>	<b>Built 1990 to 2000</b>
<b>Homes</b>	582	76	83	100	331	166	233
<b>Proportion</b>	37.05%	4.84%	5.28%	6.37%	21.07%	10.57%	14.83%

Source: US Census Bureau

Another potential concern is the prevalence of bottled fuels such as LP gas, kerosene, and oil used as heating fuel in the homes in unincorporated Monroe County; 31% (1010) of homes use LP gas as heating fuel. While LP tanks can be safe forms of fuel containment and transport, liquefied petroleum gas is flammable and can explode. LP gas is heavier than air and so it will sink to the lowest level possible; if inhaled it can cause asphyxiation through oxygen deprivation but is otherwise nontoxic. A further concern is that 120 homes (3.72%) in 2000 reported using wood as the primary heating fuel. This becomes a concern due to its potential fire hazard but also to carbon monoxide poisoning in the home if a chimney is blocked.

**b. Condition of Housing**

There is no current housing assessment for the unincorporated region of Monroe County.

**c. Value of Housing**

Between one-quarter and one-third of the owner-occupied homes in unincorporated Monroe County were valued at less than \$40,000 (28.10%) as of the 2000 Census and no homes were valued above \$300,000. Only nine homes were valued above \$150,000 as of the 2000 Census. About half of the homes in the unincorporated portion of Monroe County are valued between \$40,000 and \$99,999.

**Table 9: Unincorporated County Housing Valuations**

	Less than \$40,000	\$40,000 to \$99,999	\$100,000 to \$149,999	\$150,000+
<b>Homes</b>	111	221	27	36
<b>Proportion of total</b>	28.10%	55.95%	6.84%	9.11%

Source: US Census Bureau

**xi. Transportation**

There is one US Highways crossing through Monroe County, highway 34 running east to west. Three distinct county highways are located in the county, two (HWYs 5 and 137) converge inside the Albia municipal boundaries and one connects Melrose to US Highway 34. Three different railroad owners operate within Monroe County; Burlington Northern operates several railroad tracks. Amtrak runs trains along the Burlington Northern lines, through Albia.

Two natural gas pipelines enter the county, one from the north connecting to Lovilia and one from the south connecting to Albia. There are no pedestrian trails in Monroe County. See *Appendix J: Transportation Routes in Monroe County*.

According to preliminary crash analysis released by the Iowa DOT, HWYs 137 and 5 are considered “high crash horizontal curves.” The particular portion of HWY 137 of concern is about 1,000 feet southwest and about 750 feet northeast of 710th Avenue. For HWY 5, the area of concern is about 1,100 feet south of 139th Trail to 139th Trail.

**Table 10: High Crash Horizontal Curves in Monroe County**

ROUTE NAME	AADT	DESCRIPTION	CRASH SEVERITY					TOTAL CRASHES
			FATAL	MAJOR INJURY	MINOR INJURY	POSSIBLE INJURY	PROPERTY DAMAGE	
<b>IA 137</b>	1,850	~1000 ft. southwest and ~750 ft. northeast of 710th Ave.	0	1	2	2	5	10
<b>IA 5</b>	2,859	~1100 ft. south of 139th Trl to 139th Trl	0	2	1	2	1	6

Source: Iowa Department of Transportation, December 3, 2008

**xii. Existing Programs, Policies, and Technical Documents**

There are many tools available to communities for them to determine their own futures; many of these tools are not as common in rural areas or small communities as they are in more populated places. However, these tools are of possible use to protecting residents of an area from various hazards, such as flooding and cave-ins. See appendix CC for current programs, policies, and ordinances for each jurisdiction.

**xiii. Community Assets**

Community assets are not always easily identified and can often include cultural resources which are similar but may be more focused on historical or scientific significance (see 2.A.xiv. below). Generally speaking, community assets are those buildings, public or private facilities, and other infrastructure that make a settlement more than a cluster of homes and perhaps a few businesses. Often if such assets leave a community or are severely damaged, there may be a sense of loss in the community and it may signal impending decline of population. In these terms, community assets are more difficult to define for an unincorporated area or county since communities are generally thought of as a town or a city. None-the-less, the same assets that can be identified for an incorporated community in Monroe County, can be identified as an asset to the unincorporated county where they are present. This section also includes critical facilities which are assets that play a role in disaster recovery or are particularly vulnerable to disasters due to their vital role in the community. Grocery stores are included in this category as if they are lost or closed for extended periods of time then additional problems arise in the respective community including an incentive for residents to relocate.

For a geographic area like a county, community assets may also include water resources, wildlife preserves, and parkland. See Table 11: Community Assets for buildings located in the unincorporated county, Table 12: Critical Facilities, and Appendix M: Public Lands in Monroe County for natural and recreation areas. See Appendix Q: Community Assets and Critical Facilities for listing of which assets and facilities are present in Monroe County.

**Table 11: Unincorporated County Community Assets**

Assets	Number
Museums	0
Colleges	0
Schools	0
Libraries	0
Community Centers	0
Places of Worship	3

Source: Google Maps

**Table 12: Unincorporated County Critical Facilities**

Facilities	Number
Nursing / Convalescent / Retirement Homes	0
Hospitals	0
Ambulance Services	0
Fire Departments / Stations	0
Police / Law Enforcement Facilities	0
Courthouses	0
Grocery Stores	0
Communications	0
Other Facilities	0

Source: Google Maps



#### xiv. Cultural Resources

Non-living examples of objects acquired and preserved because of their potential value as examples, as reference material, or as objects of artistic, historic, scientific, educational, or social importance, either individually or as a collection. Cultural resources include “moveable heritage,” such as collections of artifacts, statuary, artwork, and important documents or repositories. Often housed in libraries, museums, archives, historical repositories, or historic properties, these resources range from three-dimensional examples such as sculptures, historic furnishings, family heirlooms, or textiles, to two-dimensional examples such as family records, written history or memorabilia, old photographs and maps, and other archival materials.

Source: FEMA Guide 386-6 pgvii

Most of the Cultural Resources in Monroe County that are identified in external sources are of either archeological nature or on the National Register of Historic Sites. These sources do not necessarily capture all of the cultural resources in the county, but they are a start.

The National Register of Historic Places is a program under the National Park Service that identifies places of historic significance as initiated by local efforts. These places then are subject to regulations to preserve their intrinsic nature but also qualify for funding to maintain them when available and may qualify for Federal tax benefits.

**Table 13: National Register of Historic Places**

Property	Address	City	Date Listed
<b>Albia Square and Central Commercial Historic District</b>	Roughly bounded by the alley of S. and N. Clinton E. and W. A Ave. N. and S. 2nd Street and E. and W. 2nd Ave	Albia	1/3/1985
<b>Brick Gothic House</b>	1.25 mi. S. of albia 0.75 mi. E of IA 5 0.5 mi W of T35	Albia	4/14/1994
<b>Buxton Historic Townsite</b>	Address Restricted	Lovilia	8/9/1983
<b>Clark Round Barn</b>	CR T7H	Tyrone	6/30/1986
<b>Elbert-Bates House</b>	106 2nd Ave. W.	Albia	6/27/1985
<b>Jenkins Dr. George A. House</b>	223 S. C Street	Albia	2/5/1987
<b>Monroe County Courthouse</b>	Main Street	Albia	7/2/1981
<b>Noble-Kendall House</b>	209 E. Benton Ave.	Albia	4/12/1984
<b>Perry T. B. House</b>	212 Benton Ave. W.	Albia	7/14/1983
<b>Saint Patrick's Roman Catholic Church</b>	US 34 W of Albia	Albia	5/6/1992
<b>White Arvine and Elizabeth W. House</b>	309 N. Main Street	Albia	9/8/1994

Source: <http://www.nps.gov/history/nr/>

There are approximately 101 historic sites in Monroe County; these sites include Historic Sites and Prehistoric Sites. See *Appendix G: Historic Sites in Monroe County* for an image of the county by section with a count of historic sites listed for each. Exact location and details of the historic sites is not publicly available in order to protect the sites from looting or intentional damage the exception to this may be sites that are on the National Historic Registry. The State Archeologist's office may be contacted for more information as needed.

#### xv. Endangered Species

Endangered or threatened animal species in Monroe County are confined to the Indiana Bat (endangered). Plant species on the endangered species list includes the Western Prairie Fringed Orchid (threatened) and the Prairie Bush Clover (threatened). See the *Iowa List of Federally Endangered, Threatened, Proposed, and Candidate Species – by County* list from the U.S. Fish and Wildlife Service for more information.

**Figure 4: Indiana Bat**



Source: US Fish and Wildlife Service, photo by Adam Mann, Environmental Solutions and innovations, <http://www.fws.gov/midwest/Endangered/esday/index.html>

**Figure 5: Western Prairie Fringed Orchid**



Source: Iowa Department of Natural Resources, <http://www.iowadnr.com/other/images/platanthera.jp>

**Figure 6: Prairie Bush Clover**



*Photo by USFWS; Phil Delphey*

Source: US Fish and Wildlife Service, photo by Phil Delphey <http://www.fws.gov/midwest/endangered/plants/prairieb.html>

## B. Albia

The City of Albia is the County Seat of Monroe County; see *Appendix B: Communities of Monroe County* for location of Albia in relation to other communities in the county.

### i. Geography

Albia is located slightly east of the center of the county at coordinates 41° 1' 36" N, 92° 48' 19" W. Albia encompasses an area of 3.1 square miles with a population density of 1,184.8 people per square mile according to the 2000 Census.

### ii. History / Development Trends

Albia has had a decrease in population for every census period since 1940. The population reached a high of 5157 in 1940, and has steadily decreased by a few hundred each census period since then. The smallest decrease was from 1990 to 2000 with a loss of only 164 people. This is a trend that coincides with other rural counties in Iowa as several rural county residents move towards the larger cities.

Also, 22.9% of the residents are over 65 years of age, which exceeds the state average of 14.8%. Without younger population moving into Albia, the death rate could exceed the birth rate as the population continues to age. However, Woods & Poole data suggests that population decreases

will be at less drastic rates than what have been seen in the past. It is important to note that a number of the factors could change the projections dramatically.

Albia, the present county seat of Monroe County, was first incorporated as a town in 1856, though in the summer of 1845 John Massy surveyed the town site when it was known as Princeton. The place at present contains a little more than 2,500 population. As we have stated elsewhere, John Stephenson claimed the quarter-section on which the village was located. He was the first settler in the neighborhood.

The original plat contained but two wards, defined by the alleys running north and south from the Square in the center of the plat.

In 1848 the village of Albia was chiefly a grass-plot. The public park in the center of the Square was a tangled mass of wild grass and "shoe-string" willows. John Marck and family lived in a little frame building on the southeast corner, where the Albia *Union* office now stands. Then about half way across the Square, on the south side, stood the shanty of Dr. Warrick. On the west were the little sheds occupied by Messrs. Park, Harrow, and Buchanan. On the east were Scott Arnold and the court-house, and on the northeast corner was Dan Richardson's.

The Coal Mining and Railroad industry have had a strong effect on the economic development throughout the community. The rail continues to be critical to all industries in Albia.

**iii. Population**

As of the 2000 Census, the total population of Albia was 3,636 with a total of 1,526 households. Between 1990 and 2000, Albia lost 234 people and 68 households in contrast with the unincorporated county's gain in both population and households. This is a loss of about 6% of population and about 4% loss of households.

	<b>Population</b>	<b>Households</b>
<b>2000</b>	3636	1526
<b>1990</b>	3870	1594

Source: US Census Bureau

**iv. At Risk Groups**

As discussed in 2.A.vii, the Monroe County section on at risk groups, young children, the elderly, and those that are linguistically isolated are generally identified as a "at risk groups." About half of each of the potential at risk populations in Monroe County is located in Albia (47.67 to 57.69% each category) except for the linguistically isolated population. As of the 2000 Census, all of the people that are considered linguistically isolated in Monroe County were located in Albia.

	<b>under 5</b>	<b>under 18</b>	<b>65+</b>	<b>Linguistically Isolated</b>
<b>Total County</b>	520	2037	1574	13
<b>Albia</b>	300	971	804	13

Source: US Census Bureau

**v. Income**

In the 2000 Census, median household income for Albia was \$31,728, up from \$18,648 in the 1990 Census. Once inflation is accounted for, the real median household income has declined by about 2% since 1989 meaning that increased incomes are falling behind inflation slightly.<sup>4</sup> More than 70% of the households in Albia had incomes less than \$45,000 in 1999. About 9% (318 people) of the population of Albia have incomes below the 1999 Federal Poverty Guidelines.

**Table 16: Albia Household Incomes (1999)**

	<b>under \$25,000</b>	<b>\$25,000 to \$44,999</b>	<b>\$45,000 to \$74,999</b>	<b>\$75,000 +</b>
<b>Households</b>	585	499	313	129
<b>Proportion</b>	38.34%	32.70%	20.51%	8.45%

Source: US Census Bureau

**vi. Major Employers**

See 2.A.ix. for major employers in Monroe County for a chart of major area employers.

**vii. Housing Information**

**a. Age of Housing**

Nearly half (49.5%) of homes in Albia were built prior to 1940 though there was a spike in new homes built in the 1970’s with about 14% of the housing stock built during this decade. About 4% of homes (64 homes) in Albia are heated with bottled fuels and about 1.5% of homes (24 homes) were heated primarily by firewood in 2000.

**Table 17: Years Built of Housing in Albia**

	<b>Built 1939 or earlier</b>	<b>Built 1940 to 1949</b>	<b>Built 1950 to 1959</b>	<b>Built 1960 to 1969</b>	<b>Built 1970 to 1979</b>	<b>Built 1980 to 1989</b>	<b>Built 1990 to 2000</b>
<b>Homes</b>	842	155	123	156	243	93	89
<b>Proportion</b>	49.50%	9.11%	7.23%	9.17%	14.29%	5.47%	5.23%

Source: US Census Bureau

**b. Condition of Housing**

The most recent Housing Assessment and Action Plan was completed in 2002. It was determined at that time, that the city of Albia is home to 3,706 people (2000 census). It is a county seat community with a small town personality. Population was steady over 5,000 in 1920 and again in 1940, but its population has steadily decreased ever since then. Albia remains the largest city in Monroe County.

<sup>4</sup> Various Inflation and Consumer Price Index calculators are available online, for the estimates in this plan utilizes Bureau of Labor Statistics’ calculator; <http://www.bls.gov/bls/inflation.htm>.

Quality services and facilities offered by this community make it an attractive location for families and households seeking small town living. Albia has many of the services and facilities found in larger communities, including: city water and sewer, natural gas, paved streets, fire service, high school and grade schools, banks, convenience stores, hardware store, mechanic, car dealership and other small service businesses. Transportation to larger markets is well provided for a U.S. Highway 34 travels directly through the community, linking it with the larger employment and service centers found in Ottumwa and Burlington. It is also located on Iowa's highway 5, linking it with Centerville to the south and Knoxville and Des Moines to the north. Iowa Highway 137 also runs through it, connecting it to Eddyville and Oskaloosa, and the area's largest employer, Cargill. The City is also served by 3 railroads, including 2 of the largest carriers in the country. The Burlington Northern/Santa Fe, the Union Pacific, and Monroe county Community railroads all pass through Albia.

The typical household in Albia is made up of married couples, most of which are working families. There is a higher than average percentage of senior citizens in the community (65 years and over). These statistics are all very comparable to those of Ottumwa and Oskaloosa, but with a much higher senior population.

The housing market in Albia offers an affordable range of mid-priced homes. About 80 home sales occur annually, and an average of 5 to 6 homes are built in any given year. Sale prices range between \$10-\$10,000 and above. Currently 19 homes are listed for sale in the City, with asking prices ranging from \$25,000 to \$150,000. Homes do not stay on the market long, usually 60-90 days on average. Nearly 65% of the 1,594 total housing units are owner-occupied.

There are approximately 550 rental housing units in the community. There is some senior housing in Parkview Estates and Benton Place Apartments, but more is needed. The Parkview units have a waiting list, and Benton Place generally does too. There are two rental complexes of four units each in the community. The remaining rental units are generally detached single-family units scattered about the community. The market for rental units is very tight, with 5 to 6 requests per month and an average of less than 30 days on the market. The average cost of rent is \$190/month plus utilities, which is lower than rates found in either Ottumwa or Oskaloosa.

The overall condition of housing is good across the community. Some of the homes are in need of at least some general maintenance and about 32 properties need to be demolished. There is a clean and neat appearance to most properties in the city, making the city attractive to potential buyers.

In the last several years, there have been improvements done to bring change to Albia. A subdivision was created to build new housing. Investments have allowed the community opportunities for growth by increasing the capacity to add homes to the community, and to attract new residents, especially families with children. Outside factors that will influence the ability to attract new residents and increase population will be the economic activities of cities surrounding Albia, including Oskaloosa, Ottumwa and Eddyville Industrial complex.

**c. Value of Housing**

Over 90% of the owner-occupied homes in Albia were valued at less than \$100,000 and most homes were valued between \$40,000 and \$99,999. Only twenty two homes were valued above \$150,000; no homes were valued above \$300,000.

**Table 18: Housing Valuation in Albia (2000)**

	Less than \$40,000	\$40,000 to \$99,999	\$100,000 to \$149,999	\$150,000+
<b>Homes</b>	292	609	58	22
<b>Proportion</b>	29.77%	62.08%	5.91%	2.24%

Source: US Census Bureau

**viii. Transportation**

Highway 34, running east-west, and Highway 5, running north-south, cross near the southern boundary of Albia and Highway 137 joins Highway 5 in the northern third of the city. Several railroads cross through and join up in the city as well. A natural gas pipeline enters Albia from the south. There are about 40 miles of roadway within the municipal boundaries of Albia.

**ix. Existing Programs, Policies, and Technical Documents**

There are many tools available to communities for them to determine their own futures; many of these tools are not as common in rural areas or small communities as they are in more populated places. However, these tools are of possible use to protecting residents of an area from various hazards, such as flooding and cave-ins. See Appendix CC for current existing programs, policies and ordinances.

**x. Community Assets**

Refer to 2.A.xiii. for a description of what constitutes community assets in this plan.

See Table 20: Community Assets and Table 19: Critical Facilities for buildings located in Albia. See Appendix Q: Community Assets and Critical Facilities for listing of which assets and facilities are present in Albia.

**Table 20: Albia Community Assets**

Assets	Number
<b>Colleges</b>	0
<b>Schools</b>	6
<b>Community Centers</b>	1
<b>Places of Worship</b>	

Source: Google Maps

**Table 19: Albia Critical Facilities**

Facilities	Number
<b>Nursing / Convalescent / Retirement Homes</b>	4
<b>Hospitals</b>	1
<b>Ambulance Services</b>	1
<b>Fire Departments / Stations</b>	1
<b>Police / Law Enforcement Facilities</b>	2
<b>Courthouses</b>	1
<b>Grocery Stores</b>	4
<b>Communications</b>	1
<b>Other Facilities</b>	0

Source: Google Maps



## **xi. Cultural Resources**

Refer to 2.A.xiv. for a description of what constitutes cultural resources in this plan. There is a public library and a historical museum located in Albia. There is one prehistoric site in a section partially encompassed in the municipal boundaries. See *Appendix G: Historic Sites in Monroe County* for an image of the county by section with a count of historic sites listed for each.

## **xii. Priority Hazards**

The City of Albia Mayor, Richard Clark, participated throughout the mitigation process and identified priority hazards shown in Appendix DD: Hazards by Jurisdiction. The members have identified the hazards of severe winter storms, tornados, and Thunderstorm/Lightning as major concerns for that community. The city was interested in pursuing many of the mitigation strategies but felt priority would be placed on obtaining generators for emergency shelter sites, addressing vacant structures and/or collapsed buildings.

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## **C. Lovilia**

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See *Appendix B: Communities of Monroe County* for location of Lovilia in relation to other communities in the county.

### **i. Geography**

Lovilia is the northern-most incorporated community in Monroe County, excluding Eddyville, at coordinates 41° 7' 57" N, 92° 54' 22" W. The city encompasses an area of .5 square miles with a population density of 1,160.8 people per square mile according to the 2000 Census.

### **ii. History / Development Trends**

Lovilia's first settlers arrived by wagon train in the spring of 1843 in the area now known as the Osborn Cemetery (3 miles east of town). As the boundaries began to form, a man named Bremen opened a small general store. This became a popular meeting place known as "Bremen's Place", from which the town derived its name.

A few years later Bremen became an incorporated town but due to duplication within the state a new name had to be chosen. Lovilia is presumed to have taken its new name from the daughter of the town's first postmaster.

Continued growth preceeded the period when Lovilia became known as "the coal mining center of Iowa", because of its close proximity to eight coal mining operations. Lovilia realized the most prosperous era it has ever known until the coal supply ran out.

To stimulate tourism dollars to southern Iowa, three artificial lakes were constructed – Red Rock, Rathbun, and Miami Lake. Lake Miami is located 4 miles east of Lovilia.

In the past years, an effort has begun to restore some of the oldest buildings in town. The oldest house in town build by Pat Ferris is now owned by Dean Kendall. The oldest store building once owned by T.B. McDonald has been restored to its original appearance. It now is known as "Bremen



Eatery”. Displayed inside is an old kitchen sink built on this site by Harvey Baxter and is marked Bremen 1854.

**iii. Population**

As of the 2000 Census, the total population of Lovilia was 577 with a total of 228 households. Between 1990 and 2000, Lovilia lost 26 people and gained 2 households in contrast with the unincorporated county’s gain in both population and households. This is a loss of nearly 5% of population and less than 1% loss of households.

**Table 21: Lovilia Population (2000)**

	Population	Households
<b>2000</b>	577	228
<b>1990</b>	551	226

Source: US Census Bureau

**iv. At Risk Groups**

As discussed in 2.A.vii, the Monroe County section on at risk groups, young children, the elderly, and those that are linguistically isolated are generally identified as a “at risk groups.” A little more than ten percent of the county’s “at risk populations” were in the city in 2000. As of the 2000 Census, there were no people that are considered linguistically isolated.

**Table 23: Potential At Risk Populations in Lovilia (2000)**

	under 5	under 18	65+	Linguistically Isolated
<b>Total County</b>	520	2037	1574	13
<b>Lovilia</b>	44	172	70	0

**Table 22: Lovilia Household Incomes (2000)**

	under \$25,000	\$25,000 to \$44,999	\$45,000 to \$74,999	\$75,000 +
<b>Households</b>	82	67	62	17
<b>Proportion</b>	35.96%	29.39%	27.19%	7.46%

Source: US Census Bureau

**v. Income**

In the 2000 Census, median household income for Lovilia was

\$35,577, up from \$21,184 in the 1990 Census. Once inflation is accounted for, the real median household income has declined by about 2% since 1990 meaning that increased incomes are not keeping up with inflation. About 65% of the households in Lovilia had incomes less than \$45,000 in 1999. About 7% (42 people) of the population of Lovilia have incomes below the 1999 Federal Poverty Guidelines.

**vi. Major Employers**

See 2.A.ix. for major employers in Monroe County for a chart of major area employers.

**vii. Housing Information**

**a. Age of Housing**

Nearly half (48.81%) of homes in Lovilia were built prior to 1940 though there was a spike in new homes built in the 1970’s with about 15% of the housing stock built during this decade. Only 3% of homes (7 homes) in Lovilia are heated with bottled fuels however 11 homes were heated primarily by firewood in 2000.

**Table 24: Years Built of Housing in Lovilia**

	Built 1939 or earlier	Built 1940 to 1949	Built 1950 to 1959	Built 1960 to 1969	Built 1970 to 1979	Built 1980 to 1989	Built 1990 to 2000
<b>Homes</b>	123	17	11	28	38	13	22
<b>Proportion</b>	48.81%	6.75%	4.37%	11.11%	15.08%	5.16%	8.73%

Source: US Census Bureau

**b. Condition of Housing**

There is not a currently housing assessment for the community of Lovila.

**c. Value of Housing**

All of the owner-occupied homes in Lovilia were valued at less than \$150,000 in 2000. More than half of the homes were valued at less than \$40,000 as of the 2000 Census.

**Table 25: Housing Valuation in Lovilia (2000)**

	Less than \$40,000	\$40,000 to \$99,999	\$100,000 to \$149,999	\$150,000+
<b>Homes</b>	89	68	2	0
<b>Proportion</b>	55.97%	42.77%	1.26%	0.00%

Source: US Census Bureau

**ix. Existing Programs, Policies, and Technical Documents**

There are many tools available to communities for them to determine their own futures; many of these tools are not as common in rural areas or small communities as they are in more populated places. However, these tools are of possible use to protecting residents of an area from various hazards, such as flooding, and cave-ins. See Appendix CC for existing programs, policies and ordinances in the each jurisdiction.

**x. Community Assets**

Refer to 2.A.xiii. for a description of what constitutes community assets in this plan.

**Table 26: Lovilia Critical Facilities**

Facilities	Number
<b>Nursing / Convalescent / Retirement Homes</b>	0
<b>Hospitals</b>	0
<b>Ambulance Services</b>	0
<b>Fire Departments / Stations</b>	0
<b>Police / Law Enforcement Facilities</b>	0
<b>Courthouses</b>	0
<b>Grocery Stores</b>	0
<b>Communications</b>	0
<b>Other Facilities</b>	0

Source: Google Maps

See Table 27: Community Assets and Table 26: Critical Facilities for buildings located in Lovilia. See Appendix Q: Community Assets and Critical Facilities for listing of which assets and facilities are present in Lovilia.

**xi. Cultural Resources**

Refer to 2.A.xiv. for a description of what constitutes cultural resources in this plan. There are no libraries or museums located in Lovilia. There is one prehistoric site in a section partially encompassed in the municipal boundaries. See *Appendix G: Historic Sites in Monroe County* for an image of the county by section with a count of historic sites listed for each.

**Table 27: Lovilia Community Assets**

Assets	Number
Colleges	0
Schools	1
Community Centers	1
Places of Worship	1

Source: Google Maps

**xii. Priority Hazards**

The City of Lovilia had indirect participation in this plan. The city clerk provided information as requested by the planner. The LEPC committee members have identified the hazards of severe winter storms, tornado, and Rail Transportation Incident as major concerns for that community. The city was interested in pursuing many of the mitigation strategies but felt priority would be placed on obtaining generators for an emergency shelter site.

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**D. Melrose**

See *Appendix B: Communities of Monroe County* for location of Melrose in relation to other communities in the county.

**i. Geography**

Melrose is the western-most incorporated community in Monroe County at coordinates 40° 58' 31" N, 93° 3' 0" W. The city encompasses an area of .8 square miles with a population density of 153.7 people per square mile according to the 2000 Census.

**ii. History / Development Trends**

The single greatest source of names of Iowa towns was the railroad builders, but Melrose came into being before the railroad cut through southern Iowa. Township records show that although Melrose was not incorporated until 1882, it was laid out and surveyed by John P. Currier when the railroad was built through the community in 1866. By 1876, the town had attracted a population of three-hundred some souls, and boasted three drygood stores, a millinery shop, three grocery stores, a hardware, two drugstores, a wagon-maker, a carpenter and furniture maker, a saddler, two blacksmiths, two hotels, two doctors, and an attorney.

While it is impossible to list all the business that operated in Melrose through the years, it is possible to say that the list grew and changed and diminished, according to the times.

**iii. Population**

As of the 2000 Census, the total population of Melrose was 128 with a total of 57 households. Between 1990 and 2000, Melrose gained 22 people and lost 7 households in contrast with the County’s gain in both population and households. This is a loss of about 15% of population and a loss of nearly 11% of households.

**Table 28: Melrose Population (2000)**

	Population	Households
<b>2000</b>	128	57
<b>1990</b>	150	64

Source: US Census Bureau

**iv. At Risk Groups**

As discussed in 2.A.vii, the Monroe County section on at risk groups, young children, the elderly, and those that are linguistically isolated are generally identified as a “at risk groups.” Melrose’s share of at risk groups was 4% of the county total split almost evenly between elderly and young people. As of the 2000 Census, there were no young people under the age of five nor were there people that are considered linguistically isolated.

**Table 29: Potential At Risk Populations in Melrose (2000)**

	under 5	under 18	65+	Linguistically Isolated
<b>Total County</b>	520	2037	1574	13
<b>Monroe</b>	0	25	26	0

Source: US Census Bureau

**v. Income**

In the 2000 Census, median household income for Melrose was \$34,583, up from \$44,318 in the 1990 Census. Once inflation is accounted for, the real median household income has declined by nearly 26% since 1990 meaning that increased incomes are falling behind inflation. About 70% of the households in Melrose had incomes less than \$45,000 in 1999. Over 20% (27 people) of the population of Melrose have incomes below the 1999 Federal Poverty Guidelines.

**Table 30: Melrose Household Incomes (2000)**

	under \$25,000	\$25,000 to \$44,999	\$45,000 to \$74,999	\$75,000 +
<b>Households</b>	26	14	9	8
<b>Proportion</b>	45.61%	24.56%	15.79%	14.04%

Source: US Census Bureau

**vi. Major Employers**

See 2.A.ix. for major employers in Monroe County for a chart of major area employers.

**vii. Housing Information**

**a. Age of Housing**

More than two-thirds (71.88%) of homes in Melrose were built prior to 1940 though there was a spike in new homes built in the 1970’s with nearly 13% of the housing stock built during this decade. No homes were built between 1940 and 1960. More than three-quarters of homes (41 homes) in Melrose are heated with bottled fuels and 4 homes were heated primarily by firewood in 2000.

**Table 31: Years Built of Housing in Melrose**

	Built 1939 or earlier	Built 1940 to 1949	Built 1950 to 1959	Built 1960 to 1969	Built 1970 to 1979	Built 1980 to 1989	Built 1990 to 2000
<b>Homes</b>	46	0	0	5	8	2	3
<b>Proportion</b>	71.88%	0.00%	0.00%	7.81%	12.50%	3.13%	4.69%

Source: US Census Bureau

**b. Condition of Housing**

There is no current housing assessment for the community of Melrose.

**c. Value of Housing**

About half of the owner-occupied homes in Melrose were valued at less than \$40,000; no homes were valued above \$100,000 in the 2000 Census.

**Table 32: Housing Valuation in Melrose (2000)**

	Less than \$40,000	\$40,000 to \$99,999	\$100,000 to \$149,999	\$150,000+
<b>Homes</b>	15	13	0	0
<b>Proportion</b>	53.57%	46.43%	0.00%	0.00%

Source: US Census Bureau

**ix. Existing Programs, Policies, and Technical Documents**

There are many tools available to communities for them to determine their own futures; many of these tools are not as common in rural areas or small communities as they are in more populated places. However, these tools are of possible use to protecting residents of an area from various hazards, such as flooding and cave-ins. See Appendix CC for existing programs, policies and ordinances in each jurisdiction.

**x. Community Assets**

Refer to 2.A.xiii. for a description of what constitutes community assets in this plan.

See Table 34: Community Assets and Table 33: Critical Facilities for buildings. See Appendix Q: Community Assets and Critical Facilities for listing of which assets and facilities are.

**xi. Cultural Resources**

Refer to 2.A.xiv. for a description of what constitutes cultural resources in this plan. There are no libraries or museums located in Melrose. There is one prehistoric site in a

**Table 34: Melrose Community Assets**

Assets	Number
Colleges	0
Schools	0
Community Centers	0
Places of Worship	1

Source: Google Maps

**Table 33: Melrose Critical Facilities**

Facilities	Number
Nursing / Convalescent / Retirement Homes	0
Hospitals	0
Ambulance Services	0
Fire Departments / Stations	1
Police / Law Enforcement Facilities	0
Courthouses	0
Grocery Stores	1
Communications	0
Other Facilities	0

Source: Google Maps

section partially encompassed in the municipal boundaries. See *Appendix G: Historic Sites in Monroe County* for an image of the county by section with a count of historic sites listed for each.

**xii. Priority Hazards & Mitigation Strategies**

The City of Melrose had direct participation in this plan through the resident, Dennis Ryan and city Clerk, Linda Heller process and identified priority hazards shown in Appendix DD: Hazards by Jurisdiction. They provided information as requested by the planner, scored items and identified the hazards of severe winter storms, tornado, and Rail Transportation Incident as major concerns for that community. The city was interested in pursuing many of the mitigation strategies but felt priority would be placed on obtaining generators for an emergency shelter site and maintaining their early storm warning system.

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## E. Albia Community Schools

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The Albia School District is located in Albia, IA within Monroe County and includes 6 buildings that serve 1,104 students in grades PK through 12.

Monroe County is located in the southern tier of counties in Iowa one county from the Missouri border. There are twenty-three unincorporated communities in Monroe County and four incorporated cities that are all served by the Albia Public School system. See *Appendix B: Monroe County Communities* for a map showing location of each incorporated community in the county.

### i. Geography

Monroe County is located in the south-central sector of Iowa at coordinates 41° 1' 42" N, 92° 52' 12" W. The counties surrounding Monroe are as follows; Marion, Mahaska, Wapello, Davis, Appanoose, Wayne, and Lucas. Monroe County encompasses an area of 434 square miles with a population density of 18 people per square mile according to the 2000 Census. The school properties do not lie inside a floodplain.

### ii. Climate

The climate in Monroe County is of a continental character much like other parts of the Midwest. Four distinct seasons are experienced in the area. On average, Monroe County receives about 36 inches of rain annually and 25 inches of snow annually. There are 199 sunny days per year with 103 days of measurable precipitation on average. July tends to be the hottest month with highs around 87 degrees and January tends to be the coldest month with lows around 14 degrees on average.

There are seasonal variations in weather patterns and there are extremes that can pose risks to residents. Climate projections by the Union of Concerned Scientists, the US EPA, the USDA, and International Panel of Climate Change suggest that Monroe County and the mid-west overall will experience more extreme and more frequent weather fluctuations in the near future.

### iii. Vegetation

Initially the county was predominantly forest and prairie land. This land cover has been transformed into various cropland uses over the last one hundred and fifty years. Substantial stands of deciduous forest remained despite the vast changes, more-so than may be found elsewhere in Iowa. See *Appendix E: Changes in Vegetative Cover* for a graphic comparison.

### iv. Soils Information

According to the Natural Resource Conservation Service (NRCS), Monroe County is located in three soil regions; Loess Ridges / Glacial Till Sideslopes, Loess, Shale, and Glacial Till, and Loess Ridges / Glacial Till – SE Iowa. Most of Monroe County is composed of the first soil type. Loess is fine, loamy, wind-blown sediment that is typically yellowish or brownish in color that is unstratified (Dictionary.com). Geologically, Loess is highly erodible, but in terms of the human life-span it is relatively stable soil. Loess soils tend to become very rich soil after it accumulates over time. See *Appendix H: NRCS Iowa Soil Regions Map*.

None of the incorporated communities in Monroe County have Karst soils underlying them, however some area of Karst soils are in the northeast corner of the county. Karst soils are soil compositions that contain rock that can be dissolved by water thereby creating a gap in the soil which can collapse and cause subsidence (see *Appendix I: Karst Soils in Relation to Monroe County*).

#### **v. Population and Projections**

As of the 2000 Census, the total population of Monroe County was 8,016 with a total of 3,222 households. This is down 98 persons since the 1990 Census count of 8,114 people; a total decline of 1.2%. In 1990 there were 3,180 households. According to Iowa State University's Regional Capacity Analysis Program<sup>5</sup> (ReCAP), Monroe County has faced nearly a century of decline starting around 1910. The decline has been evening out in recent decades with the smallest amount of population loss between 1990 and 2000. The 2000 Census population of Monroe County is below the population of the county in 1860 but significantly higher than the population was in 1850. The school has projected numbers that to maintain about the same enrollment numbers for the next 10 years.

#### **vi. At Risk Groups**

Young people in the county comprised about 29% (2,223) with only about 6.4% (512) of those young people under age 5.

Another population that is often identified as an "at risk group" are those that are deemed "linguistically isolated" in the Census. This designation for households is defined as all members of the household over age 5 speak little or no English, or speak English "not very well." The reason for this population as an "at risk group" is the concern that they may not understand storm warnings or information provided by law enforcement or emergency responders. A large population increase has been seen in Monroe County (400%) according to the 2000 and 2010 U.S. Census data. This increase of Hispanic population has been because of employment opportunities.

In the Albia School District, 12% of students have an IEP (Individualized Education Program). An IEP is a written plan for students eligible for special needs services that also places children "at risk".

#### **vii. Income**

In the 2000 Census, median household income for Monroe County was \$34,877, up from \$20,745 in the 1990 Census. y. In 2000, 319 people in Monroe County were determined to be under the Federal Poverty Guidelines in 1999.

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<sup>5</sup> Historic Population Census data is available for the State of Iowa through ReCAP at the following website; <http://www.recap.iastate.edu/atlas/population/population-historical.php>.



### **viii. Transportation**

There is one US Highways crossing through Monroe County, highway 34 running east to west. Three distinct county highways are located in the county, two (HWYs 5 and 137) converge inside the Albia municipal boundaries and one connects Melrose to US Highway 34. These are distinct “Hard surface” bus routes that operate throughout the county. The school manages sixteen (16) buses to the 1,104 students enrolled in the Albia Community Schools.

### **ix. Existing Programs, Policies, and Technical Documents**

Albia Public School system has many policies and procedures that are implemented to comply with all Iowa State school regulations. The school hosts emergency procedure drill throughout the school year to acquaint teachers, administrators and students with the proper action required in such situations.

### **x. Community Assets**

The Albia School District spends \$8,656 per pupil in current expenditures. The district spends 65% on instruction, 29% on support services, and 6% on other elementary and secondary expenditures. The district also owns 6 buildings all within the city limits of Albia, Iowa.

### **xi. Priority Hazards & Mitigation Strategies**

The Albia Community Schools had direct participation in this plan through Superintendent, Kevin Crall. He contributed in the process, identified priority hazards shown in Appendix DD: Hazards by Jurisdiction, and will have the school officially adopt the document when a final draft is approved by Iowa’s Homeland Security. They provided information as requested by the planner, scored items and identified the hazards of severe winter storms, tornado, and Thunderstorm/Lightning as major concerns for the school. The school is interested in pursuing the mitigation strategy for grant opportunities that could allow the construction of a school safe room.

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## **3. Identifying and Profiling Hazards**

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In order to properly identify mitigation strategies and activities, the hazards that may affect the city must be identified. This section lists the potential hazards to the city that were identified by the planning committee. This section also discusses previous occurrences of the hazards, the areas of the city most at risk from each hazard, and the populations most at risk. By identifying the hazards and quantifying the risks, the city can better assess current mitigation strategies, develop future mitigation strategies, and identify needed mitigation projects.

The hazards addressed in this plan were identified by taking the list of hazards from the Iowa Hazard Mitigation Plan (*Figure 7*) which were evaluated in relation to local conditions. Descriptions of the hazards and preliminary data on the impacts and the vulnerable populations and structures were taken largely from the State Plan supplemented with local knowledge during the meeting where the hazards were selected initially. There were hazards that clearly apply to the cities of

Albia, Melrose or Lovilia, some that may or may not, and a few that clearly do not apply. The ones that do not apply were removed from the list of hazards that were detailed in the hazard profiles.

*Figure 7: Hazards Identified in State Plan*

Natural Hazards	Human Caused/Combination Hazards
Flash Flood	Human Disease Pandemic
Tomadoes	Fixed Hazardous Materials
Windstorms	Transportation Hazardous Materials Incident
Extreme Heat	Structural Fire
Hailstorms	Cyber Terrorism
Grass or Wild land Fire	Highway Transportation Incident
Sink Holes	Air Transportation Incident
River Flooding	Rail Transportation Incident
Severe winter storms	Bioterrorism
Levee Failure	Radiological Terrorism
Drought	Enemy Attack
Earthquakes	Pipeline Transportation Incident
Landslide	Fixed Radiological Incident
Dam Failure	Chemical Terrorism
Expansive Soils	Agro-Terrorism
Thunderstorm & Lightning	Human Disease Incident
	Waterway Incident
	Energy Failure
	Conventional Terrorism
	Public Disorder
	Structural Failure
	Communications Failure
	Animal/ Plant/ Crop Disease
	Radiological Transportation

Source: Iowa Hazard Mitigation Plan: Iowa Comprehensive Emergency Plan September 2007

The hazards that may or may not apply were predominantly human caused or combination hazards; these were evaluated by the planning committee as far as their local relevance. This was done by distributing a survey to the planning committee for them to identify which hazards *have a chance of occurring in Monroe County*. The only hazard unanimously identified as not likely in Monroe County is radiological transportation hazards in the initial discussion. However, some responses indicated that committee members thought that due to the presence of the railroad throughout the county, there may be a chance of a radiological incident and therefore be included and profiled. It should be noted that the survey incorrectly indicated that the state *designates* radiological transport routes, rather the state determined *likely* radiological transportation routes in the state hazard mitigation plan.

This initial list of hazards that were identified as having a chance of occurring anywhere in Monroe County was further refined following the Monroe County Hazard Mitigation Committee’s selection. Determining what hazards are likely to occur in Monroe County was based on preliminary research conducted following the initial hazard selection and on local knowledge conveyed during

committee meetings. The preliminary research on what hazards are likely to occur in Monroe County consisted of the Description, Historical Occurrence, and Probability elements in the hazard profiles. This method of incorporating the information to determine what hazards *are likely* into the profiles themselves was used to avoid repetition of hazard information.

The potential hazards identified for the County of Monroe and discussed in detail below correspond to hazards identified by FEMA and the Iowa Department of Homeland Security with additional hazards locally identified. The list of hazards addressed in this plan is as follows:

***Natural Hazards***

- Flash Floods
- Tornadoes
- Windstorm/High Wind Events
- Extreme Heat
- Hailstorms
- Sink Holes
- Severe Winter Storms
- River Flooding
- Drought
- Earthquake
- Dam Failure
- Thunderstorm & Lightning
- Radon/Lead
- Grass/Wildfire

***Human Caused and Combination Hazards***

- Air Transport Incident
- Rail Transportation Incident
- Highway Transportation Incident
- Transportation Hazardous Materials
- Human Disease Incident
- Fixed Hazardous Materials
- Energy Failure
- Communications Failure
- Pipeline Incident
- Transportation Radiological Material
- Animal/plant/crop disease
- Human Disease Pandemic
- Agro Terrorism
- Biological Terrorism
- Chemical Terrorism

- Waterway Incident
- Structural Failure
- Structural Fire

Documented historic events are not always specifically noted for rural communities in this area or other similar communities so some information in the following hazard analysis includes the entire Monroe County area. Monroe County contains 27 communities in relatively close proximity to one another and share similar topography, land uses, and land cover in addition to sharing other socio-economic characteristics. Events would most likely impact many neighboring communities. See Appendix DD to review hazards affecting each jurisdiction.

Some information in the following hazard analyses is drawn from Iowa's *Hazard Analysis and Risk Assessment: 2003 Local Guide* and the *Iowa Hazard Mitigation Plan: Iowa Comprehensive Emergency Plan September 2007*.

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### **A. State and FEMA Recognized Hazards not Detailed**

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The State of Iowa and FEMA recognize a certain list of hazards that all hazard mitigation plans are to address initially. However, not all hazards impact all areas, this brief section indicates what hazards are not addressed and why. Likewise, not all hazards were determined by the Monroe Planning Committee to be significant enough to include in this plan.

Levees – There are no levees in Monroe County as of the writing of this plan

Expansive Soils – The Monroe county committee determined after some discussion to exclude this hazard in part due to the relatively slow speed of onset and to the fact that it is addressed in the State Plan.

Climate Change – The committee determined that many of the other categories address the conditions that would be associated with climate change.

Enemy Attack – The Monroe County Planning Committee decided to exclude this hazard from this plan due to the consideration that Albia, Melrose, Lovilia or the unincorporated regions of Monroe County would be very unlikely to be a target in the event of an attack.

Landslides – The committee determined that on the outside chance of a landslide, limited areas would be affected and the damage would be minimal.

Public Disorder – The Monroe Planning Committee decided to exclude this hazard from this plan due to the relatively small population of the communities and the relative low likelihood of any significant public disorder event taking place in town.

Fixed Radiological Incident – There are no nuclear power plants in Monroe County.

## B. Risk Assessment

The risk assessment identifies how people, properties, and structures will be damaged by the event. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high risk areas, will help the community decide what mitigation measure should be undertaken and how to implement the activities they select.

In making their hazard analysis and risk assessment, the Monroe County Hazard Mitigation Planning Committee considered the following:

- Historical Occurrence
- Probability
- Vulnerability
- Maximum Threat
- Severity of Impact
- Speed of Onset

The following tables define each factor and the rating scale the Planning Committee used to assess the hazards risk to the community.

**Historical Occurrence:** Number of times that a hazard has occurred in the community in the past.

Rating	Number of Historical Occurrences
1	Fewer than 4 occurrences
2	5 to 7 occurrences
3	8 to 12 occurrences
4	More than 12 occurrences

**Probability:** Likelihood of the hazard occurrence, sometimes without regard to hazard history.

Rating	Likelihood	Frequency of Occurrence
1	Unlikely	Less than 1% probability in the next 100 years
2	Possible	Between 2 and 10% probability in next year, or at least one chance in the next 100 years
3	Likely	Between 11 and 100% probability in next year, or at least one chance in next 10 years
4	Very Likely	Near 100% chance in the next year

**Vulnerability:** Measure of the percentage of people and property that would be affected by the hazard event.

Rating	Magnitude	Percentage of people and property affected
1	Negligible	Less than 10%

2	Limited	11 to 25%
3	Critical	26 to 50%
4	Catastrophic	More than 50%

**Maximum Threat:** Spatial extent of the community that might be impacted.

Rating	Magnitude	Percentage of jurisdiction that can be affected
1	Negligible	Less than 10%
2	Limited	11 to 25%
3	Critical	26 to 50%
4	Catastrophic	More than 50%

**Severity of Impact:** Assessment of the severity in terms of fatalities, injuries, property losses, and economic losses.

Rating	Level	Characteristics
1	Negligible	Few if any injuries or illness. Minor quality of life lost with little or no property damage. Brief interruption of essential facilities and services for less than four hours.
2	Limited	Minor injuries and illness. Minor or short term property damage which does not threaten structural stability. Shutdown of essential facilities and services for 4 to 24 hours.
3	Critical	Serious injury and illness. Major or long term property damage, which threatens structural stability. Shutdown of essential facilities and services for 24 to 72 hours.
4	Catastrophic	Multiple deaths. Property destroyed or damaged beyond repair. Complete shutdown of essential facilities and services for 3 days or more.

The State of Iowa expands this evaluation element by specifically addressing nine factors of any given hazard’s impacts. These factors are as follows;

- A) Health and Safety of persons in the affected area at the time of the incident (injury and death)
- B) Health and Safety of persons responding to the incident
- C) Continuity of operations
- D) Property, facilities, and infrastructure
- E) Delivery of services
- F) The environment
- G) Economic and financial conditions
- H) Regulatory and contractual obligations
- I) Reputation of the entity

**Speed of Onset:** Potential amount of warning time available before the hazard occurs.

Rating	Probable amount of warning time
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	5 to 12 hours warning time.
4	Minimal or no warning time.

### C. Hazard Profile Score Analysis

The following chart displays the scores that the committee rated each identified hazard based on the scales given in the previous Risk Assessment section.

	Historical	Probability	Vulnerability	Threat	Impact	Onset	Comb.
<b>Natural Hazards</b>							
Flash Flood	4	3	2	2	3	4	18
Tornado	4	4	4	4	4	4	24
Windstorm/High Wind Events	4	4	3	3	3	4	21
Extreme Heat	2	2	2	3	2	2	13
Hailstorm	4	4	2	2	2	4	18
Grass/Wild Fire	2	2	1	1	2	4	12
Sink Holes	1	2	1	1	1	4	10
River Flooding	4	4	2	2	2	2	16
Severe Winter Storm	4	4	4	4	3	3	22
Drought	2	2	3	4	3	1	15
Earthquake	1	1	2	4	2	4	14
Dam Failure	1	2	2	2	2	2	11
Thunderstorm / Lightning	4	4	2	2	3	3	18
Radon/Lead	4	4	3	3	3	1	18
<b>Human Caused and Combination Hazards</b>							
Air Transport. Incident	1	3	1	1	4	4	14
Pipeline incident	1	2	1	1	3	4	12
Transport Radiological Mat	1	2	2	3	2	1	11
Rail Transport. Incident	2	2	1	1	2	4	12
Highway Transport. Incident	4	4	2	1	3	4	18
Transport. Haz. Materials	2	3	2	2	2	4	15
Human Disease Incident	2	2	2	3	3	1	13
Human Disease Pandemic	2	3	3	3	3	1	15
Animal/plant/Crop Disease	1	1	1	2	2	1	8
Agro Terrorism	1	1	2	2	2	2	10
Biological Terrorism	1	1	2	2	2	2	10

Chemical Terrorism	1	1	2	2	2	2	10
Fixed Hazardous Materials	4	4	2	1	2	4	17
Waterway Incident	1	2	2	1	1	4	11
Energy Failure	2	3	3	3	2	4	17
Communications Failure	1	3	3	3	2	4	16
Structural Failure	1	3	2	2	3	4	15
Structural Fire	1	3	2	2	3	4	15

### D. Hazard Prioritization

Once the Monroe County Hazard Mitigation Committee had identified and scored the hazards, they examined each hazard in relation to the risk that hazard presented to the community. All of the identified hazards were then given a priority state. The Committee defined high-risk hazards to be those hazards that caused the substantial damage to the community in the past, have a high probability of occurring in the future, contribute to other hazards happening, or have the potential to affect a large proportion of the community. High-risk hazards were also considered to be the hazards for which immediate planning and mitigation activities were to be focused. These hazards are given as one through ten on the following priority ranking chart (and in red font).

The Committee considered moderate-risk hazards to be those hazards that should be addressed by the community in the future, however the need for mitigation activities for these hazards was not considered to be as immediate. These hazards were in the ranks of eleven through twenty on the priority chart (and are in green font). Finally, acceptable risk hazards were defined by the Committee as those hazards that, at the present time, have an acceptable level of risk. This does not mean that they are not of concern for the community but they did score in the bottom eleven hazards of concern (and shown in blue font). The hazards are listed below by priority.

#### MONROE COUNTY HAZARD RANKINGS 3/9/2010

- 1. Tornado 24
- 2. Severe Winter storm 22
- 3. Windstorm/High Wind Events 21
- 4. Flash Flood 18
- 5. Hailstorm 18
- 6. Thunderstorm/Lightning 18
- 7. Radon/Lead 18
- 8. Highway Transportation Incident 18
- 9. Fixed Hazardous Materials 17
- 10. River Flooding 17



11. Communications Failure	16
12. Energy Failure	16
13. Drought	15
14. Transportation Hazardous Materials	15
15. Human Disease Pan.	15
16. Structural Failure	15
17. Structural Fire	15
18. Earthquake	14
19. Air Transportation Incident	14
20. Extreme Heat	13
21. Human Disease Incident	13
22. Rail Transportation Incident	12
23. Pipeline incident	12
24. Grass/Wild fire	12
25. Dam failure	12
26. Transportation of Radiological Materials	11
27. Waterway Incident	11
28. Sinkholes	10
29. AgroTerrorism	10
30. Biological Terrorism	10
31. Chemical Terrorism	10
32. Animal/plant/crop disease	8

### E. Fire Insurance Rating

The fire insurance rating is measured on a scale of 1 to 10 with 1 representing exemplary public protection. A rating of 10 indicates that a community’s fire suppression program does not meet minimum requirements of ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk.

Community	Fire Dept.	Rating
	(Y/N)	1 - 10
Monroe County	Y	10
Albia	Y	6
Lovilia	Y	8
Melrose	Y	8

### F. National Flood Insurance Program (NFIP) Participation

The following table organizes information provided by the Iowa DNR’s flood plain coordinator for Monroe County and its communities.

Community	Participates?	NFIP #	Mapped?	Map Date	Repetitive Loss
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	(Y / N)		(Y / N)		Properties
Monroe County	N	-	-	-	-
Albia	Y	190541	NSFHA	06/10/80	0
Lovilia	N	-	-	-	-
Melrose	Y	190465	Y	07/02/87	0

## 4. Hazards Profiled

### A. Natural Hazards

Some natural hazards impact a broad area simply due to their nature or a specific local area; these hazards are often weather related. This section addresses hazards that have the potential to be both widespread or potentially an isolated area.

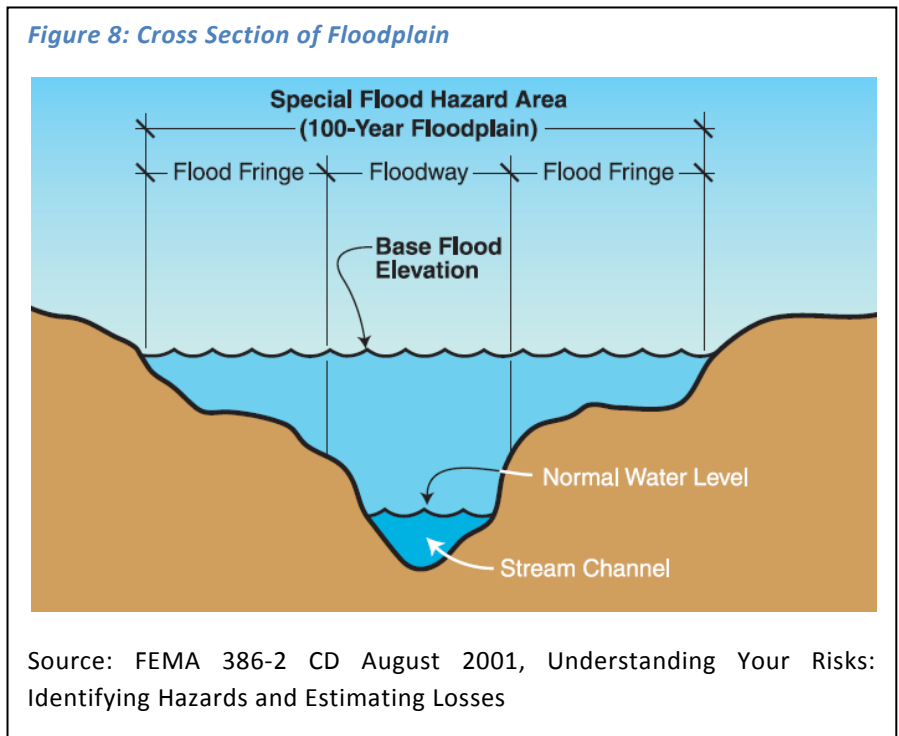
Hazard	<b>Flash Flood</b>	
Definition	<b>Flash Flood:</b> A flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. They can also occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam (National Weather Service).	Rating
Description	<p>Flooding causes more damage in the United States than any other severe weather related event, an average of \$5 billion a year. Flooding can occur in any of the 50 states or U.S. territories at anytime of the year. Flash flooding can occur anywhere and is not confined to or near flood plains; once the soil is saturated, water will wash over it to lower lying areas. Damage is likely to be more severe in lower lying areas, but can occur at higher ground as well.</p> <p>Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood waters move at very fast speeds and can roll boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.</p> <p>Two common terms to describe areas that are prone to flooding are 100-year flood plain and 500-year flood plain. The meaning of these</p>	

	<p>terms are often confused; though they sound like a flood in the designated areas only happens once every 100 or 500 years, this interpretation is incorrect. What the designation actually means is that for a 100-year flood plain, the chance of a flood occurring in any given year is 1% which is statistically about once every 100 years. Likewise, for the 500-year flood plain, the chance is .2% chance of a flood occurring in any given year. Floods may certainly occur more frequently in either flood plain designation, but these would be rare occurrences.</p> <p>Flash floods do not always occur in flood plains, during heavy downpours the capacity of the soil to absorb rain can be overwhelmed leading to water accumulating and running off of the surface of the land. Similarly with compaction of soil due to built infrastructure such as roads and buildings heavy rain is limited in its local soil infiltration capacity leading to runoff. This runoff can accumulate very quickly resulting in flash flooding.</p>	
Historical Occurrence	<p>Since 1950, there have been fifteen recorded flash flood events in Monroe County. All fifteen recorded events happened since 1993. These flash flood events caused \$690 million in property damage with no injuries or loss of life reported. The events caused \$125 thousand in crop damage.</p> <p>Countywide flash flooding occurring in 2001 resulting in \$150,000 in Personal Property damage.</p> <p>Eleven flash floods occurred in the spring and summer of 2008 in areas of Monroe county. Seven different communities recorded over \$225,000 in Personal property damage and \$10,000 in crop damage.</p>	<b>4</b>
Probability	<p>With 15 flash flooding events occurring in Monroe County in the last eight years, the probability of future flash floods is likely.</p>	<b>3</b>
Vulnerability	<p>Flash flooding occurred in Albia, Hiteman, Lovilia, Melrose, Selection, and Tyrone all in 2008. Cedar Creek commonly experiences flash flooding as it flows north to south and crosses approximately 75% the county’s length. This creek can solely affect 5 villages in the unincorporated region.</p> <p>Monroe county LEPC specifically sites the locations of Middle Avery</p>	<b>2</b>

	<p>Creek along “Smokey Hollow”; White Creek Valley; and Cedar Creek Valley in the rural regions of the county are particularly vulnerable to flash flooding. Primary damage along these valleys result in roadway and agriculture damage.</p> <p>The community of Albia experiences flash flooding in the northeast quarter of the City. The flooding occurs due to problems with poor storm water drainage system in that area. This places about 15% of the residential structures at risk of experiencing flooding damage.</p> <p>The City of Melrose has the southern 20% of the community lying in the flood plain as mapped in the FEMA FIRM (See Appendix U). This region has historically experienced flash flooding and continues to be at risk. This does include possible damage to the BNSF rail system, the MFA propane containers, potentially the community’s sewer lift station, a critical bridge and 2 structures that are on the private properties of the railroad and the MFA business.</p> <p>There are structures in low lying areas along Cedar and White Creek. Cedar Creek extends from the west county line to near the middle of Monroe County, then northwest to the north county line. Along this path, potential flash flooding could affect 12 county bridges, 1 road area, and 1 state highway bridge. White Creek extends from the west county line to the northeast and joins Cedar Creek. There are approximately 8 county bridges that could be impacted and 2 possible road areas that could experience a slide potential.</p> <p>The 100 year flood plain map of the county was updated in 1987 and can be seen in <i>Appendix T</i>. The only community in Monroe County that is mapped as a FIRM is Melrose and it’s in <i>Appendix U</i>.</p>	
<p>Maximum Threat</p>	<p>The most threat is to property and persons within flood plains, especially near streams and rivers and individuals in vehicles. More than half of all flash-flooding fatalities result from individuals misjudging the depth and strength of flood waters. . However, since flash flooding can occur anywhere and not just in flood plains, the entire county, including all jurisdictions, are considered a hazard area. The 100 year floodplain estimates that 4.7% of the county is located in this potential flood zone (“<b>A HAZUA-MH Assessment of Iowa’s Vulnerability to Flooding</b>”). Nearly all of this area is located in the rural region of the county. The unincorporated community of Hiteman</p>	<p>2</p>

	<p>is of greatest concern because it lies just on the outer edge of the 100 year flood plain along Cedar Creek.</p> <p>The majority of damage that occurs in this region during a flash flooding event is to the roadways, both state and county.</p> <p>The maximum threat for flash flooding in Albia occurs in the Northeast quadrant of the city. The city has chosen a mitigation strategy to help them address the drainage issues with the storm water system to alleviate the problems.</p> <p>Melrose has a maximum threat for flash flooding to occur in the south quarter of the county. The majority of the community is located on a small hillside which places the structures and businesses at the base at the maximum risk of flash flooding.</p>	
<p>Severity of Impact</p>	<ul style="list-style-type: none"> <li>A. Flash floods can result in death and injury, typically to individuals caught either in vehicles swept off of roads or who may be in low-lying areas when fast moving water moves through</li> <li>B. Flash floods can present a challenge to first responders by limiting access to a site or by requiring alternative modes of access such as by boat or helicopter; special training is often necessary for such rescues</li> <li>C. Continuity of operations can be affected depending on the facilities impacted, transportation impacts, and delays in government responses</li> <li>D. Property can be impacted either by being damaged by the force of flowing water, water damage inside buildings, and compromises to structural integrity due to erosion</li> <li>E. Flash floods can quickly inundate areas thought to be out of flood-prone areas. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business are common impacts from flash flooding.</li> <li>F. Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of flash flooding situations. Materials swept away by flood waters can contaminate and leave a lasting impact on the environment.</li> <li>G. Most impacts are indirect due to disruption of business and damage to infrastructure on which industry and services rely upon.</li> <li>H. Flash floods can be damaging to the reputation of the community if proper notification and warning are not given. Often times the victim will blame development or other changes in the community</li> </ul>	<p style="text-align: center;"><b>3</b></p>

	as the cause of the flooding on their property.	
Speed of Onset	Flash floods are somewhat unpredictable, but there are factors that can point to the likelihood of a flood’s occurring in the area. Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Warnings may not always be possible for these sudden flash floods. Predictability of flash floods depends primarily on the data available on the causal rain. Individual basins react differently to precipitation events. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modeling, monitoring, and warning systems increase the predictability of flash floods. Depending on the location in the watershed, warning times can be increased. The National Weather Service forecasts the height of flood crests, the data, and time the flow is expected to occur at a particular location.	<b>4</b>
Hazard Worksheet Score		<b>18</b>
Composite Score		<b>38</b>



Hazard	<b>Tornado</b>	Rating
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<p>Definition</p>	<p><b>Tornado:</b> A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of 1 mile wide and 50 miles long (FEMA 386-2 CD).</p>	
<p>Description</p>	<p>Tornadoes are among the most unpredictable of weather phenomena. While tornadoes can occur almost anywhere in the world, they are most prevalent in the United States. According to the National Weather Service, about 42 people are killed because of tornadoes each year. Tornadoes can occur in any state but are more frequent in the Midwest, Southeast, and Southwest. Tornado season runs ordinarily from March through August; however, tornadoes can strike at any time of the year if the essential conditions are present.</p> <p>Thunderstorms and hurricanes spawn tornadoes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. The winds produced from hurricanes, earthquake-induced fires, and wildfires have also been known to produce tornadoes. The frequency of tornadoes in the nation's midsection is the result of the recurrent collision of moist, warm air moving north from the Gulf of Mexico with colder fronts moving east from the Rocky Mountains.</p> <p>Tornadoes were measured in intensity with the Fujita Scale which was then updated with the Enhanced Fujita Scale (EFS) in 2006. The EFS lowers the Fujita Scale threshold for each category ranging from 1 to 5 with 5 being the most intense with wind speeds in excess of 200 mph for at least 3 seconds (wind gusts). An additional scale is available called the Fujita-Pearson Scale which matches the Fujita Scale ratings and wind speeds with tornado path lengths and widths. All three scales follow this hazard profile in Figure 9 and Table 35; also see <i>Appendix AA: Enhanced Fujita Parameters and Damage Details</i> for more information.</p>	
<p>Historical Occurrence</p>	<p>In the U.S., Iowa is ranked third in the number of strong-violent (F2-F5) tornadoes per 10,000 square miles. From 1950-95, Iowa averaged 31 twisters per year. In Iowa most tornadoes occur in the spring and summer months, but twisters can and have occurred in every month of the year. Late afternoon to evening hour tornadoes are the most common, but they can occur at any time of the day.</p> <p>Monroe County has had 9 recorded tornadoes between 1964 and</p>	<p><b>4</b></p>

	<p>2008. One of these tornadoes has exceeded F2 status. This event was an F4 tornado that occurred in 1985 which alone resulted in \$25 million dollars in Personal Property damage. Throughout the history of the 9 tornados a total of eight injuries, \$6.283 million in property damage, and \$5,000 in crop damage.</p> <p>Two funnel clouds are on record since 1950 occurring in 2008 in Melrose and Avery. No damage or injuries are reported from this event. See <i>Appendix O: NCDC Storm Events</i> for a record of events that have impacted Monroe County.</p>	
<p>Probability</p>	<p>There have been 9 recorded tornadoes in Monroe County in the past 47 years. This equates to approximately one event per 5.2 years. Because tornadoes are sporadic there cannot be a reliable long-term prediction made as to when they may occur. Likewise, the chance of a tornado occurring at an exact location is very low making forecasting of tornado paths or touch-downs impossible.</p>	<p><b>4</b></p>
<p>Vulnerability</p>	<p>Everyone is vulnerable to the powerful forces that accompany a tornado.</p> <p>There are those who are more vulnerable than others. For example:</p> <ol style="list-style-type: none"> <li>1. People in automobiles,</li> <li>2. People in mobile homes,</li> <li>3. People who may not understand warnings due to language barriers,</li> <li>4. The elderly and very young,</li> <li>5. People with physical or mental impairments.</li> </ol> <p>At the time of the 2000 Census in Monroe County there were approximately 387 persons living in mobile homes/manufactured housing and approximately 390 multi-family units throughout the county, each of which may not have adequate storm shelters available. In addition, there were 1574 persons over the age of 64 throughout the county. There were also 520 children in the county under the age of five. All of the aforementioned populations could be at additional risk in the event of a tornado.</p> <p>In the event of a tornado, the Cities of Albia, Lovilia, and Melrose operate outdoor, early warning sirens that, given enough time, allow people to search for suitable shelter. The sirens are operable on a 24-</p>	<p><b>4</b></p>



	hour basis.	
Maximum Threat	<p>Generally the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Following this profile is a chart showing the Fujita-Pearson Tornado Path Scale.</p> <p>Normally a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area.</p>	<b>4</b>
Severity of Impact	<p>A. Injury or death related to tornadoes most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the tornado in a vehicle.</p> <p>B. Response personnel are exposed to the same risk as the general public when caught in the storm without shelter.</p> <p>C. Tornadoes can destroy government facilities just as they could other property. Disruption of critical services can also affect operations. Employees may be affected and unable to attend work-related issues.</p> <p>D. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees.</p> <p>E. Tornadoes can impact many critical services, mainly electrical power. Buried services are not as vulnerable, but can be affected by their system components that are above ground.</p> <p>F. Tornadoes are naturally occurring phenomena. Damages to the environment could result from spills and other contaminants from the built environment.</p> <p>G. Whole towns have been known to be “wiped off the map” such as Greensburg, KS in recent years. Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power, gas, or water.</p> <p>H. Debris removal is a vital service that is often too vast for the jurisdiction to do without contractual assistance. These plans should be in place and monitored; a debris management plan is in progress including Monroe County.</p> <p>I. Adequate warning is critical to the positive reputation of the jurisdiction. Responding in a timely manner and reconstructing the community is also important. Bringing critical services back on line quickly will ensure the residents can begin their personal recovery process sooner.</p>	<b>4</b>
Speed of	Tornado watches can warn of likely conditions hours in advance of an	<b>4</b>

Onset	upcoming storm. Although significant advances in meteorological technology has allowed for much more effective forecasting, specific tornadoes cannot be predicted with any precision any more than minutes before they develop. The rapid change in direction a tornado can achieve makes it difficult to say with certainty the path the tornado will continue on even after it has been identified. Therefore warning time can sometimes be very short or occasionally non-existent.	
Hazard Worksheet Score		<b>24</b>
Composite Score		<b>36</b>

*Figure 9: Fujita Scale*

ORIGINAL FUJITA SCALE		ENHANCED FUJITA SCALE	
<b>F5</b>	<b>261-318 mph</b>	<b>EF5</b>	<b>+200 mph</b>
<b>F4</b>	<b>207-260 mph</b>	<b>EF4</b>	<b>166-200 mph</b>
<b>F3</b>	<b>158-206 mph</b>	<b>EF3</b>	<b>136-165 mph</b>
<b>F2</b>	<b>113-157 mph</b>	<b>EF2</b>	<b>111-135 mph</b>
<b>F1</b>	<b>73-112 mph</b>	<b>EF1</b>	<b>86-110 mph</b>
<b>F0</b>	<b>&lt;73 mph</b>	<b>EF0</b>	<b>65-85 mph</b>

Source: National Oceanic and Atmospheric Administration, <http://www.srh.noaa.gov/lch/jamb/jambalaya0407-5.php>

*Table 35: Tornado Paths - LENGTH and Width*

Fujita-Pearson Tornado Scale				
Pearson Rating	length	Width	Fujita Rating	Wind Speed
<b>P0</b>	0.3 - 0.9 miles	6-17 yards	F0	40-72 mph
<b>P1</b>	1.0-3.1 miles	18-55 yards	F1	73-112 mph
<b>P2</b>	3.2-9.9 miles	56-175 yards	F2	113-157 mph
<b>P3</b>	10.0-31.0 miles	176-566 yards	F3	158-206 mph
<b>P4</b>	32.0-99.0 miles	0.3-0.9 miles	F4	207-260 mph
<b>P5</b>	100.0-315.0 miles	1.0-3.1 miles	F5	261-318 mph

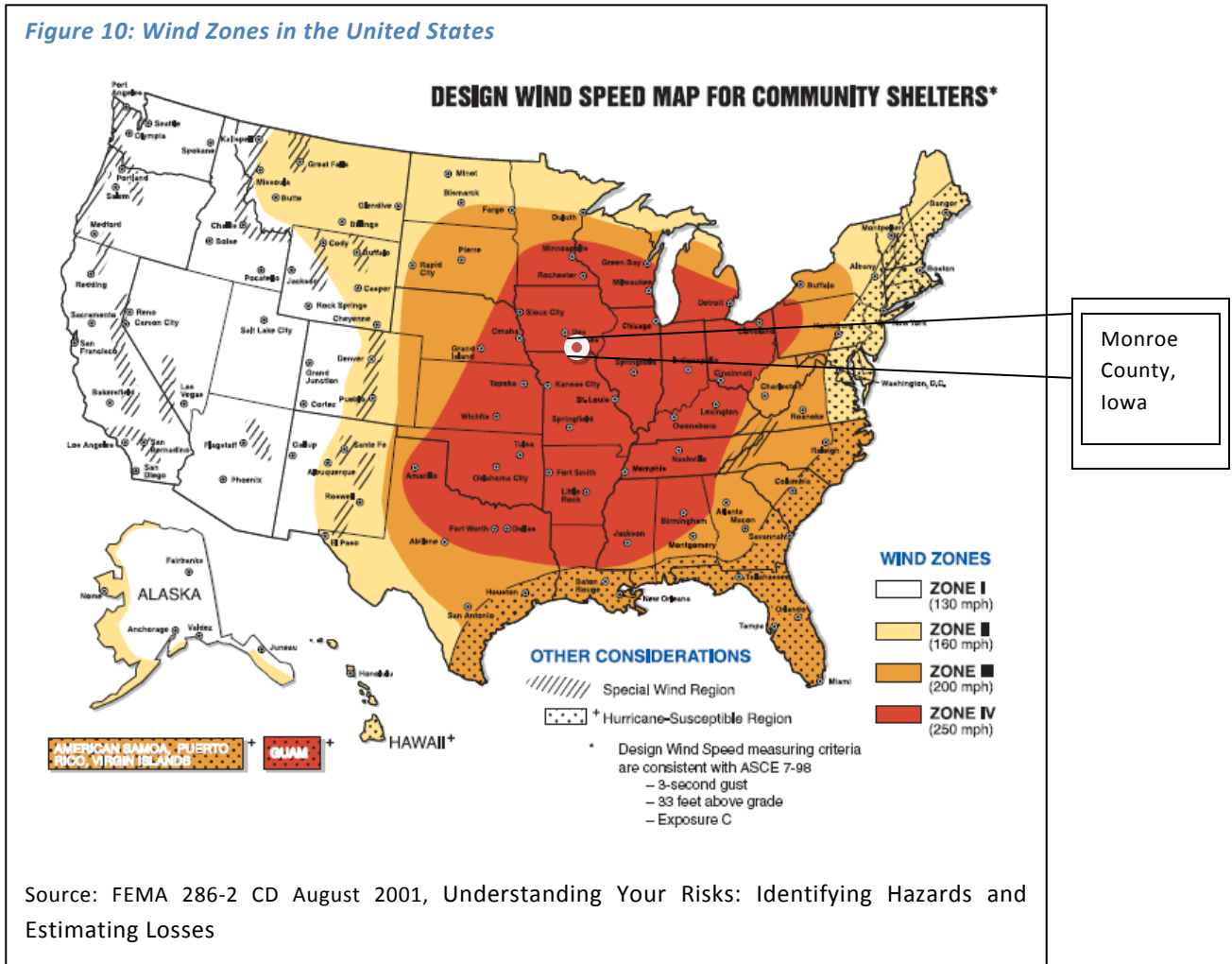
Source: <http://www.stormfax.com/fujita.htm>

Hazard	<b>Wind Storms / High Wind Events</b>	
Definition	<p><b>Windstorm/High Wind Event:</b> A storm with high winds or violent gusts but little or no rain (American Heritage Dictionary).</p> <p><b>High Wind Event:</b> An event where sustained winds of at least 40 mph or gusts are 58 mph or more (NOAA).</p>	
Description	<p>Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100mph and can produce a damage path extending for hundreds of miles. These winds are often called "straight-line" winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Damaging winds are classified as those exceeding 50-60mph.</p> <p>Since most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft, anyone living in thunderstorm-prone areas of the world is at risk for experiencing this phenomenon.</p> <p>High winds can result from thunderstorm inflow and outflow, or downburst winds when the storm cloud collapses, and can result from strong frontal systems, or gradient winds (high or low pressure systems) moving across a region. High winds are defined as speeds reaching 50 mph or greater, either sustaining (continuous) or gusting. Downdraft winds are from a strong thunderstorm downburst which causes damaging winds on or near the ground, and can extend to as little as 2 ½ miles or extend over a hundred miles. Downdraft wind speeds can be from 80 mph up to 168 mph, and occur quite suddenly as a thunderstorm cloud collapses. This is different from the winds associated with tornadoes. Winds associated with storms are convective. Non-convective winds are caused by fronts or gradient winds. These speeds can range from light breezes to sustained speeds of 80 to 100 mph. Windstorm/High Wind Events can be with little or no rain.</p> <p>All of Monroe County and its jurisdictions are located in the upper reaches of Zone IV in which wind speeds can reach up to 250 mph. A map showing extents of each wind speed follows this hazard profile.</p>	Rating
Historical	High winds have been responsible for 26 recorded events since 1993 in	<b>4</b>

<p>Occurrence</p>	<p>Iowa and Monroe County. However, many other high wind events are on record combined with thunderstorms since 1965. High winds tend to affect a large area so there are few events that impacted solely Monroe County alone. Of the high wind events alone that impacted Monroe County, including events that affected broader areas of Iowa, there were \$38.295 million in property damages, \$360 thousand in crop damage, one death, and 9 injuries.</p> <p>The highest recorded wind speed from a high wind event was 72 knots which is equivalent to almost 83 miles per hour.</p> <p>One of the most significant events was on November 10, 1998 which affected 52 counties and resulted in \$17.3 million in property damage, \$260 thousand in crop damages, and one death. This amounts to about \$333 thousand in property damage on average per county, however it is unlikely that each of the affected counties were impacted equally. See <i>Appendix O: NCDC Storm Events</i> for a record of events that have impacted Monroe County.</p>	
<p>Probability</p>	<p>Based on the high wind events occurring since 1993, there is on average about 1.5 events each year. The State of Iowa estimates that throughout the state there will be 7-10 high wind events in excess of 70 knots (80.5 mph) annually.</p>	<p><b>4</b></p>
<p>Vulnerability</p>	<p>Vulnerability to Windstorm/High Wind Events is very similar to tornadoes as Windstorm/High Wind Events mimic tornadoes in their effects. Buildings may be damaged by debris picked up by the storm, windows could be potentially blown out, and vehicles may be overturned. Persons in mobile homes, outdoors, and in vehicles during Windstorm/High Wind Events are at the most risk. See the Tornado profile above for additional relevant information.</p>	<p><b>3</b></p>
<p>Maximum Threat</p>	<p>The maximum threat of a Windstorm/High Wind Event may be spread over a wider area than many tornadoes since the winds are not confined to a rotating form and therefore a concentrated area. A Windstorm/High Wind Event that strikes Monroe would likely impact multiple areas throughout the county.</p>	<p><b>3</b></p>
<p>Severity of Impact</p>	<p>A. Injury or death related to Windstorm/High Wind Events most often occur from building failure, or people struck by flying objects                  B. Response personnel are exposed to the same risk as the public when caught in storms without shelter.                  C. Windstorm/High Wind Events can damage government facilities</p>	<p><b>3</b></p>

	<p>just as they could other property. Disruption of critical services can also affect operations. Employees may be affected and unable to attend work-related issues.</p> <p>D. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction of well constructed structures, infrastructure, and trees.</p> <p>E. Windstorm/High Wind Events can affect many critical services, especially electrical power. Buried Services are not as vulnerable, but can be affected by their system components that are above ground.</p> <p>F. Windstorm/High Wind Events are naturally occurring phenomena. Damages to the environment could result from hazardous materials spills and other contaminants from the built environment.</p> <p>G. Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power. Crop damage is often associated with Windstorm/High Wind Events; laying down crops, breaking stalks, and twisting plants, reducing the yield and making it difficult to harvest.</p> <p>H. Debris removal is a vital service that is often too vast for the jurisdiction to do without contractual assistance. These plans should be in place and monitored.</p> <p>I. Adequate warning is critical to the positive reputation of the jurisdiction. Responding in a timely manner and reconstructing the community is also important. Bringing critical services back on line quickly will ensure the residents can begin their personal recovery process sooner.</p>	
Speed of Onset	<p>Although significant advances in meteorological technology has allowed for much more effective forecasting, Windstorm/High Wind Events are the hardest of storm events to predict due to the variety of conditions that create them. Doppler radar can help to identify Windstorm/High Wind Events and their strength but may not provide much warning for people in the affected area to seek shelter. Currently the best lead-time for a specific severe storm is about 30 minutes.</p>	<b>4</b>
Hazard Worksheet Score		<b>21</b>
Composite Score		<b>33</b>

Figure 10: Wind Zones in the United States



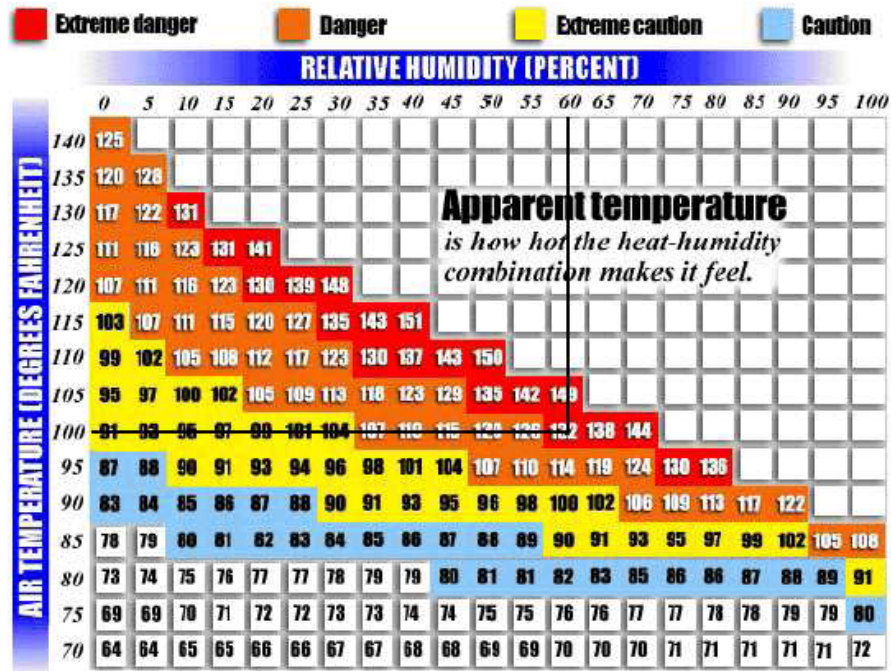
Source: FEMA 286-2 CD August 2001, Understanding Your Risks: Identifying Hazards and Estimating Losses

Hazard	<b>Extreme Heat</b>	Rating
Definition	<b>Extreme Heat:</b> Temperatures (including heat index) in excess of 100 degrees Fahrenheit or 3 successive days of 90+ degrees Fahrenheit. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.	
Description	A prolonged period of excessive heat and humidity. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature ( <i>Figure 12</i> ). Exposure to full sunshine can increase the heat index by at least 15 degrees. Extreme heat can impose stress on humans and animals. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure or physical activity due to the body’s inability to dissipate the heat. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.	
Historical Occurrence	Two periods of extreme heat between 1995 and 2001 resulted in 4 deaths and \$3.8 million in property damage for the region. See <i>Appendix O: NCDC Storm Events</i> for a record of events that have impacted Monroe County.  During the summers of 1997 and 1998, there were a combined total of 31 days when the high temperature was 90 degrees Fahrenheit or higher. There were 3 periods when temperatures were 90 degrees or above for at least 3 consecutive days between 2001 and 2003.	<b>2</b>
Probability	Indicated in Iowa’s <i>Hazard Analysis and Risk Assessment: 2007 Local Guide</i> , Iowa will likely experience about 26 days a year with temperatures above 90 degrees. There is a very good chance that there will also be a period of 3 consecutive days or more with temperatures in the 90s. It is also common for the temperature to hit 100 degrees or more once every three years during the summer months.	<b>2</b>
Vulnerability	The very young and the elderly are particularly vulnerable to extreme heat as are low income populations. Likewise, those on certain medications or drugs (especially tranquilizers and anticholinergics), and persons with weight and alcohol problems are particularly susceptible to heat reactions. Children are less likely to recognize the risk and therefore less likely to take precautionary measures. Likewise,	<b>2</b>

	<p>the elderly may have more difficulty in sensing the extremities and may become over-exposed to the dangers.</p> <p>As of the 2000 Census, Monroe county was shown to have 1574 elderly persons over 64 and 520 children under the age of five residing in the county. Nearly one-third of the population (28.14%) of Monroe County earned less than \$25,000 annually in 2000.</p>	
Maximum Threat	<p>Most of the state would likely be impacted by extreme heat, but urban areas pose special risks. The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add to the stresses of hot weather. Extreme heat events will likely impact all of Monroe county including Albia, Lovilia, Melrose and unincorporated areas.</p>	<b>3</b>
Severity of Impact	<ul style="list-style-type: none"> <li>A. Nationally, over the last 30 years, excessive heat accounts for more reported deaths annually than hurricanes, floods, tornadoes, and lightning combined.</li> <li>B. Response personnel could suffer heat stroke and dehydration working in extreme heat conditions.</li> <li>C. None directly, see E.</li> <li>D. Transportation impacts include the loss of lift for aircrafts, softening of asphalt roads, buckling of highways and railways, and stress on automobiles and trucks (increase in mechanical failures).</li> <li>E. Electric transmission systems are impacted when power lines sag in high temperatures. High demand for electricity also outstrips supply, causing electric companies to have rolling black outs. The demand for water also increases sharply during periods of extreme heat. This can contribute to fire suppression problems for both urban and rural fire departments.</li> <li>F. Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well.</li> <li>G. Economic costs in transportation, agriculture, production, energy, and infrastructure. These direct costs could impact many other economic sectors indirectly.</li> </ul>	<b>2</b>
Speed of Onset	<p>As with some other weather phenomena, periods of extreme heat are predictable within a few degrees within about 3 days. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes. The National Weather Service will initiate alert procedures in the event of extreme heat.</p>	<b>2</b>
Hazard Worksheet Score		<b>13</b>
Composite Score		<b>18</b>



Figure 11: Apparent Temperature; Heat-Humidity Combination



Source: National Oceanic and Atmospheric Administration

Hazard	<b>Dam Failure</b>	Rating
Definition	<p><b>Dam Failure:</b> A dam is any artificial barrier together with appurtenant works that will divert or restrain the flow of a stream or other body of water for the purpose of protecting an area from inundation by floodwaters. Dam failure occurs when the structural integrity of the dam is lost and the structure fails to hold back the water.</p>	
Description	<p>When a dam failure occurs the structure fails to hold back the water, resulting in flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if there are people downstream of the dam.</p> <p>The National Inventory of Dams database indicates there is one significant dam and 45 low hazard dams in Monroe county. Lake Miami is approximately three miles south and east of Lovilia.</p>	
Historical Occurrence	There are no incidents of dam failure in Monroe County on record.	<b>1</b>
Probability	<p>Since dams are present in the county, there is a chance of failure occurring. The chance of a dam failure impacting a large population may be low, but it may be possible.</p> <p>With increased attention to sound design, quality construction, and continued maintenance and inspection, dam failure probability can be reduced. It is important to consider that by 2020, 85% of the dams in the United States will be more than 50 years old (the design life of a dam). Lake Miami’s Dam was completed in 1967 and the 50 year design life will be reached in 2017. This 140 acre body of water is governed and monitored by the Monroe County Conservation Board. This board has taken additional precautionary measure to alleviate potential problems with an inundation of water by developing four large ponds and a wetland area upstream from the lake.</p>	<b>2</b>
Vulnerability	People and property along streams are most vulnerable. Facilities and lives considerable distances from the actual impoundment are not immune from the hazard. Depending on the size and volume of the impoundment as well as the channel characteristics, a flash flood can travel a significant distance.	<b>2</b>

<p>Maximum Threat</p>	<p>The area impacted following a dam failure would be limited to those areas in and near the floodplain. People and property outside the floodplain could also be impacted depending on the proximity to the dam and the height above the normal stream level.</p> <p>The most direct impact of a dam failure of Lake Miami would be one a section of the unincorporated region of Monroe county. It is also recognized as a “Significant Hazard Dam” in the State of Iowa Mitigation plan. A significant hazard dam is determined if it’s located in an area where failure may dam failure may damage isolated homes or cabins, industrial/commercial buildings, moderately traveled roads or railroads, interrupts major utility services, but without substantial risk of loss of human life. In addition, structures where the dam and its impoundment are of themselves of public importance, such as dams associated with public water supply systems, public recreation, etc. The topography of the area between Albia and the lake would dissipate the water. The only structure at risk of damage would be a rural bridge located downstream.</p> <p>There are 45 low hazard dams identified throughout the county, but primary damage would occur to the unincorporated region of the county. A Low Hazard dam is defined if it is located in an area where damages from a failure would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands and lesser used roads and where loss of human life is considered unlikely. Maximum risk would be to the roadways and bridges throughout the county. For example, a breach of Albia Reservoir dam would release water to a rural region of the county. A larger concern would be the impact that could occur to highway 34 and a few rural homes.</p>	<p>2</p>
<p>Severity of Impact</p>	<ul style="list-style-type: none"> <li>A. The severity of damage could be similar to flash flooding impacts.</li> <li>B. Operations could be affected by communication loss, critical facility damage/destruction, etc.</li> <li>C. Depends upon the downstream property, facilities, and infrastructure. Worst case scenario could involve whole subdivisions being swept away by the fast flowing water.</li> <li>D. Property can be impacted either by being damaged by the force of flowing water, water damage inside buildings, and compromises to structural integrity due to erosion</li> <li>E. Dam failure would quickly inundate areas thought to be out of flood-</li> </ul>	<p>2</p>

	<p>prone areas. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business are common impacts.</p> <p>F. Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of flooding situations which could occur from dam failure. Materials swept away by flood waters can contaminate and leave a lasting impact on the environment.</p> <p>G. Most impacts are indirect due to disruption of business and damage to infrastructure on which industry and services rely upon.</p> <p>H. Dam failure would be damaging to the reputation of the community if proper notification and warning are not given. Often times the victim will blame development or neglect of the structure as the cause of the damage on their property.</p>	
Speed of Onset	In the event of dam failure, advanced notice would likely be minimal and the onset of the event could occur very rapidly. With maintenance and monitoring, weak areas and possible failure points can be identified allowing time for evacuation and securing of the dam. Most dams are only inspected periodically thus allowing problems to go undetected until a failure occurs.	<b>2</b>
Hazard Worksheet Score		<b>11</b>
Composite Score		<b>15</b>

Hazard	<b>Hailstorm</b>	
Definition	<b>Hailstorm:</b> An outgrowth of a severe thunderstorm in which balls or irregularly shaped lumps of ice greater than 0.75 inches in diameter fall with rain.	Rating
Description	Hail is frozen water droplets formed inside a thunderstorm cloud. They are formed during the strong updrafts of warm air and downdrafts of cold air, when the water droplets are carried well above the freezing level to temperatures below 32 deg F, and then the frozen droplet begins to fall, carried by cold downdrafts, and may begin to thaw as it moves into warmer air toward the bottom of the thunderstorm. This movement up and down inside the cloud, through cold then warmer temperatures, causes the droplet to add layers of ice and can become quite large, sometimes round or oval shaped and sometimes	

	<p>irregularly shaped, before it finally falls to the ground as hail.</p> <p>Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. Pets and livestock are particularly vulnerable to hail. Hailstorms impact an area about 15 miles in diameter on average. See <i>Appendix Y: TORRO Hailstorm Intensity Scale</i> for charts indicating the impacts of hail based on size of hail.</p>	
Historical Occurrence	<p>A total of 4,472 hail events have occurred in Iowa since 1993 according to the National Climatic Data Center. These have resulted in 11 injuries and 4 deaths in the state.</p> <p>Since 1961 there have been 34 recorded hail storms in Monroe County. The largest noted hailstorm occurred in Hiteman during May 2008. The storm produced 3.25 inch hail stones that created \$100,000 damage in personal property damage, as well as \$25,000 in crop damage. The cumulative damage of these events on property amounted to \$297 thousand and \$150 thousand in crop losses.</p> <p>While none of the recorded hail storms occurred in Monroe County, numerous ones occurred within 2-4 miles. See <i>Appendix O: NCDC Storm Events</i> for a record of events that have impacted Monroe County.</p>	<b>4</b>
Probability	<p>Data on probability and frequency of occurrence of hailstorms is limited, but research indicates that any given point in Iowa can expect on average two to three hailstorms in a year (<i>Iowa's Hazard Analysis and Risk Assessment: 2003 Local Guide</i>).</p> <p>Based on the recorded events that have impacted Monroe County, portions could expect about one hailstorm annually.</p>	<b>4</b>
Vulnerability	<p>Agricultural crops such as corn and beans are particularly vulnerable to hailstorms stripping the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly although injuries can occur.</p>	<b>2</b>
Maximum Threat	<p>There are many similarities between hailstorms and thunderstorms as they often occur together. Hail can cause debris to accumulate in roads along with the hail itself making travel more difficult, visibility can be reduced, and the hail can cause significant damage to vehicles and buildings.</p>	<b>2</b>
Severity of	<p>A. Exposure to hail larger than a nickel can be very dangerous and life</p>	<b>2</b>

Impact	<p>threatening.</p> <p>B. Risk to response personnel is the same as the risk to others without shelter from the hail.</p> <p>C. Operations should not be affected to any significant degree.</p> <p>D. Damage to property, facilities, and infrastructure is usually limited to broken windows and damaged roofs.</p> <p>E. Delivery of services should not be affected to any significant degree. There may be minor disruptions, but they would likely come from high winds and lightning (usually associated with hailstorms).</p> <p>F. Hail can strip plants of their vegetation in very little time. If this occurs at a critical time in the life cycle of plants, it could have fatal consequences.</p> <p>G. Hailstorms cause nearly \$1 billion dollars annually in property and crop damage in the United States. The peak hail activity coincides with the Midwest's peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollars every year, most of which is covered by crop and hazard insurance.</p> <p>H. Timely and adequate response to the event is the key.</p>	
Speed of Onset	Forecasting hailstorms as with their parent thunderstorms, is becoming quite accurate due to the advancement in Doppler Radar and other technologies operated by the National Weather Service and local television weather departments. Warnings in the 20 to 30 minute range are usually available prior to the occurrence of the storm.	<b>4</b>
Hazard Worksheet Score		<b>18</b>
Composite Score		<b>23</b>

Hazard	<b>Thunderstorm &amp; Lightning</b>	
Definition	<p><b>Thunderstorm:</b> A thunderstorm is formed from a combination of moisture, rapidly rising warm air and a force capable of lifting air such as a warm and cold front, a sea breeze or a mountain. All thunderstorms contain lightning. Thunderstorms may occur singly, in clusters or in lines. Thus, it is possible for several thunderstorms to affect one location in the course of a few hours. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time.</p> <p><b>Lightning:</b> Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light</p>	Rating

	<p>usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second. The rapid heating and cooling of air near the lightning causes thunder.</p>																																											
<p>Description</p>	<p>Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. They are formed from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses. Most thunderstorms produce only thunder, lightning, and rain. Severe storms however, can produce tornadoes, high straight-line winds above 58 mph, microburst's, lightning, hailstorms, and flooding. The NWS considers a thunderstorm severe if it produces hail at least 3/4-inch in diameter, wind 58 mph or higher, or tornadoes. High straight-line winds, which can often exceed 60 mph, are common occurrences and are often mistaken for tornadoes. Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees Fahrenheit in a split second. This rapid heating, expansion, and cooling of air near the lightning bolt creates thunder.</p> <p>Lightning associated with thunderstorms is itself a major hazard. In the United States, from 75 to 100 Americans are hit and killed each year by lightning. The power of lightning's electrical charge and intense heat can electrocute on contact, split trees, ignite fires and cause electrical failures.</p>																																											
<p>Historical Occurrence</p>	<p>Since 1950 there has been 73 Thunderstorm events recorded in Monroe County. Since 1950, thunderstorms have caused nearly \$46 million in property damage, \$410 thousand in crop damage, 1 death and 11 injuries .</p> <p style="text-align: center;">Thunderstorm / Wind since 1950</p> <table border="1"> <thead> <tr> <th>Jurisdiction</th> <th>number</th> <th>mag.</th> <th>deaths</th> <th>injuries</th> <th>property</th> <th>crop</th> </tr> </thead> <tbody> <tr> <td>Total</td> <td>73</td> <td>73 kts max</td> <td>1</td> <td>11</td> <td>\$45.95K</td> <td>\$410K</td> </tr> <tr> <td>Albia</td> <td>13</td> <td>69kts</td> <td>0</td> <td>0</td> <td>\$159K</td> <td>\$18K</td> </tr> <tr> <td>Melrose</td> <td>3</td> <td>52kts</td> <td>0</td> <td>0</td> <td>\$9K</td> <td>\$1K</td> </tr> <tr> <td>Lovilia</td> <td>2</td> <td>61kts</td> <td>0</td> <td>0</td> <td>\$43K</td> <td>0</td> </tr> <tr> <td>Avery</td> <td>3</td> <td>60kts</td> <td>0</td> <td>0</td> <td>\$120K</td> <td>\$5K</td> </tr> </tbody> </table>	Jurisdiction	number	mag.	deaths	injuries	property	crop	Total	73	73 kts max	1	11	\$45.95K	\$410K	Albia	13	69kts	0	0	\$159K	\$18K	Melrose	3	52kts	0	0	\$9K	\$1K	Lovilia	2	61kts	0	0	\$43K	0	Avery	3	60kts	0	0	\$120K	\$5K	<p>4</p>
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<p>Probability</p>	<p>Iowa experiences between 30 and 50 thunderstorm days per year on average. With Iowa's location in the interior of the U.S., there is a very high likelihood that a few of these summer storms will become severe and cause damage. Because of the humid continental climate that Iowa experiences, ingredients of a severe thunderstorms are usually available (moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses).</p> <p>Based on the events over the last 44 years, Monroe County may anticipate at least one thunderstorm or lightning event per year.</p>	<p>4</p>
<p>Vulnerability</p>	<p>Those in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across roads and power lines. Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the U.S. with nearly 100 deaths and 500 injuries each year following flooding and flash flooding. Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning.</p> <p>Hail can be very dangerous to people, pets, and livestock if shelter is not available. Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile homes are particularly vulnerable to the impacts of severe thunderstorms. No more than about 11% of Monroe County households reside in mobile homes, however a great number of people may be on the roads when a thunderstorm hits. However the whole county would likely be impacted by a thunderstorm; lightning would impact a much more localized area per strike.</p>	<p>2</p>
<p>Maximum Threat</p>	<p>Although the developments in technology have been very beneficial in reducing the long-term negative effects of thunderstorms, certain dangers still exist. The maximum threat of a thunderstorm would be realized if it was accompanied by power outages and limitation of travel due to debris in the roadways. In addition lightning damage to communication centers could result in the reduction of adequate medical response time.</p> <p>Severe thunderstorms can be quite expansive with areas of localized severe conditions. Most severe thunderstorm cells are 5 to 25 miles wide with a larger area of heavy rain and strong winds around the main cell.</p>	<p>2</p>



	<p>Most non-severe thunderstorms have a lifespan of 20 to 30 minutes, while severe thunderstorms last longer than 30 minutes. While short-lived, a thunderstorm could impact up to the entire county.</p>	
<p>Severity of Impact</p>	<p>A. Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures. Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily injury to people, pets, and livestock.</p> <p>B. Response personnel are exposed to the same risk as the general public when caught in the storm without shelter. Work on ladders and other apparatus during lightning can expose responders to higher risk situations.</p> <p>C. Continuity of operations would be affected through indirect impacts such as loss of critical services.</p> <p>D. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. Straight-line winds are responsible for most thunderstorm damage.</p> <p>E. One or more severe thunderstorms occurring over a short period (especially on saturated ground) can lead to flooding and cause extensive power and communication outages as well as agricultural damage.</p> <p>F. Thunderstorms and lightning can damage trees, but this is a naturally occurring hazard and the environment proves to be resilient following these and other natural hazards.</p> <p>G. Thunderstorms and lightning occur rapidly and do not persist. The aftermath may cause moderate economic impacts, but most will be related to cascading hazards such as flooding.</p> <p>H. Timely and adequate response will stave off any negative reputation that the jurisdiction could be exposed to. Clean up procedures should be established including a debris removal and disposal plan.</p>	<p>3</p>
<p>Speed of Onset</p>	<p>The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public in advance of the storm. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include severe thunderstorm watch, severe thunderstorm warning, tornado watch, tornado warning, flash flood watch, and flash flood warning.</p>	<p>3</p>



<b>Sink Holes</b>		Rating
Definition	<b>Sinkhole:</b> A natural depression in a land surface communicating with a subterranean passage, generally occurring in limestone regions and formed by solution or by collapse of a cavern roof (American Heritage Dictionary).	
Description	<p>Sinkholes, also known as subsidence, come in two primary forms in Iowa, Karst subsidence and Mine subsidence. Mines subsidence occurs when a mine or part of a mine collapses causing surface land to create a basin or hole. Karst subsidence occurs as water dissolves underlying rock creating a gap that ultimately collapses.</p> <p>Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has a potential impact on groundwater quality.</p> <p>Given the prevalence of mines under Albia, Lovilia, and Melrose and in the surrounding area, subsidence may well be of concern for the area.</p>	
Historical Occurrence	There have been no recorded incidents of sinkholes opening in Monroe County. However, anecdotal evidence suggests that the railroads in the area have had some problems from sinkholes impacting their infrastructure. The Iowa Department of Natural Resources tracks sinkholes and provides Geographic Information Systems data on their locations. The vast majority of sinkholes in Iowa have occurred in the northeast quarter of the state. See Appendix Z for a map of Iowa mines and potential sinkholes.	<b>1</b>
Probability	While there are no recorded sinkholes in or immediately surrounding the incorporated cities, there is a possibility of subsidence occurring. The prevalence of mines under a large proportion of the communities provides the potential of large areas within the county being damaged by mine cave ins. The Iowa Department of Natural Resources monitors and maps sinkholes and mines in Iowa. Not all of the mines under Monroe County are fully mapped; the extents of some mines are estimated. Based on these mapping limitations, the condition of at	<b>2</b>

	least some of the mines is presumably not fully known.	
Vulnerability	<p>Anyone is vulnerable to sinkholes should they occur in a developed area. Buildings and infrastructure such as roads, underground pipes, and railroad lines face potentially severe damage from mine subsidence. In the Melrose, Albia and Lovilia area the potentially for damage from Karst subsidence is low given the soil composition of the area (i.e. a lack of Karst soils). Personal injury or even death is possible should a cave in happen suddenly; indirect injury or death is possible from building collapse or damage to infrastructure.</p> <p>Karst (unincorporated county – near Eddyville, maybe where industrial park is) soils – “Fissures, tubes and caves generally less than 1,000 ft (300 m) long; 50 ft (15 m) or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of non-carbonate material 10 ft (3 m) to 200 ft (60 m) thick” (from GIS data).</p>	1
Maximum Threat	The maximum threat of subsidence would be if one or more of the underlying mines were to collapse damaging homes, businesses, and infrastructure. The worst case scenario is if subsidence or a full cave-in were to happen on Albia’s historic square where a number of old, and presumably unreinforced (due to age), brick buildings are located. One building could lead to structural damage to adjacent structures as many buildings are attached.	1
Severity of Impact	<p>A. Generally subsidence poses a greater risk to property than to people. However, should a depression or hole open or occur suddenly, people may be injured or killed. Likewise if a road were to collapse due to subsidence and it is not identified promptly, motorists may fall into the gap and be injured or killed.<sup>6</sup></p> <p>B. Impacts on response personnel is minimal and would be most likely confined to falls or subsequent collapse in the event of a mine cave-in.</p> <p>C. Impacts on continuity depend on the structures or infrastructure damaged.</p> <p>D. Damage to structures and infrastructure depends on the severity of the subsidence ranging from foundation cracking to building collapse in the event of a mine-collapse.</p> <p>E. Delivery of services depends on the structures and infrastructure impacted.</p> <p>F. Most sinkholes are the result of naturally occurring events.</p>	1

	<p>However mine collapse can disturb harmful substances contained in the soil, in mines, and in structures located above.</p> <p>G. Depends on the affected area.</p> <p>H. Impacts to the reputation of the DNR, local government, and emergency management may occur if the threat of mine collapse is not addressed. Based on available data from the DNR, many mines in Monroe County are not mapped and so condition and full extent of these mines may not be known.</p>	
Speed of Onset	The speed of onset can vary from a sudden collapse with little if any warning to more gradual “sinking” of the ground. Monitoring of the area mines could provide additional warning if signs of subsidence or structural stress in the mines are found.	4
Hazard Worksheet Score		10
Composite Score		23

Hazard	<b>River Flooding</b>	Rating
Definition	<b>River Flood:</b> A rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel’s capacity.	
Description	<p>Floods are the most common and widespread of all natural disasters, except fire. Most communities in the United States can experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, waterway obstructions, or levee or dam failures. Often it is a combination of these elements that causes damaging floods. Floodwaters can be extremely dangerous. The force of six inches of swiftly moving water can knock people off their feet and two feet of water can float a car. Floods can be slow-, or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas.</p> <p>Two common terms to describe areas that are prone to flooding are 100-year flood plain and 500-year flood plain. The meaning of these terms are often confused; though they sound like a flood in the designated areas only happens once every 100 or 500 years, this interpretation is incorrect. What the designation actually means is that for a 100-year flood plain, the chance of a flood occurring in any given year is 1% which is statistically about once every 100 years. Likewise,</p>	

	for the 500-year flood plain, the chance is .2% chance of a flood occurring in any given year. Floods may certainly occur more frequently in either flood plain designation, but these would be rare occurrences.	
Historical Occurrence	<p>Since 2000 there have been sixty-two flood events in Monroe County in addition to the 15 flash floods previously detailed. There have been no deaths or injuries directly attributed to these events. The 62 flood events impacting Monroe County have incurred nearly \$138 million in property damage and \$33.4 million in crop damage since 1993.</p> <p>See <i>Appendix O: NCDC Storm Events</i> for a record of events that have impacted Monroe County.</p>	4
Probability	Flooding is a regular and frequent hazard in Iowa; in Monroe County, the number of flooding events suggests that there can be 3-4 floods annually.	4
Vulnerability	<p>Flash flooding occurred in Albia, Hiteman, Lovilia, Melrose, Avery, Selection, and Tyrone all in 2008. Cedar Creek flows north to south and crosses approximately 75% the county's length. This creek can sole effect 5 villages in the unincorporated region. There are few structures in low lying areas of Cedar and Miller Creek.</p> <p>The large number of commuting to work and such a high amount of Travel on Highways 5 and 63, flood events that disrupt transportation around Albia and surrounding communities would impact negatively.</p>	2
Maximum Threat	<p>The Flood Insurance Rate Map for Melrose indicates the most likely maximum extent of flood damage. The area contained in Flood Zone A amounts to approximately 20% of Melrose. See <i>Appendix U: FEMA FIRM for the City of Melrose</i>. The other flood plain regions in the county are not currently mapped. The estimated 100 year Floodplain is displayed in Appendix T. This estimate does show that there are more concerns with possible damage to the unincorporated community of Hiteman along Cedar Creek. Mitigation strategies are planned to have FIRM's completed for the communities of Albia and Lovilia, as well as more precise mapping for the rural regions of the county.</p> <p>According to the HAZUS-MH Assessment of Iowa's Vulnerability to Flooding, 4.7% of the county is located within the 100 year floodplain. This land is located in the rural regions of the county and does not</p>	2

	include any incorporated community in the county.	
Severity of Impact	<p>A. Flooding impacts include potential loss of life. River flooding does not have as high of risk as does flash flooding because of the slower onset of the river flood.</p> <p>B. Responding to river flooding often includes sandbagging and working in floodwaters. Response personnel should have current tetanus and hepatitis shots. Rescuing victims often requires rescue from boat. Wearing personal protective gear such as life vests at all times can prevent most injuries related to river flooding.</p> <p>C. Operations could be disrupted from direct impacts if facilities are in the floodplain and indirectly from loss of critical services to maintain operations. Backup power and other services can eliminate the impact to operations.</p> <p>D. Personal property can be extensively damaged and destroyed by swift moving water. Facilities and infrastructure can be scoured around and degrading its structural integrity.</p> <p>E. Damage and disruption of communications, transportation, electric service, and community services are likely in severe cases. Wastewater treatment facilities may be located in the floodplain and thus at high risk of flooding; this is not uncommon around Iowa and eventually results in them being taken offline for a period of time.</p> <p>F. Hazards of fire, health and transportation accidents; and contamination of water supplies are likely affects of flooding situations as well.</p> <p>G. Crop and livestock losses and interruption of businesses either from direct flooding or loss of the delivery of critical services can have damaging impacts on the local economy. River flooding can last for weeks and the impacts can last for months and even years following the flood. Economic impacts can be felt with only a couple days of disruption.</p> <p>H. Jurisdictions should pay careful attention to disclosing flood risk in the community. Participation in the National Flood Insurance Program and providing accurate and up to date flood insurance rate maps will head off most allegations of poor service by the jurisdiction by the citizens.</p>	<b>2</b>
Speed of Onset	Gauges along streams and rain gages throughout the state provide for an early flood warning system. River flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position of the particular reach of the stream. The National Weather Service provides flood forecasts for Iowa. Flood warnings are issued over emergency radio and television messages as well as the NOAA Weather Radio. People in the paths of river floods	<b>2</b>

	may have time to take appropriate actions to limit harm to themselves and their property.	
	Hazard Worksheet Score	<b>16</b>
	Composite Score	<b>35</b>

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>

Hazard	<b>Severe Winter Storm</b>	
Definition	<b>Severe Winter Storm:</b> Severe winter weather conditions that affect day-to-day activities. These can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold.	Rating
Description	Winter storms are common during the winter months of October through April. The various types of extreme winter weather cause considerable damage. Heavy snows cause immobilized transportation systems, downed trees and power lines, collapsed buildings, and loss of livestock and wildlife. Blizzard conditions are winter storms which last at least three hours with sustained wind speeds of 35 mph or more, reduced visibility of 1/4 mile or less, and white-out conditions. Heavy snows of more than six inches in a 12-hour period or freezing rain greater than 1/4 inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as well as disrupting emergency and medical services. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions. The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Ice storms result in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power losses over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads. Frigid temperatures and wind chills are dangerous to people, particularly the elderly and the very young. Dangers include frostbite or hypothermia. Water pipes, livestock, fish and wildlife, and pets are also at risk from extreme cold and severe winter weather.	
Historical Occurrence	There have been 50 recorded snow and ice events in Monroe County since 1993 including freezing rain, snow, ice storms, and winter	



	<p>storms. Six deaths are associated with these events and property damage totaling \$41.94 million are recorded. In 1995 two snow events that affected Monroe County, were recorded for a larger part, or all of Iowa totaling \$65 million in property damage for all included areas.</p> <p>Monroe county was affect twice in December 2007 by 2 separate ice storms. The combined loss for this area was more than \$150,000 in personal property.</p> <p>Between February 1995 and January 1997, there have been nine recorded events of extreme wind chill and extreme cold that impacted Monroe County and the surrounding area. These 9 events are attributed for \$1.8 million in property damage, one death and no injuries. See <i>Appendix O: NCDC Storm Events</i> for a record of events that have impacted Monroe County.</p>	
<p>Probability</p>	<p>Winter storms regularly move easterly and use both the southward plunge of arctic cold air from Canada and the northward flow of moisture from the Gulf of Mexico to produce heavy snow and sometimes blizzard conditions in Iowa and other parts of the Midwest. The cold temperatures, strong winds, and heavy precipitation are the ingredients of winter storms. Most counties can usually expect 2 or 3 winter storms a season with an extreme storm every 3 to 5 years on average (more in the northwest, fewer in the southeast). A snowfall of six inches or more from one storm only occurs in 49% of Iowa winters, while a large winter storm event of 10 inches or more will occur about once every 3 years.</p>	<p><b>4</b></p>
<p>Vulnerability</p>	<p>Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. About 70% of winter-related deaths occur in automobiles and about 25% are people caught out in the storm. The majority of these are males over 40 years of age. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk are primarily either engaged in outdoor activity (shoveling snow, digging out vehicles, or assisting stranded motorists), or are the elderly or very young. Schools often close during extreme cold or heavy snow conditions to protect the safety of children and bus</p>	<p><b>4</b></p>

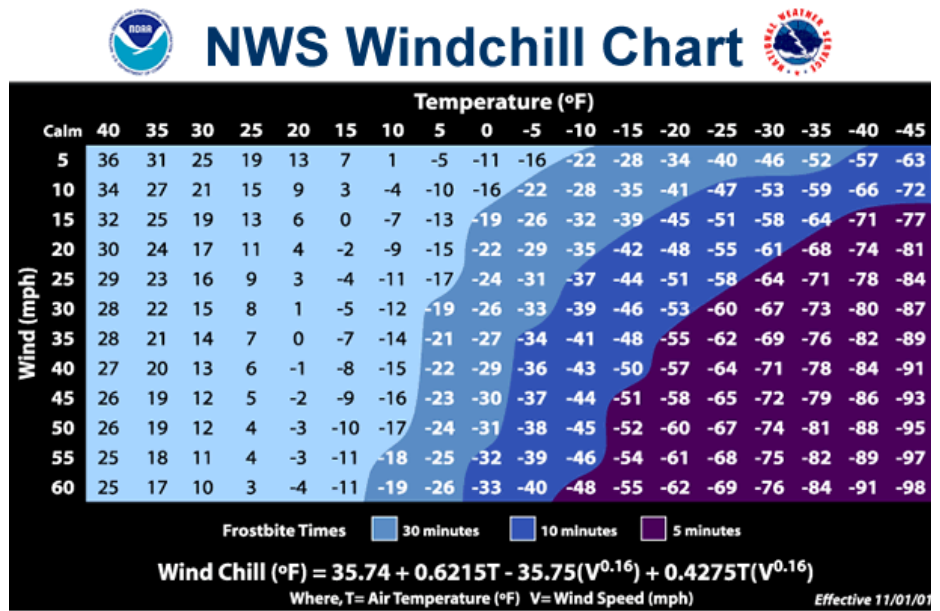
	<p>drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such as structural fires and carbon monoxide poisoning.</p> <p>Winter storms are a particular challenge for all small cities in southern Iowa. The strain they place on municipal budgets to clear transportation routes, on area utilities to repair damaged facilities, including power lines, and to homeowners and businesses to repair and maintain property can be significant.</p> <p>Approximately 20% of the population of Monroe County is aged 65 and above. An additional challenge is that winter storms have the effect of isolating persons with mobility challenges, including the elderly whose mobility may not be on par with younger persons. This isolation puts such populations at risk if sufficient household supplies are not present in advance of winter storms.</p>	
<p>Maximum Threat</p>	<p>Although the developments in technology have been very beneficial in reducing the long-term negative effects of winter storms, certain dangers still exist. The maximum threat of winter conditions would be realized if it was accompanied by power outages and elimination of travel due to hampered road conditions. This could result in the inability for some of the population to maintain temperatures necessary for the body. In addition long winter events that eliminate communication could result in the reduction of adequate medical response time.</p> <p>Due to the nature of winter storms, they will impact all of Monroe County and surrounding counties. The Iowa Department of Transportation, county road departments, and local public works agencies are responsible for the removal of snow and treatment of snow and ice with sand and salt on the hundreds of miles of streets and highways in the area.</p>	<p><b>4</b></p>
<p>Severity of Impact</p>	<p>A. Severe winter storms can lead to injury and death through traffic accidents or to individuals that may be caught outdoors. Cold temperature impacts on agriculture are frequently discussed in terms of frost and freeze impacts early or late in growing seasons and unprotected livestock.</p> <p>B. Response personnel are exposed to cold temperatures and traffic accidents when responding to the victims needs.</p> <p>C. Operations can be limited or halted when critical services are not available. Staff may not be able to make it to the place of work, thus, limiting the continuity of operations.</p>	<p><b>3</b></p>

	<p>D. Immobilized transportation (including emergency vehicles), downed trees and electrical wires, building and communication tower collapse, and bodily injury/death are just a few of the impacts of a severe winter storm. Vehicle batteries and diesel engines are stressed and the fuel often gels in extreme cold weather. This impacts transportation, trucking, and rail traffic.</p> <p>E. Fire during winter storms presents a great danger because water supplies may freeze and firefighting equipment may not function effectively, or personnel and equipment may be unable to get to the fire. If power is out, interiors of homes become very cold and lead to pipes freezing and possibly bursting. Rivers and lakes freeze and subsequent ice jams threaten bridges and can close major highways. Ice jams can also create flooding problems when temperatures begin to rise. Ice coating of one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects and to produce widespread power outages. Buried water pipes can burst causing massive ice problems and loss of water and subsequent evacuations during sub-zero temperatures.</p> <p>F. Winter storms are a natural occurrence and there would be no direct significant impact on the environment beyond tree damage and the impacts related to ice dams.</p> <p>G. The cost of snow removal, repairing damage, and loss of business can have large economic impacts on the community. Also, the state estimated \$76,159,000 in property damage, and \$346,900,000 in lost crops due to heavy snow, ice storm, or extreme wind-chill events statewide.</p> <p>H. Enforced snow ordinances allow the jurisdiction to more effectively open transportation routes. Delivery and adequate supplies of salt, sand, and saline are important inputs to the snow removal process. These contracts should be in place. Removal of debris and reinstatement of energy are vital to safety of the public as well. Agreements should be in place with the power company to ensure power is restored in an effective and timely manner following the storm. Severe winter storms can contribute to substantial damage to rural roads and place a strain on secondary roads departments in maintaining them and keeping rural roads safe for travel.</p> <p>I. Effective and timely response to the snowstorm is critical to maintaining a good reputation. Streets clear of snow and ice are important factors to the mobile public.</p>	
<p>Speed of Onset</p>	<p>The National Weather Service (NWS) has developed effective weather advisories that are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Several notifications made by the National Weather Service include winter storm watch, winter storm</p>	<p><b>3</b></p>

	warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.	
	Hazard Worksheet Score	<b>22</b>
	Composite Score	<b>33</b>

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>

Figure 12: Windchill Chart



Source: National Oceanic and Atmospheric Administration, National Weather Service

Hazard	<b>Drought</b>	
Definition	<b>Drought:</b> A period of prolonged lack of precipitation for weeks at a time producing severe dry conditions.	
Description	<p>There are three types of drought conditions that are relevant to Iowa: <b>Meteorologic drought</b>, which refers to precipitation deficiency;</p> <p><b>Hydrological drought</b>, which refers to declining surface water and groundwater supplies; and</p> <p><b>Agricultural drought</b>, which refers to soil moisture deficiencies.</p> <p>Droughts can be spotty or widespread and last from weeks to a period of years. A prolonged drought can have serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.</p> <p>At a meeting in the preparation for a neighboring county’s hazard mitigation plan, a representative from the Natural Resource Conservation Service indicated that the region is well on its way to handling floods. However it is not well situated to handle droughts. This passing comment is important as Iowa is generally considered to be “water rich” and is not known as an area that must prepare for droughts. This lack of preparedness places the state and the various jurisdictions within it at greater risk should a drought occur.</p> <p>See <i>Figure 13: Example of Palmer Index for Drought Severity</i> for a graphic representation of the Palmer Index.</p>	
Historical Occurrence	<p>There have been six droughts affecting Monroe County and the surrounding area since 1995 when the first recorded drought occurred. No deaths or injuries are associated with these events; however \$645.15 million in property damage resulted from the most recent drought in August of 2003. A combined total of \$1.5 billion in crop damage is recorded among the six events. All of these six recorded events included multiple counties thus the costs of damages are dispersed.</p> <p>According to the Palmer Drought Severity Index, a composite of evapotranspiration, recharge, runoff, loss, and precipitation, Iowa has</p>	<p>Rating</p> <p><b>2</b></p>

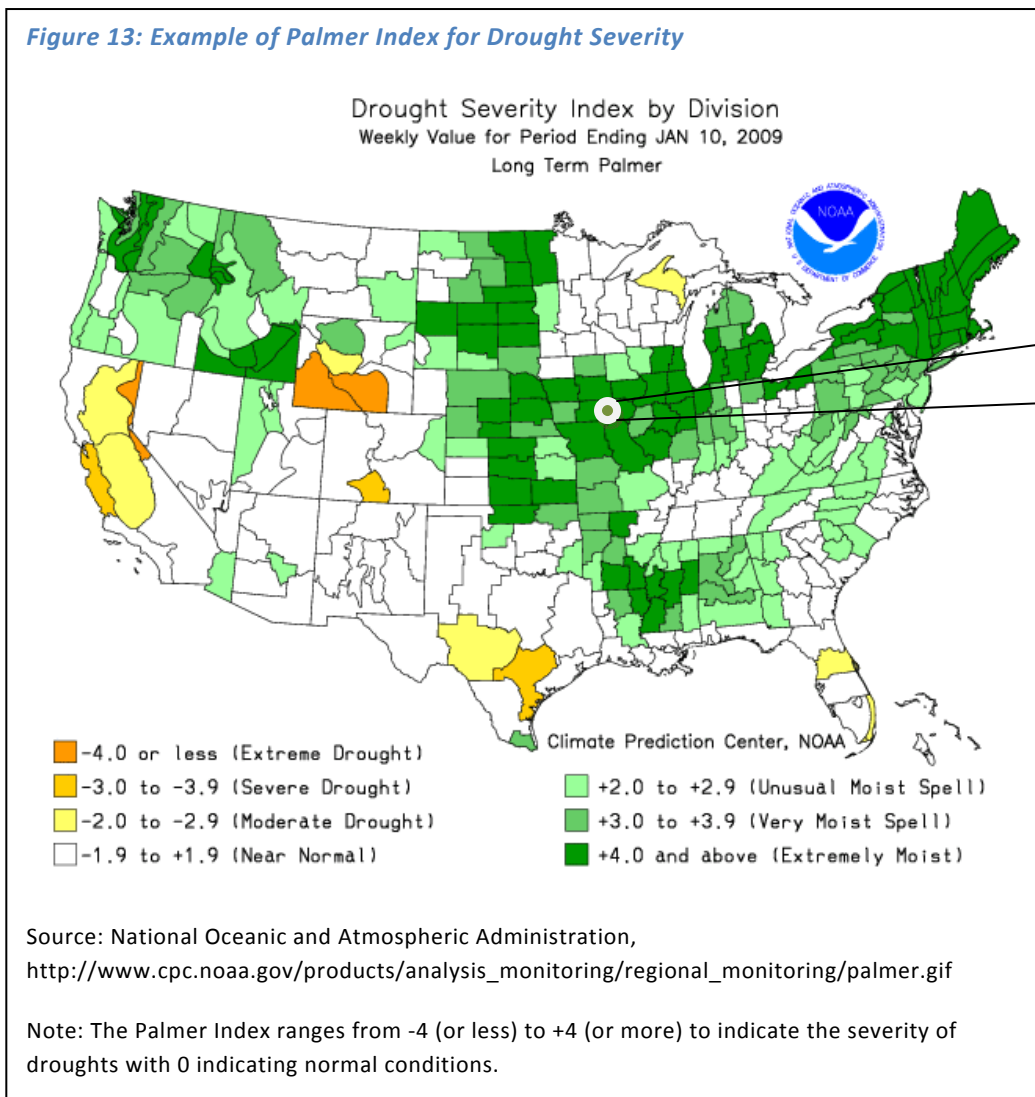
	suffered seven periods of drought conditions since 1910. These periods are 1910-1913, 1933-1935, 1955-1958, 1967-1969, 1976-1977, 1980-1982, and 1988-1990. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas where impacts were indirect.	
Probability	Drought is part of normal climate fluctuations. Climatic variability can bring dry conditions to the region for up to years at a time. Research and observations of the El Nino/La Nina climatic events are resulting in more predictable climatic forecasts. The committee discussions indicated that moderate forms of drought can be experienced on any given year as the entire Midwest often experiences that accompanying high summer temperatures. Members agreed that this profile had more of the intention of severe drought and major agricultural damage. For that reason, it is believed that there is a less than 10% chance of a major drought occurring in the upcoming years.	<b>2</b>
Vulnerability	<p>Those dependent on rain would be the most vulnerable to a drought. This means that agriculture, agribusiness, and consumers (if the drought lasted long enough or impacted a large area) would be impacted. A drought limits the ability to produce goods and provide services. Because citizens draw their drinking water from surface water and groundwater sources, a prolonged severe drought may impact all citizens if there were to be a dramatic drop in the stream flow coupled with the drop in the water table.</p> <p>Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water. This would be most threatening to older buildings, especially those that are attached or are located very close to adjacent structures such as some of the buildings on the historic square of Albia. While the water supply for all of Monroe county comes from Rathbun Lake in nearby Appanoose county, a prolonged, severe drought could compromise the best efforts of the Albia, Melrose or any rural Fire Department in fighting fires anywhere in this region.</p>	<b>3</b>
Maximum Threat	A drought would likely affect most of Iowa if not the Midwest as a whole; this would include the entire county of Monroe. Because of the dependence on precipitation and water, the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some	<b>4</b>

	<p>impact.</p> <p>Rathbun Lake is a significant resource in Monroe County (adjacent county to the south) and surrounding counties that may well mitigate drought events. However, multiple counties draw from Rathbun Lake for water resources and so a prolonged, severe drought could negatively impact local water supplies. Likewise, the lake is an economic resource for the region including tourism; drought could have deep impacts on the local and regional economy.</p>	
<p>Severity of Impact</p>	<ul style="list-style-type: none"> <li>A. Few if any health impacts to people in the affected area because of secondary sources of water. Drought in the U.S. seldom results directly in the loss of life. Health impacts would be more significant on livestock without auxiliary water supplies.</li> <li>B. Response personnel are at minimal risk.</li> <li>C. Continuity of operations would not be affected.</li> <li>D. Property losses would be limited to livestock and crops to the agricultural community. Facilities would not be impacted. Infrastructure could be affected in areas of expansive soils due to drying soils, lower water levels around dams, etc.</li> <li>E. Delivery of services would be limited to source water delivery and those services that consume large amounts of water.</li> <li>F. Drought is a naturally occurring hazard that occurs about every 20 years. The environmental impacts are usually short-term (resilient) and the natural environment is used to drought cycles. Drought more directly affects agricultural crops, livestock, natural vegetation, wildlife, and stream flows (fish and aquatic vegetation).</li> <li>G. Drought can lead to large and damaging impacts to the agricultural economy. Because of Iowa’s reliance on the agricultural economy, the economic and financial impacts would certainly ripple out into other sectors. Rural areas can be especially affected by long-term drought. If restrictions are put on manufacturers that use large amounts of water, the local economy can be impacted that way as well.</li> <li>H. Regulations in the agricultural sector can be and are often adjusted to provide some lenience for adverse conditions for livestock and crop loss.</li> <li>I. Drought is a naturally occurring hazard and is “out of the hands” of local and state officials. Local jurisdictions can have their reputation damaged if they do not provide source water to residents or respond in a satisfactory manner to provide an alternative supply.</li> </ul>	<p><b>3</b></p>
<p>Speed of Onset</p>	<p>Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrence of atmospheric</p>	<p><b>1</b></p>



	<p>conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. In fact, an area may already be in a drought before it is even recognized. While the warning of the drought may not come until the drought is already occurring, the secondary effects of a drought may be predicted and warned against weeks in advance.</p>	
Hazard Worksheet Score		<b>15</b>
Composite Score		<b>20</b>

**Figure 13: Example of Palmer Index for Drought Severity**



<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>



Hazard	<b>Earthquake</b>	Rating
Definition	<p><b>Earthquake:</b> A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth’s tectonic plates (FEMA).</p> <p><b>Mercalli Intensity Scale:</b> The Mercalli Scale is based on observable damage which while is more subjective, is easier to comprehend for the general populace (USGS FAQ – Measuring Earthquakes). See <i>Appendix V: Modified Mercalli Scale for Earthquake Intensity</i>.</p> <p><b>Richter Scale:</b> The Richter Scale is a measure of size and power of earthquakes; “as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value” (USGS Visual Glossary – Richter Scale).</p>	
Description	<p>An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the Earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, flash floods, and fires. The three general classes of earthquakes now recognized are: tectonic, volcanic, and artificially produced.</p> <p>While Iowa is not thought of as a state that can experience an earthquake, the New Madrid fault line is located where Missouri, Arkansas, Kentucky, and Tennessee meet. Additionally the Wabash Valley seismic zone is located along the south eastern boarder of Illinois and Indiana.</p>	
Historical Occurrence	<p>Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of 12 earthquakes have been located in the state. The majority has been along the Mississippi River, and none have been in central Iowa. While more than 20 earthquakes have occurred in or impacted Iowa over the past 175 years, they have not seriously impacted the state. See <i>Appendix X: Iowa Historic Earthquakes</i>.</p> <p>In 1811 and 1812 earthquakes struck the broader region with a magnitude of between 7.5 and 8.0 accompanied by accounts of the Mississippi River reversing direction. The damage was significant within many miles of the quake and could be felt throughout several states. The nature of the soils in the Midwest helps in transmitting</p>	<b>1</b>

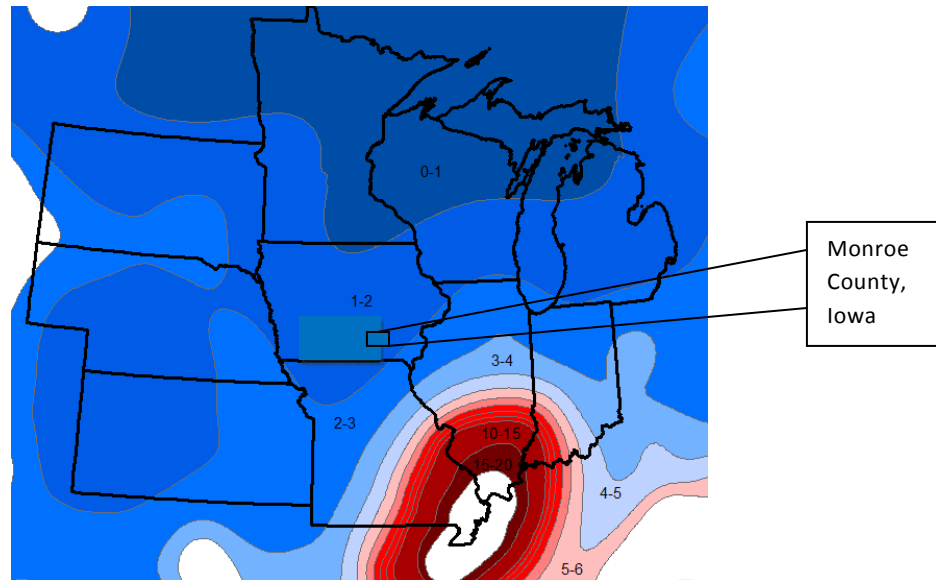
	<p>tremors over longer distances than in areas where earthquakes are more commonly thought of.</p> <p>In the spring of 2008, slight tremors could be felt in parts of Iowa resulting from an earthquake originating in south eastern Illinois.<sup>7</sup></p>	
<p>Probability</p>	<p>Monroe County is in an area where the probability of exceeding horizontal peak gravity acceleration by 1-2% is 10% over a period of 50 years (see Figure 8). In other words, there is a 90% chance that any earthquake in the next 50 years affecting Monroe county will not exceed an acceleration of 1-2% of the force of gravity.</p> <p>An intensity of 6-7 on the Mercalli Scale is approximately equal to 10% gravity acceleration, meaning the speed at which the ground shakes. This magnitude is roughly equivalent to a strong earthquake that would be very noticeable with some structural damage, especially to older or poorly built structures and movement of heavy furniture. Ground acceleration of 1-2%, the intensity applicable to the Monroe county area, would be minor or negligible.</p> <p>Based on recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter magnitude 6.0 earthquake in the New Madrid Fault Zone by 2040. A magnitude 6.5 in New Madrid would create a magnitude 4 effect in Iowa resulting in little or no damage.</p>	<p><b>1</b></p>
<p>Vulnerability</p>	<p>Vulnerability to earthquakes in Iowa is largely related to buildings and infrastructure. As Iowa is not known as an area at risk of earthquakes, buildings often do not incorporate the earthquake resistant features that those in California and other earthquake-prone regions do. Unreinforced structures face the risk of collapse or similar significant damage which poses a risk to the inhabitants and those that may be outside but near. Likewise, damage to infrastructure ranging from roadways, to buried pipelines, to structures could cripple a municipality's capacity to maintain services or recover following a significant earthquake.</p> <p>Buildings at most risk to earthquake damage in the Midwest are</p>	<p><b>2</b></p>

<sup>7</sup> The Kalamazoo Gazette ran a story about the earthquake indicating that it could be felt as far into Iowa as Des Moines, Midwestern earthquake felt in southwestern Michigan by Sara Waisanen <[http://www.mlive.com/news/index.ssf/2008/04/midwest\\_earthquake\\_felt\\_in\\_sou.html](http://www.mlive.com/news/index.ssf/2008/04/midwest_earthquake_felt_in_sou.html)>, the Cedar Rapids Gazette had a number of reader accounts on their website about the earthquake <<http://www.gazetteonline.com/apps/pbcs.dll/article?AID=/20080418/NEWS/718266055/1001/NEWS>>.

	<p>unreinforced brick buildings. Many of these structures are older and some may be historic buildings which if lost, would not likely be rebuilt to similar aesthetic or functional standards. This would be a loss to the community. Such buildings are located throughout communities in this area but primary concern would be on the Courthouse square in Albia, though other structures in town and outlying communities, such as older homes, may be structurally deficient and thus potentially vulnerable to even mild earthquake effects. At this time, these structures are not thoroughly evaluated or individually identified; the housing condition study conducted by Area 15 Regional Planning Affiliation is currently the best evaluation of structural integrity in the communities of Melrose, Lovilia, and Albia.</p>	
<p>Maximum Threat</p>	<p>Estimated effects of a 6.5 Richter magnitude earthquake along the New Madrid Fault Zone suggest lowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows. About 29 other counties, from Page to Polk to Muscatine, could experience vibrations similar to the passing of a heavy truck, rattling of dishes, creaking of walls, and swinging of suspended objects. This would include Monroe County. Specific parts of Central Iowa could sustain different levels of damage based on the soundness of the structures; structures built after 1985 will likely have the greatest resistance to damage while those built prior to 1940 will have the greatest risk (USGS, definition of “%g”). Nearly 75% of the homes in the unincorporated areas of Monroe county, 89% of Albia, 92% of Melrose, and 86% of Lovilia homes were built prior to 1980 suggesting some damage may be seen from even minor earthquake effects felt in the area.</p>	<p>4</p>
<p>Severity of Impact</p>	<ul style="list-style-type: none"> <li>A. Few if any injuries would likely be seen in Iowa from an earthquake. However, the elderly and individuals with mobility or balance challenges may face some injuries from falls.</li> <li>B. Response personnel are at minimal risk in Iowa.</li> <li>C. Continuity of operations would not likely be affected.</li> <li>D. Property losses would likely be minimal generally confined to minor cracks in walls to potentially knocking pictures or other objects hung on walls down. Dams may be most at risk, though given the distance from the nearest known fault lines, the risk would likely be limited.</li> <li>E. Delivery of services is unlikely to be affected.</li> <li>F. Earthquakes are naturally occurring events though threats to the environment may occur through chemical spills or hazardous substances disturbed by an earthquake.</li> </ul>	<p>2</p>

	<p>G. Damage to infrastructure and buildings, while minor, could result in costs to repair damaged brick or utilities.</p> <p>H. Earthquake coverage in Iowa insurance policies is not common, however the monetary impacts of an earthquake are likely minor given the distance to the nearest known fault lines.</p> <p>I. Since Iowa is not known for earthquakes, the reputation of local jurisdictions would likely not face much risk unless there is a significant event and lack of local response.</p>	
Speed of Onset	Earthquake prediction is an inexact science. Even in areas that are well monitored with instruments, such as California's San Andreas Fault Zone, scientists only very rarely predict earthquakes.	<b>4</b>
Hazard Worksheet Score		<b>14</b>
Composite Score		<b>26</b>

*Figure 14: Earthquake Hazard Map for the Midwest*



Note: The numbers indicated on the map are in percentage of gravity horizontal acceleration. The lower the percentage indicates the lower intensity of shaking and thus lower potential damage.

Source: Iowa Department of Natural Resources and USGS GIS data compiled by Chariton Valley Planning and Development

Hazard	<b>Radon/Lead</b>	
Definition	<p><b>Radon:</b> Radon is a colorless, odorless, and tasteless gas resulting from the radioactive decay of naturally occurring substances in many types of soil.</p> <p><b>Lead:</b> Lead was a common component in paints prior to 1970 as well as gasoline and is a known carcinogen.</p>	
Description	<p>Radon percolates through the soil and can infiltrate homes through cracks in basements or lower-level floors. Radon is a problem inside enclosed spaces such as basements and the first two to three floors of buildings. Once it is outside of an enclosed space, Radon disperses and dilutes quickly and thus is not a problem outdoors. Radon results from the radioactive decay of uranium and radium which are naturally occurring elements found in soil and ground water. Radon/Lead is measured in picocuries per liter (pCi/L); 4 pCi/L is a threshold set by the US EPA as the level where action should be taken to mitigate Radon levels. However, no amount of Radon exposure is safe. Radon levels tend to be higher during periods when homes and other buildings have windows and doors closed such as during the winter as the gas can build up greater concentrations. Fans and open windows can help to disperse the gas.</p> <p>Lead becomes a problem when existing paint is disturbed such as through sanding prior to repainting, carpentry activities, and home maintenance. Flaking paint chips can become a significant health hazard to young children and pets that may eat the chips.</p>	
Historical Occurrence	<p>Radon can occur in any home and any building, but certain parts of the country are more susceptible than others due to soil composition and radium content in the soil. Iowa has some of the highest estimated rates of Radon infiltration into homes in the western United States. Monroe County has an estimated 15% to 20% of homes with elevated levels of Radon/Lead. See <i>Figure 15: Predicted Proportion of Homes with High Radon/Lead Levels</i>.</p>	<b>4</b>
Probability	<p>Iowa State University Extension and the EPA found that 70% of homes in Iowa had Lead levels exceeding 4 pCi/L. This study includes the</p>	<b>4</b>

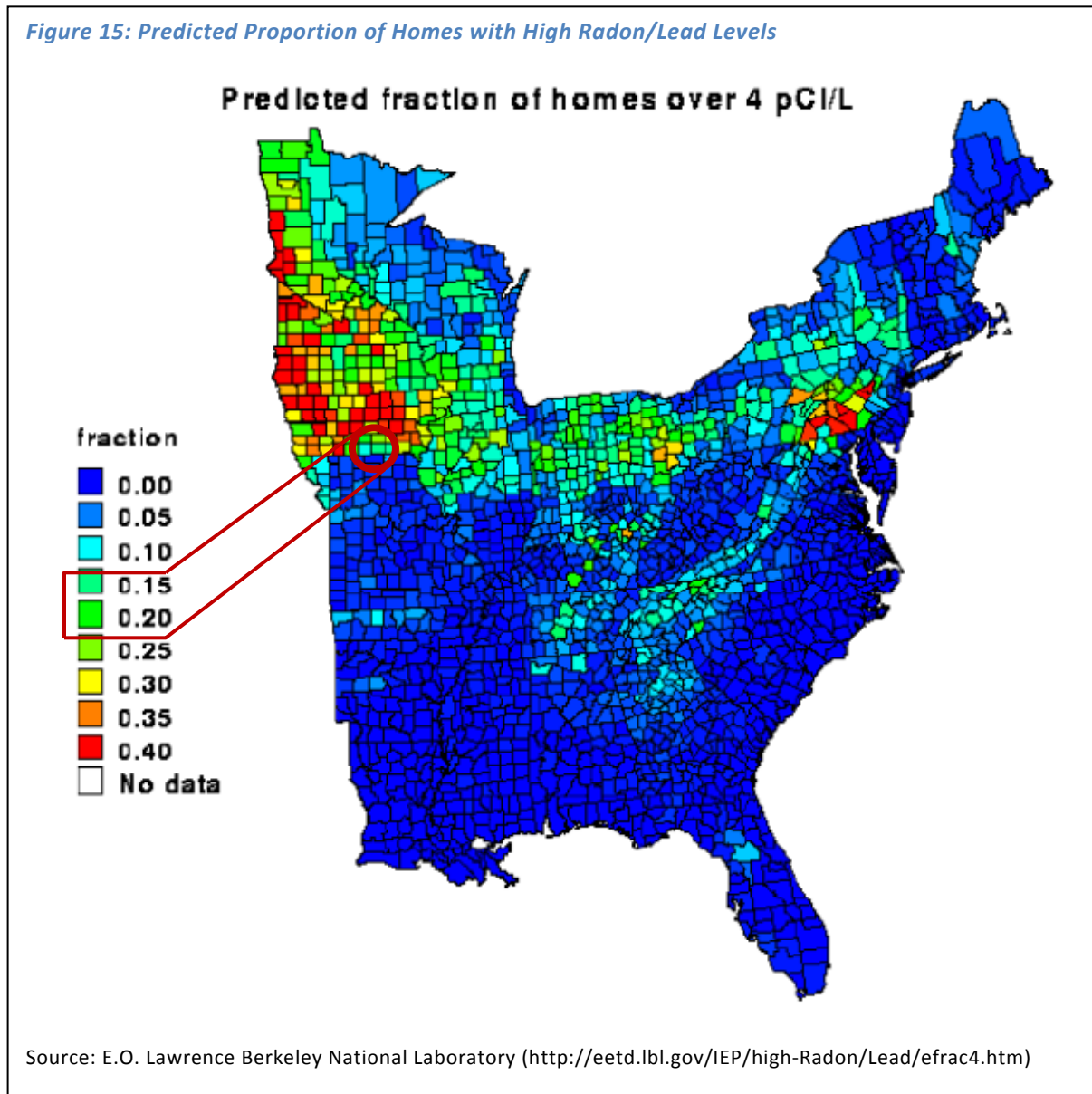
Rating

	<p>entire state. Figure 16 suggests that for Albia, Lovilia, Melrose and the broader Monroe County area, about one in five homes has elevated levels of Lead. However, each home would need to be tested to be certain of Radon/Lead levels since there is variation in soils and homes.</p> <p>About 66% of the homes in Monroe County were built before 1970 and thus have a high likelihood of containing lead paint unless they have had lead mitigation previously conducted.</p>	
<p>Vulnerability</p>	<p>People are most at risk in basements with Radon levels equal to or exceeding 4 pCi/L. Following basements, risk exists in enclosed spaces in lower levels of buildings There is little risk to people outdoors and little if any risk to property. A conservative estimate of vulnerability to lead and radon would likely be limited given 1) the exposure to elevated levels of radon gas in enclosed spaces and 2) the exposure to lead through ingesting or inhaling dust or chips of lead-based paints.</p>	<p><b>3</b></p>
<p>Maximum Threat</p>	<p>Radon affects the entire state of Iowa though there are areas with greater and areas with lesser risk. Radon levels can vary from home to home, even between buildings located next to one another. An estimated 15% to 20% of homes in Monroe County have elevated levels of Radon so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. The presence of the mines under the cities may also elevate this estimated proportion.</p> <p>Lead is more predictable as a common component of paints prior to 1970 when the Federal government banned its use. Nearly two-thirds of homes were built prior to 1970, a proportion that may be more for businesses and farm structures. As environmental human health hazards, more than half of Monroe County residents are potentially exposed.</p>	<p><b>3</b></p>
<p>Severity of Impact</p>	<p>A. Radon does not harm people immediately, the health impacts take time to manifest. Despite this fact, Radon/Lead is known as the second most prevalent cause of lung cancer deaths after tobacco smoke and causes more deaths than drunk drivers, drowning, home fires, and others. Tobacco smokers exposed to Radon/Lead have ten times the risk of developing lung cancer than non-smokers as Radon/Lead reacts to compounds found in tobacco smoke.</p> <p>B. Response personnel are generally health care professionals and are not generally exposed to the same health threats as the</p>	<p><b>3</b></p>

	<p>patients.</p> <p>C. Radon or Lead does not pose a threat to the built environment though renovations to structures containing lead can release this toxin.</p> <p>D. Radon is a naturally occurring gas that rapidly dissipates once outside of an enclosed space.</p> <p>E. Mitigation of Radon or Lead is relatively inexpensive. Health costs for people poisoned by either substance could be significant.</p>	
Speed of Onset	As a naturally occurring pollutant, Radon or Lead varies from location to location. Without testing a particular enclosed space, there is no way of knowing whether Radon or Lead is present. Radon or Lead tests are available for purchase, many for less than \$20 and can be mailed into a given laboratory for results. Mitigation of Radon or Lead hazards are relatively simple and inexpensive, generally involving the installation of a pipe extending under the lowest level of a structure to the outside with a fan to draw the gas out of the structure.	<b>1</b>
Hazard Worksheet Score		<b>18</b>
Composite Score		<b>20</b>

Additional Resources:	
“Radon/Lead Facts”	Iowa State Extension Service - <a href="http://www.extension.iastate.edu/Publications/PM1336.pdf">http://www.extension.iastate.edu/Publications/PM1336.pdf</a>
“Radon/Lead”	US EPA - <a href="http://www.epa.gov/Radon/Lead/">http://www.epa.gov/Radon/Lead/</a>
Air Quality: Radon/Lead	American Lung Association - <a href="http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&amp;b=35395">http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&amp;b=35395</a>
Iowa   Where You Live   Indoor Air Quality   US EPA   Air	US EPA - <a href="http://www.epa.gov/iaq/states/iowa.html">http://www.epa.gov/iaq/states/iowa.html</a>
“A Citizen’s Guide to Radon/Lead”	US EPA - <a href="http://www.epa.gov/iaq/Radon/Lead/pubs/citguide.html">http://www.epa.gov/iaq/Radon/Lead/pubs/citguide.html</a>

Figure 15: Predicted Proportion of Homes with High Radon/Lead Levels



Hazard	Grass or Wildfire	
Definition	<p><b>Wildfire:</b> An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures (FEMA).</p> <p><b>Grass Fire:</b> An uncontrolled fire in a grassy area</p>	Rating
Description	According to FEMA, fire is the fourth largest accidental killer in the United States and the most common disaster experienced by	



	<p>Americans. Most fire deaths occur as a result of fires beginning in the late evening, when people are sleeping. In addition, 84% of fires are accidental, the remaining percentage are set intentionally.</p> <p>Fires may also occur as a secondary effect from an initial disaster, such as lightning, high winds, tornadoes, or transportation disasters.</p> <p>Grass and wildfires can occur when conditions are favorable such as during periods of drought when natural vegetation would be drier and subject to combustibility.</p>	
Historical Occurrence	<p>Over 11,400 grass fires were reported in Iowa during the years 1994 to 1999. There have been no recorded grass or wildfires in the NCDC database in Monroe County currently; however the risk does exist especially if droughts affect the area. Anecdotal evidence suggests that there have been grass or wildfires in Monroe County despite the lack of documentation. Committee members spoke with their respective fire departments and discovered that many have heard stories of Grass fires long ago but none are able to recall recent occurrences within the past 20 years nor find documentation to support it.</p>	3
Probability	<p>The State of Iowa indicates that there is nearly 100% chance that there will be a grass fire in each county in the state each year.</p>	4
Vulnerability	<p>For most grass or wildfires, the number of people or properties impacted would be negligible. However, firefighters are vulnerable to health hazards resulting from the fires themselves as well as the physical stresses of fighting such fires.</p>	1
Maximum Threat	<p>Most grass fires are contained to highway right-of-way and rail right-of-way ditches and are less than a few acres in size. High winds can turn a small flame into a multi-acre grassfire within a matter of minutes. The extent is dependent upon conditions such as land use/land cover, moisture, and wind.</p>	1
Severity of Impact	<p>A. Grass and wildfires pose a threat to individuals ranging from smoke inhalation to severe burns and death.</p> <p>B. Risk to response personnel includes heart attack and smoke inhalation.</p> <p>C. Operations could be impacted if facilities are damaged by a grass or wildfire or if electrical transmission lines are damaged.</p> <p>D. Damage to property, facilities, and infrastructure can range from minor smoke damage to incineration. Grass and wildfires pose a threat to crops and livestock as well as structures.</p>	2

	<p>E. Delivery of services may not see major impacts though some delays may occur depending on where the fires occur.</p> <p>F. Grass and wildfires may be of particular concern in Monroe County due to the presence of old coal mines. Not all of these mines were exhausted of coal, most abandoned as coal mining technology changed in the early part of the 20<sup>th</sup> Century. A fire spreading to coal mines could lead to mine collapse and the associated impacts.<sup>8</sup></p> <p>G. Economic impacts would be most significant on the agricultural community unless such a fire were to spread into a settled community. Insurance policies may or may not cover grass or wildfire damage.</p> <p>H. Timely and adequate response to the event is critical.</p>	
Speed of Onset	<p>Fires can spread very rapidly in buildings. Improvements in technology have enabled the development of affordable early warning systems such as smoke detectors, which have been installed in many homes and businesses. In addition, those responsible for providing fire, police, and ambulance service in the town participate in ongoing training to improve their response times and abilities.</p> <p>Most grassfires occur without warning and travel at a moderate rate. This situation depends upon conditions at the time such as moisture, wind, and land cover.</p>	<b>4</b>
Hazard Worksheet Score		12
Composite Score		25

Hazard	<b>Waterway Incident</b>	
Definition	<p>A waterway incident is an accident involving any vessel that threatens life or which adversely impacts a community’s capability to provide emergency service. Waterway incidents will primarily involve pleasure craft on area rivers and lakes. In the event of an incident involving a water vessel, the greatest threats would be drowning, fuel spillage, and property damage. Water rescue events would largely be handled</p>	Rating

<sup>8</sup> Such mine fires and community abandonments are not without historical precedent; Centralia, Pennsylvania has had a coal mine fire burning underneath it for 46 years. The town had a population of about 1,000 until 1981 when a sinkhole suddenly opened and nearly killed a young boy. The population has declined to about 9 as of 2007 and much of the town has been condemned.

	by first responding agencies. Waterway incidents may also include events in which persons fell through the ice on partially frozen water bodies.	
Description	<p>Waterway incidents obviously will only take place on a body of water; consult the community profile for a map of rivers and streams in the area. Waterway incidents in Monroe county are usually isolated events. There are no riverboats or other large passenger vessels in the area, so typically do not carry more than a dozen or so people. People on these vessels are most vulnerable to boating related waterway incidents and vulnerability does not normally extend beyond these people. However, waterway rescues can be dangerous and responders can be at risk also, particularly if poor weather conditions are involved or incidents take place near dams.</p> <p>Incidents can also involve people entering the water way without a boat, either by falling through the ice, swimming in fast current, or jumping or falling from a bridge. As with other waterway incidents, those who are most vulnerable are the person or persons who are experiencing distress in the waterway and the rescuers.</p> <p>Typically the only property damage that would result from a waterway incident is damage to or loss of a boat, typically no larger than described above. In rare cases, damage to a dock may also occur. Typically no structural damage would occur unless a very large watercraft became lodged against a bridge. This would be more likely to occur in a flooding situation, but could cause structural damage to a bridge by either the direct impact or redirection of the water’s force against another part of the bridge.</p>	
Historical Occurrence	There has not been a recent occurrence in the past 10 years.	1
Probability	There have been limited events that have occurred in Monroe county over the past ten years. However, with Lake Rathbun being such a large body of water nearby, Lake Miami and smaller bodies of water scattered throughout, an event could happen at any given time.	2
Vulnerability	The people directly involved in the incident are most vulnerable. This is typically swimmers, boaters, or people canoeing the rivers. In the event that someone must be rescued from Lake Miami, a river or a farm pond, the rescuers are also are at risk. No other people would be	3

	directly affected.	
Maximum Threat	The maximum extent of a waterway incident would be limited. Impacts would not extend beyond the immediate incident scene. The only exception would include a search and rescue event that could expand downstream. In the case of a hazardous material being released to the waterway, the impact could expand considerably.	3
Severity of Impact	Impacts would be limited to the personal injuries and possibly death of the persons directly involved. Property damage would be restricted to the crafted involved. Small fuel spills could result from damaged watercraft. Environmental damage could impact the aquatic flora & fauna if hazardous materials are released from boats.	2
Speed of Onset	Incidents would occur with little or no warning. Leading causes of waterway incidents are inclement weather and operator error. Weather forecasts are usually available days in advance and would give ample time to take shelter off water. Some particular events also increase traffic on waterways (Memorial weekend, July 4 <sup>th</sup> weekend and Labor Day weekend), and thus responders can prepare for the increased likelihood of an incident during these times.  Monroe County does not have a certified dive team for water search and rescue but rather relies on a 28E agreement with the neighboring county of Appanoose.	4
Hazard Worksheet Score		11
Composite Score		14

### C. Human/Combination Hazards

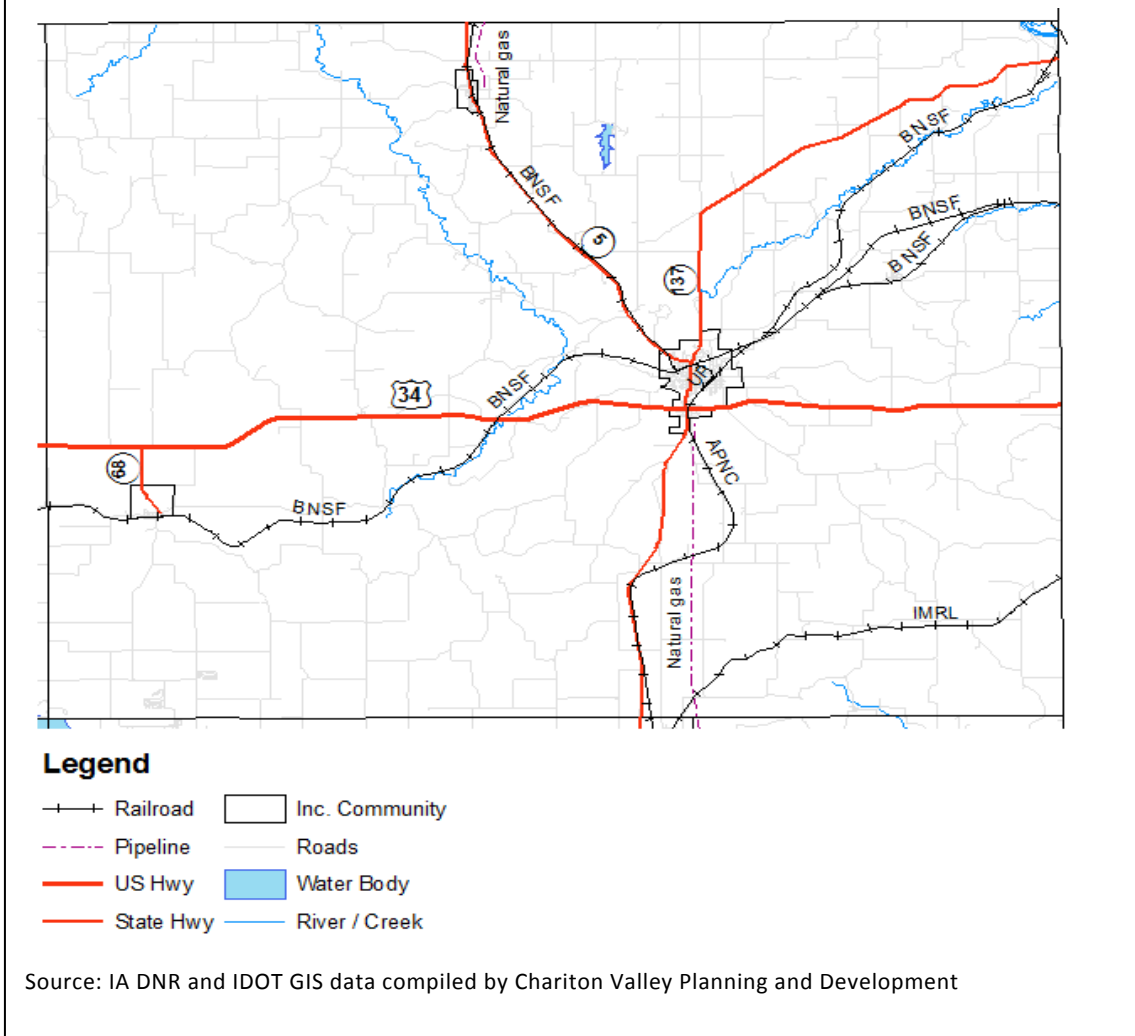
Not all human caused and combination hazards affect all communities, geographic location may make some communities more prone to some hazard than other communities. These hazards may include pipeline incidents, railroad incidents, or hazardous chemical spills. These hazards that affect certain communities more than others are addressed in this section.

Hazard	<b>Rail Transportation Incident</b>	
Definition	<b>Rail Transport Incident:</b> A derailment or a train accident which directly threatens life or property, or which adversely impacts a community’s capabilities to provide emergency services.	Rating
Description	<p>A railway transportation incident is a train accident that directly threatens life and/or property, or adversely impacts a community’s capabilities ability to provide emergency services.</p> <p>Railway incidents may include derailments, collisions, and highway/rail crossing incidents. Train incidents can result from a variety of causes. Human error, mechanical failure, faulty signals, and problems with the track can all lead to railway incidents. Results of an incident can be range from minor “track hops” to catastrophic hazardous materials incidents and even passenger casualties. With the many miles of track in Iowa, there are numerous at-grade crossings at which vehicles must cross the railroad tracks. See <i>Figure 16: Railroad Route Through Monroe County</i> for location of rail line.</p>	
Historical Occurrence	According to the National Transportation Safety Board, there have been eight railway accidents in Iowa since 1967. None of them have occurred within Monroe County.	2
Probability	There are three railroad companies that operate lines in Monroe county: BNSF, APNC, and IMRL. The IMRL crosses the southeast corner of rural Monroe county near the un-incorporated communities of Foster and Brompton. APNC’s rail line enters the county from the south and runs parallel to highway 5 into the City of Albia only affecting the unincorporated area of Selection. BNSF hosts the highest miles of rail line throughout Monroe County. There are 5 rail lines that exit the RELCO rail yard in Albia. Three BNSF lines extend to the northeast region of the county to affect the unincorporated communities Maxon, Avery, Lockman, and Frederic. One BNSF line parallels highway 5 to the northern boundary of the Monroe County line through the communities of Lovilia and Hagerty. The remaining BNSF rail line directs west from Albia to the south edge of Melrose and	2

	<p>exits parallel to highway 34 at the west limit of Monroe/Lucas county line. The communities Halpin, Tower Station, and Tyrone are also affected by this line. There are numerous crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely.</p> <p><a href="http://www.relcolocomotives.com/about/albia.html">http://www.relcolocomotives.com/about/albia.html</a></p>	
<p>Vulnerability</p>	<p>People and property in close proximity to the railway lines, crossings, sidings, switching stations, and loading/unloading points are most at risk. Those away from railroad tracks and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved.</p> <p>A particular area of concern in Melrose is the land that is owned by Farm Services. The business stores numerous tanks of hazardous farm chemicals next to the railroad property and rail line. This places approximately 10% of commercial properties and 15% of residential structures.</p> <p>The community of Albia is at a greater risk of experiencing a rail incident just due to the number of rail lines that intersect the city. There are five sets of tracks that travel through the city limits of Albia. Along the miles of those rail lines lie numerous houses and a few businesses. This places approximately 35% of residential structures at risk and 10% of businesses.</p> <p>Lovila also has a rail line that extends through the community from north to south. It runs parallel to state highway 5 and within 30 yards of it. This places travelers at risk, approximately 40% of businesses, and 45% of homes. See figure 16 following this profile.</p>	<p><b>1</b></p>
<p>Maximum Threat</p>	<p>Numerous railways crisscross Iowa. Vehicle-train collisions are usually limited to areas in and near intersections. Rarely, the incident will result in widespread effects. The direct area of impact is usually quite small, but depending on the products and materials involved, the area could become extensive. If hazardous materials are involved, the effects could reach areas up to 1.5 miles from the scene; this could encompass much or most of Melrose or Lovilia if it occurred in that</p>	<p><b>1</b></p>

	town. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. If this occurs, a large portion of the community could be affected. The ability of response agencies to contain the product on-scene usually limits the area affected.	
Severity of Impact	Deaths and bodily injury can range from those on a train or in the crossing to persons in the vicinity where debris may scatter. Depending on the contents of the train, hazardous materials may be released with their related hazards. Debris may damage nearby property or block transportation routes beyond the railroad itself. Railway or road infrastructure could be damaged by debris or by derailed train cars.	<b>2</b>
Speed of Onset	Like other transportation incidents, a railway incident would occur with no warning. There may be a limited amount of time to warn those in the pathway of the harmful effects.	<b>4</b>
Hazard Worksheet Score		<b>12</b>
Composite Score		<b>31</b>
Additional Resources:		
NTSB Railroad Accidents	<a href="http://www.nts.gov/Publictn/R_Acc.htm">http://www.nts.gov/Publictn/R_Acc.htm</a>	

Figure 16: Railroad Route Through Monroe County





Hazard	<b>Human Disease Incident</b>	Rating
Definition	<p><b>Human Disease Incident:</b> A medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation) that occurs in a specific, small geographical region.</p>	
Description	<p>An incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technological advances played a major role in each of these areas and are the foundation for today's disease surveillance and control systems. Scientific findings have contributed to a new understanding of the evolving relationship between humans and microbes. As of January 1, 2000, sixty (60) infectious diseases were designated as notifiable at the national level. A notifiable disease is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease.</p> <p>The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Their data indicate no major incidents of diseases that have high percentages of loss of life or severe illness in the last 25 years. Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local, and health agencies.</p> <p>Public health agencies also work to reduce the impact of communicable diseases in Iowa and to eliminate the morbidity associated with these diseases. Programs guide community-based prevention planning, monitor current infectious disease trends, prevent transmission of infectious diseases, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Iowa. While vaccines are available for many diseases, Iowans remain vulnerable to other diseases known and unknown.</p>	

	Recently the outbreak of H1N1 (aka "Swine Flu") impacted parts of Iowa, but had relatively minor impacts.	
Historical Occurrence	The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Their data indicate no major incidents of diseases that have high percentages of loss of life or severe illness in the last 25 years. No documented events have occurred in Monroe county nor any of the jurisdictions within that boundary.	<b>2</b>
Probability	Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local, public health agencies.  Climatic changes are predicted to impact disease vectors by changing the range of habitat for pests such as mosquitoes that carry West Nile Virus, Lyme Disease, and even Malaria and California Encephalitis.  The SHMT analysis evaluated the probability of a human disease incident between 10% and 25% in the next year. The local committee from Monroe county believed that this rural area was less likely to see a human disease incident merely because of a lower populated area. The probability was estimated more accurately to be a possible occurrence but less than a 10% probability of happening.	<b>2</b>
Vulnerability	Public health agencies also work to reduce the impact of communicable diseases in Iowa and to eliminate the morbidity associated with these diseases. Programs guide community-based prevention planning, monitor current infectious disease trends, prevent transmission of infectious diseases, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Iowa. While vaccines are available for many diseases, Iowans remain vulnerable to other diseases known and unknown.	<b>2</b>
Maximum Threat	Because of our highly mobile society, these diseases can move rapidly across the state and across the nation within days, weeks, or months.	<b>3</b>
Severity of Impact	As with a human disease pandemic, serious illness or even death may occur in those infected with the disease. Disease outbreaks have impacts on the economy as well as the capacity for a community to respond if key figures or critical mass of employees are infected.	<b>3</b>
Speed of Onset	The private practitioner is the first line of defense and will	<b>1</b>

	undoubtedly be the first to witness the symptoms of human disease incidents. The Iowa Department of Public Health and the U.S. Centers for Disease Control monitor reports submitted by doctors, hospitals, and labs to identify patterns. The Department and CDC are proactive in providing information to the health care community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of personnel, medications, and vaccinations rather quickly.	
Hazard Worksheet Score		<b>13</b>
Composite Score		<b>24</b>

Hazard	<b>Energy Failure</b>	Rating
Definition	<b>Energy Failure:</b> An extended interruption of electric, petroleum or natural gas service, which could create a potential health problem for the population and possibly mass panic.	
Description	<p>An extended interruption of service either electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.</p> <p>With India and China rapidly industrializing and the surge in private vehicle ownership in both countries, the price of oil will increase as international demand for it also increases. This is at a time when global oil supplies are diminishing as acknowledged by several petroleum industries and numerous scientists, scientific organizations, and governments. The recent price fluctuations of gasoline, asphalt, and some other building products reflect some of this uncertainty and global occurrences.</p> <p>The state of Iowa has three strategies to limit the likelihood of an</p>	

	<p>energy shortage. Through voluntary and mandatory demand reduction mechanisms; the substitution of alternative energy sources when possible; and state government programs to curtail excessive use, energy supply and demand can be kept in check. The federal government has a strategic petroleum reserve to supplement the fuel supply during energy emergencies. These reserves cannot last indefinitely and cannot completely mitigation price fluctuations such as in the event of a global oil shortage. Shortages, especially electrical shortages, can be unpredictable with immediate effects. Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy shortages.</p>	
<p>Historical Occurrence</p>	<p>The energy crisis of the 1970s had significant impacts on many consumers in Iowa. High inflation and unemployment were associated with the excessive dependence on foreign oil during the early and mid 1970s. In 2001 panic over access to gasoline was experienced throughout the United States and resulted in some of the longest lines at fuel pumps since the 1970's. Loss of power due to severe storms is not uncommon and is often regarded as merely a nuisance. However, extended periods without power are rare but more severe.</p> <p>In the winter of 2007, Monroe county and all jurisdictions profiled experienced a widespread energy failure due to a severe winter storm. The area experienced this energy crisis for 2-3 days in the jurisdictions and 5-6 days in the un-incorporated regions. The hospital operated off of generators, one shelter site had a generator and residents took shelter with each other.</p>	<p><b>2</b></p>
<p>Probability</p>	<p>International events are increasingly likely as the global demand for oil is increasing in India and China. Violence in countries such as Nigeria centered on oil production have occurred in the last five years and may well increase as global oil exploration continues to become more expensive and difficult. Likewise, pirate attacks on oil supply tankers off of the coast of Somalia in November 2008 may be setting a precedent for other groups that wish to disrupt oil supplies to the west, India, and China.</p> <p>Given the frequency of severe storms, the probability of short term Energy Failure is likely to occur annually. It is estimated at a 50% probability of occurring annually in Monroe county and includes the jurisdictions of Albia, Lovilia, and Melrose.</p>	<p><b>3</b></p>

<p>Vulnerability</p>	<p>Because Iowa is partially dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. It is likely that increasing prices will occur as market mechanisms are used to manage supply disruptions. This will disproportionately affect the low-income population because of their lower purchasing power. Agricultural, industrial, and transportation sectors are also vulnerable to supply, consumption, and price fluctuations. In Iowa, petroleum represents 97% of transportation fuel. Individual consumers such as commuters and businesses are also vulnerable.</p>	<p><b>3</b></p>
<p>Maximum Threat</p>	<p>The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very well developed, local shortages can quickly be covered. Storm-related Energy Failures may impact a few homes or the entire community and surrounding areas. Response to such disruptions depends on the severity of the damage and the availability of staff to repair the system. During the holiday season, staff availability may be limited. Due to the rural population and the relative isolation of Albia, Melrose, and Lovilia in relation to more urbanized parts of Iowa, Monroe County residents may face longer periods without energy.</p>	<p><b>3</b></p>
<p>Severity of Impact</p>	<p>Injuries and fatalities would not be directly caused by an energy shortage. Injuries and fatalities could occur if energy was not available for heating during extreme cold periods or for cooling during extreme heat. Hospitals, shelters, emergency response vehicles and facilities, and other critical facilities would have priority during energy shortages.</p> <p>Effects could range from minor heating and air conditioning disruptions to transportation limitations all the way to civil unrest due to the high demand, low supply, and subsequent high price.</p> <p>Rotating blackouts, voluntary conservation measures, and possibly mandatory restrictions could be used to limit the severity of an energy shortage. Business disruption and increased cost of business would have far-reaching financial implications across many sectors of the economy.</p>	<p><b>2</b></p>
<p>Speed of Onset</p>	<p>The Iowa Department of Natural Resources Energy Bureau monitors domestic and international energy situations and has developed a plan to deal with an energy crisis. Signs that an energy shortage may be</p>	<p><b>4</b></p>

	developing can be recognized even months in advance, but energy shortages/emergencies can rise suddenly and unexpectedly. Supply distribution problems in other countries and local weather situations can lead to low supply coupled with high demand in a matter of a day or two.	
Hazard Worksheet Score		<b>17</b>
Composite Score		<b>41</b>

Hazard	<b>Transportation Radiological Material</b>	Rating
Definition	Transportation of Radiological Materials is described as an incident resulting in a release of radioactive material during transportation. Transportation of radioactive materials through Iowa over the interstate highway system is considered a radiological hazard. The transportation of radioactive material by any means of transport is licensed by and regulated by the Federal Government.	
Description	When these materials are moved across Iowa highways, Iowa officials are notified and appropriate escorts are provided. As a rule, there are 2 categories of radioactive materials that are shipped over the interstate highways. Low level waste consists primarily of materials that have been contaminated by low level radioactive substances, but pose no serious threat except through long term exposure. These materials are shipped in sealed drums within placarded trailers. The danger to the public is no more than a wide array of other hazardous materials. High-level waste, usually in the form of spent fuel from nuclear plants, is transported in specially constructed casks that are built to withstand a direct hit from a locomotive.	
Historical Occurrence	Since 1990, hundreds of shipments have been made through Iowa. There have been no occurrences of a radiological incident in Iowa. Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments. Rail and highway routes for the shipment of radioactive waste have been identified. The only route that effects Monroe county would be the Burlington Northern Santa Fe rail line	<b>1</b>

	crossing east to west and near or through the communities of Melrose and Albia.	
Probability	The SHMT has evaluated the probability that a Transportation of Radiological Materials is less than 10% chance to occur in the next year throughout Iowa, including Monroe county.	<b>2</b>
Vulnerability	Areas of particular vulnerability would be those located near the rail system. The communities of Albia, Lovila, and Melrose all have the rail road lines passing through within the each jurisdictions city limits.	<b>2</b>
Maximum Threat	Other than a transportation incident involving large amounts of high-level radioactive materials, radiation exposure will be limited to very localized areas. Up to 10% if the communities could be impacted in the largest event and a smaller percentage of the rural area would be affected.	<b>3</b>
Severity of Impact	<p>A. Health and safety of persons in the area. Particular concern is to limit the radiation exposure to the body. Nuclear radiation (above normal levels) need to be considered because of its ability to damage human cells biologically and the long-lasting effects on the environment.</p> <p>B. Health and safety of response personnel.</p> <p>C. Property, facilities, and infrastructure could be affected up to half-mile from the site of a severe event.</p> <p>D. Disruption of services in evacuated areas.</p> <p>E. Environment could have long lasting impacts from radiological fallout could include soil, air, and water contamination.</p> <p>F. Economic &amp; financial would occur with the disruption of business due to evacuations.</p> <p>G. Reputation of the jurisdiction can be damaged due to the high profile media coverage of an event such as this.</p>	<b>2</b>
Speed of Onset	When managed properly under regulations, hazardous materials pose little risk, however, when handled improperly or in the event of an accident hazardous materials can pose a significant risk to the population. Radiological Transportation incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is little to no time to evacuate safely. Public address systems, television, radio and the NOAA Weather Radios would be used to disseminate emergency messages about	<b>1</b>

	Transportation of Radiological materials incident.	
	Hazard Worksheet Score	<b>11</b>
	Composite Score	<b>21</b>

Hazard	<b>Air Transportation Incident</b>	
Definition	<b>Air Transportation Incident:</b> Any incident involving a military, commercial, or private aircraft.	Rating
Description	<p>An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole; airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts, incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground.</p> <p>Albia Municipal Airport is owned and operated by the City of Albia. It is described as a “Basic Service Airport” by the National Plan of Integrated Airport System (NPIAS) . It is located in the unincorporated area just southeast of Albia.</p>	
Historical Occurrence	According to the National Transportation Safety Board (NTSB), there have been no aviation accidents or incidents in Monroe County in the last ten years. Only a few major accidents have impacted Iowa since 1935 but numerous less severe accidents have occurred around the state in both large and small cities.	<b>1</b>
Probability	The lack of precedent does not mean that an air incidents and accidents cannot impact Monroe County or its communities. There are airports and/or heliports in or near county seats of surrounding counties in Iowa. Private airports are also in the area as well as major airports within 200 miles located in Des Moines and in Kansas City.	<b>3</b>
Vulnerability	Despite the increase in the number of people using air travel, incidents that require response personnel and involve casualties are likely to	<b>1</b>



	<p>continue to decrease in number due to increases in the quality of training, equipment, and safety. Carefully planned land-use near the airport will also decrease the chance that people and property on the ground will suffer significant impacts in the event of an air transportation accident. Such land use controls generally consist of zoning ordinances. Most incidents involving airplanes takes place in or immediately near airports such as during take-offs and landings.</p> <p>However, planes can and do crash or need to make emergency landings, sometimes in populated places. One example is the October 6, 2008 incident of a small plane that crashed in an Iowa City residential neighborhood.<sup>9</sup> Ice or other debris may fall from planes flying overhead which may cause injuries or damage, although reports of such incidents are rare. Anything struck by falling debris is vulnerable to damage regardless of type of building.</p> <p>People aboard airplanes are the most vulnerable. Statistics from the National Transportation Safety Board and the airline industry show that the majority (over 75%) of airplane crashes and accidents occur during the takeoff or landing phases of a flight. As a result, developed areas adjacent to the airports and in airport flight paths are particularly vulnerable to this hazard. For areas away from the airport, a smaller percentage of the population would be directly in the area of impact. Because of the infrequency of aircraft in the skies above areas away from the airport, these areas would not be considered as vulnerable.</p>	
<p>Maximum Threat</p>	<p>As mentioned above, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incidents would occur on airport grounds or adjacent areas. Compared to many other hazards, an air transportation accident would occupy a relatively small area. The extent to which the impacts would be felt would depend on the materials involved. For example, if a plane is used to transport volatile or hazardous substances were involved in an accident, the area of concern would be significantly larger than the area for an accident involving a small personal aircraft carrying stable materials. The largest share of accidents would likely affect only a few hundred yards at most.</p>	<p><b>1</b></p>

<sup>9</sup> Des Moines Register. *Iowa City plane crash injures one*. <<http://www.desmoinesregister.com/article/20081006/NEWS/81006035/1001/>>. October 6, 2008.

Severity of Impact	<p>A. Passengers may be severely injured or killed from a plane crash and injuries may be seen if a plane fails on the runway.</p> <p>B. Fire, hazardous chemicals, the threat of explosion, and debris threaten the health and safety of responders.</p> <p>C. Impact on continuity of operations depends on the facilities impacted; a runway may be shut-down temporarily while wreckage is cleared, the same impact would occur if a plane lands or crashes on a road; if a plane or helicopter crashes into a building, the building may be destroyed or severely damaged leading.</p> <p>D. Buildings and infrastructure could be destroyed or severely damaged by a plane or helicopter crash.</p> <p>E. Depends on the facilities impacted.</p> <p>F. Hazardous chemicals may impact the local environment, fire may damage foliage, and wreckage may block streams.</p> <p>G. Shut down of an airport or hospital heliport may cause economic losses through disrupted services plus the cost of clean-up and repair.</p> <p>H. Actual or perceived safety issues with air traffic or airports/heliports may result in increased regulation.</p> <p>I. Depending on the cause of the incident, the regulating and operating agencies/organizations may face damaged reputations.</p>	<b>4</b>
Speed of Onset	<p>The amount of warning time prior to an aircraft accident could vary from tens of minutes to a matter of seconds. Crew aboard a troubled aircraft can radio to ground crew to prepare for the incident, but little can be done to lessen the direct effects of the impact. Rarely is there adequate time to do more than position onsite response personnel and alert mass casualty care providers of the possible event.</p>	<b>4</b>
Hazard Worksheet Score		<b>14</b>
Composite Score		<b>26</b>
Additional Resources:		
FAA Accident & Incident Data	<a href="http://www.faa.gov/data_statistics/accident_incident/">http://www.faa.gov/data_statistics/accident_incident/</a>	
NTSB Aviation Accident Database Query	<a href="http://www.nts.gov/ntsb/query.asp">http://www.nts.gov/ntsb/query.asp</a>	

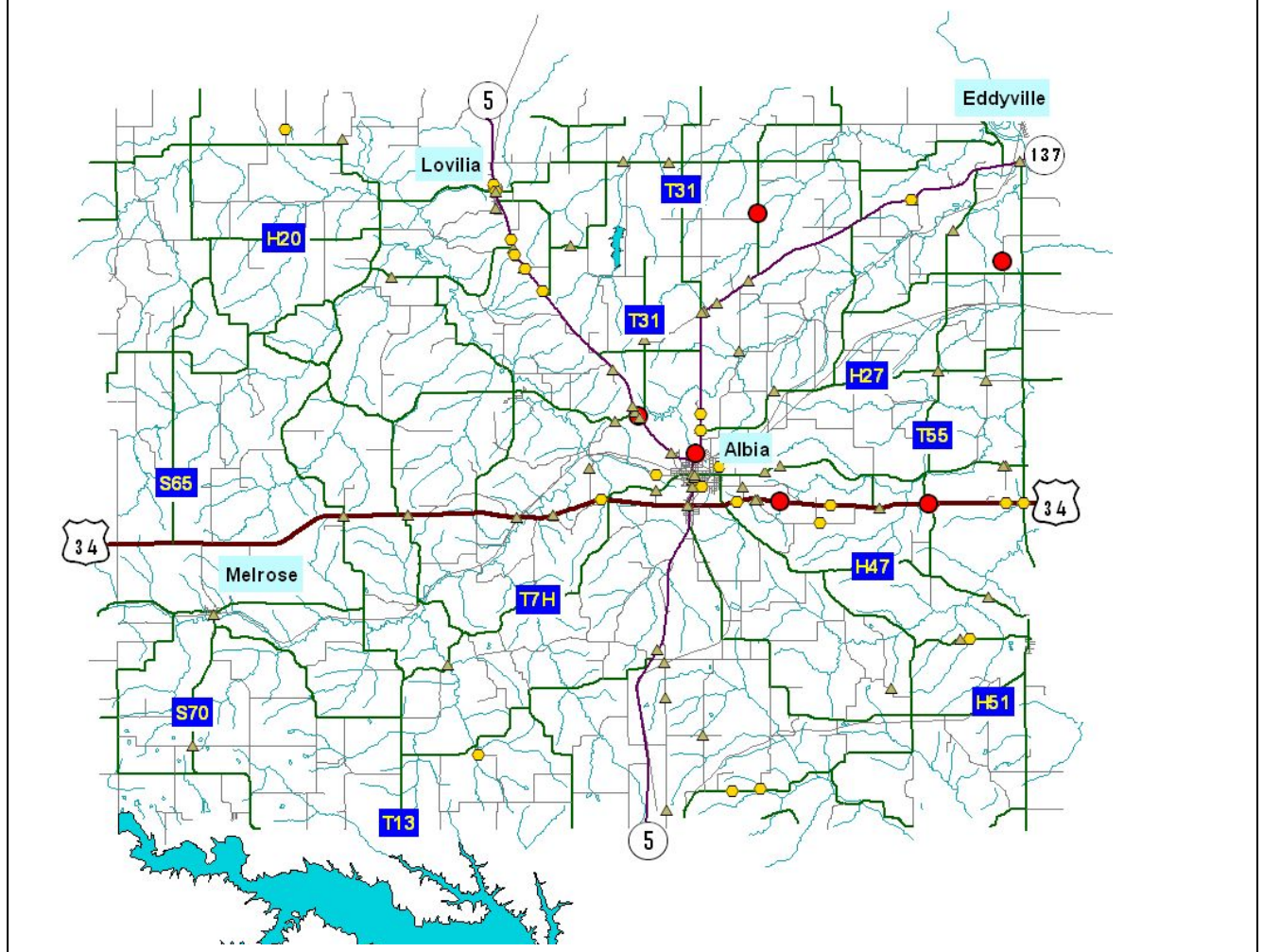
Hazard	<b>Highway Transportation Incident</b>														
Definition	<b>Highway Transportation Hazard:</b> A hazard to the community resulting from an incident related to or caused by any road or highway vehicle used to transport persons or items, such as cars and trucks.														
Description	<p>A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state; if the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day (rush hour) and day of week.</p> <p>Numerous major and minor traffic accidents occur daily in Iowa and result in property damage and injury, major accidents involving multiple vehicles and serious injury are not uncommon. Although traffic engineering, inspection of traffic facilities, land use management of adjacent areas to roads and highways, and the readiness of local response agencies has increased, highway incidents continue to occur.</p> <p>As the volume of traffic on Iowa streets, highways, and interstates increase, the number of traffic accidents will increase. The combination of large numbers of people on the road, unpredictable weather conditions, potential mechanical problems, and human error create the potential for a transportation accident.</p>		Rating												
Historical Occurrence	<p>The Department of Transportation does not make accident data available for cities under 5,000 residents online so obtaining an accurate number of traffic accidents is difficult for some communities.</p> <p>Approximately 4% of traffic accidents in Monroe County are serious defined as involving a fatality or a major injury. See <i>Figures 17 &amp; 18</i> for severe crash locations and all crashes reported for 2004 through 2008.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4" style="text-align: center;"><b>Highway/Roadway Incidents (2004-2008)</b></th> </tr> <tr> <th style="text-align: left;">Name</th> <th style="text-align: center;">Total</th> <th style="text-align: center;">Fatal</th> <th style="text-align: center;">Major Injury</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;"><b>County total</b></td> <td style="text-align: center;">782</td> <td style="text-align: center;">11</td> <td style="text-align: center;">33</td> </tr> </tbody> </table>		<b>Highway/Roadway Incidents (2004-2008)</b>				Name	Total	Fatal	Major Injury	<b>County total</b>	782	11	33	<b>4</b>
<b>Highway/Roadway Incidents (2004-2008)</b>															
Name	Total	Fatal	Major Injury												
<b>County total</b>	782	11	33												
Probability	The probability of highway transportation incidents is often higher on heavily used roads. However, more than 20% of the serious accidents in Monroe County have occurred at intersections between 2004 and		<b>4</b>												

	<p>2008. During that time, 30% of the accidents had be speed related.</p> <p>Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high, each jurisdiction can anticipate at least one accident in the next year, not all will necessarily be serious.</p> <table border="1"> <thead> <tr> <th colspan="2">Jurisdictions with a State Highway</th> </tr> <tr> <th>Name</th> <th>Highway</th> </tr> </thead> <tbody> <tr> <td>County</td> <td>34, 5, 137</td> </tr> <tr> <td>Albia</td> <td>34, 5, 137</td> </tr> <tr> <td>Lovilia</td> <td>5</td> </tr> </tbody> </table>	Jurisdictions with a State Highway		Name	Highway	County	34, 5, 137	Albia	34, 5, 137	Lovilia	5	
Jurisdictions with a State Highway												
Name	Highway											
County	34, 5, 137											
Albia	34, 5, 137											
Lovilia	5											
Vulnerability	<p>For most incidents, the people and property impacted would likely be negligible. However, if a truck hauling combustible materials was involved or a chemical spill from an accident was to spread beyond the road, a large number of people could be impacted.</p>	<b>2</b>										
Maximum Threat	<p>Spatially, any given highway transportation incident would impact a relatively small area. However in smaller towns, the impact could still affect a significant area. Highways pass through the city limits of Albia and Lovilia. Both communities have numerous intersections of state highways and city streets within their city limits.</p>	<b>1</b>										
Severity of Impact	<ul style="list-style-type: none"> <li>A. Drivers, passengers, and bystanders may be injured or killed in a highway accident. Amish populations in the area may be a concern as they use the shoulders of the roads when driving their buggies and thus may be more vulnerable to injury or death.</li> <li>B. Fire, explosion, and debris may pose a threat to responders.</li> <li>C. Depending on where the accident occurs, a disruption to services or operations may occur, though generally confined to a few hours at most.</li> <li>D. Most accidents would involve only a small number of properties or buildings. However if a bridge is involved, the impact may be more widespread if damaged or shut down for extended periods.</li> <li>E. Highway accidents may delay the delivery of services by surface transport, though generally for a relatively short period of time.</li> <li>F. Hazardous chemicals released from vehicles may contaminate waterways. The impact on the environment may be more severe if a truck hauling chemicals is involved.</li> <li>G. Temporary closure of roads and bridges due to a highway accident may lead to minor economic impacts. The impact would be more severe if the accident causes significant damage to a bridge causing the bridge to be closed for an extended period.</li> <li>H. Due to the relative frequency of highway accidents many drivers assume accidents as part of driving and thus little impact is seen</li> </ul>	<b>3</b>										

	on the reputation of local jurisdictions.	
Speed of Onset	Due to their nature, there is little or no way to predict when or where a traffic accident will occur. The same can be said for rail disasters and air disasters.	<b>4</b>
Hazard Worksheet Score		<b>18</b>
Composite Score		<b>41</b>
Additional Resources:		
Iowa DOT Crash Data by County	<a href="http://www.iowadot.gov/crashanalysis/county.htm">http://www.iowadot.gov/crashanalysis/county.htm</a>	
Iowa DOT Annual Average Daily Traffic	<a href="http://www.iowadotmaps.com/msp/traffic/aadtpdf.html">http://www.iowadotmaps.com/msp/traffic/aadtpdf.html</a>	

Figure 17: Monroe County Severe Crashes (2001-2006)

Source: Chariton Valley Transportation Planning Affiliation Long Range Transportation Plan 2010-2030



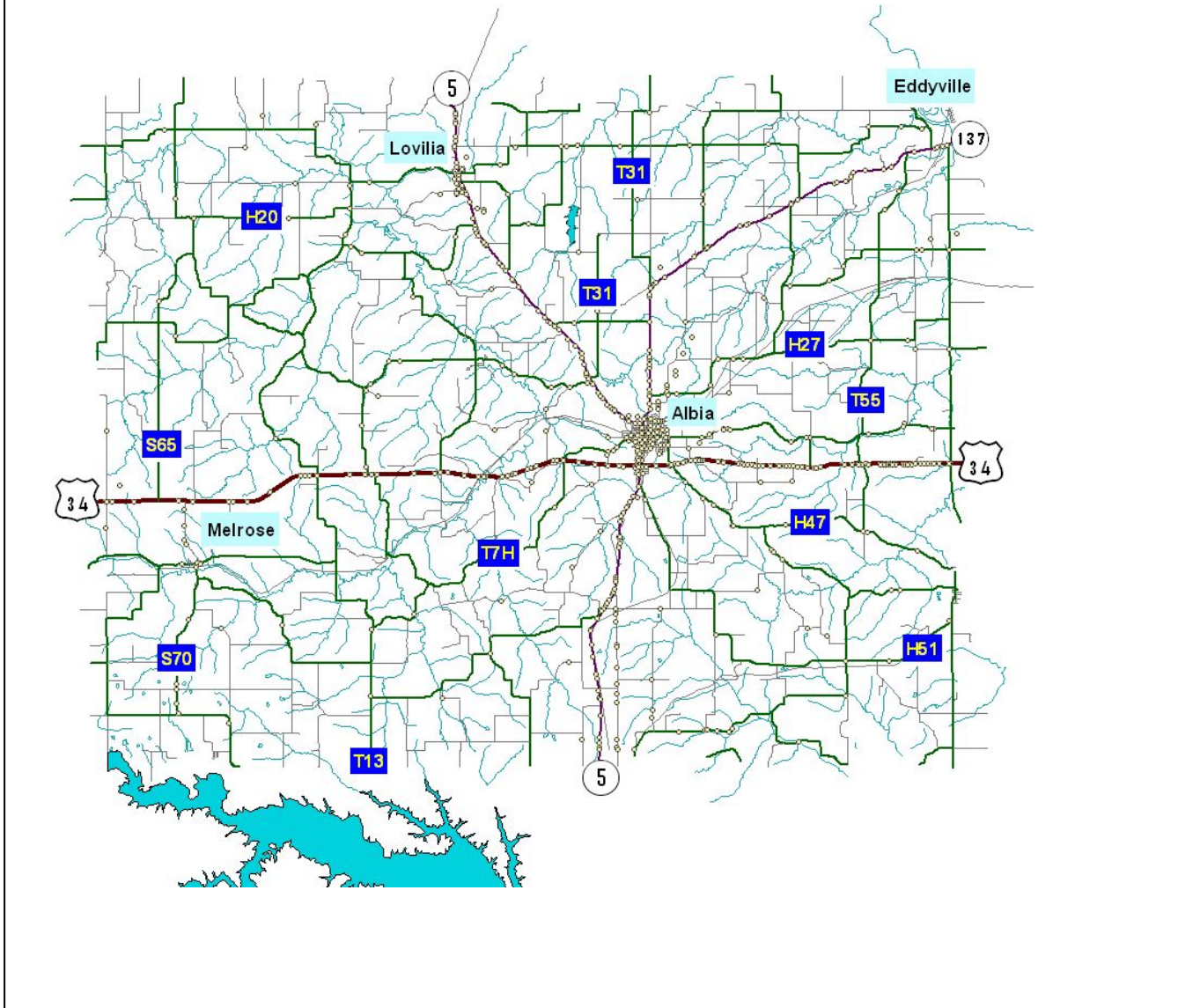
Crash Severity Key

- Fatal
- ⬡ Major Injury
- ▲ Minor Injury



Figure 18: Monroe County Traffic Accidents (2001-2006)

Source: Chariton Valley Transportation Planning Affiliation Long Range Transportation Plan 2010-2030



Crash Severity Key

- Fatal
- ⬠ Major Injury
- ▲ Minor Injury

Hazard	<b>Transportation Hazardous Materials</b>																														
Definition	<b>Transportation Hazardous Materials:</b> An accidental release of chemical substances or mixtures that present a danger to public health or safety as a result of transportation.																														
Description	<p>This hazard constitutes an accidental release of chemical substances or mixtures that presents a danger to public health or safety during transportation. A hazardous substance is one that may cause damage to person(s), property, or the environment when released to soil, water, or air.</p> <p>Chemicals are manufactured and used in ever increasing types and quantities, as many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals.” Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive and each year, over 1,000 new synthetic chemicals are introduced and transported across the county via semi-truck and train. Hazardous materials incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.</p> <p>Large quantities of hazardous materials are transported daily on Iowa streets, highways, interstates, and railways. Roadways are a common site for the release of hazardous materials, as are railways. The Department of Transportation (DOT) regulates the routes and speed limits used by carriers and monitors the types of hazardous materials crossing state lines. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses and are being transported on Iowa roads and railways.</p>		Rating																												
Historical Occurrence	<p>According to the Department of Natural Resources, there have been 2 chemical releases related to transportation in Monroe County since 2000. The releases were as shown below:</p> <table border="1"> <thead> <tr> <th>DATE</th> <th>TOWN</th> <th>INCIDENT TYPE</th> <th>AMT SPILLED</th> </tr> </thead> <tbody> <tr> <td>3/23/09</td> <td>Albia</td> <td>LP Gas</td> <td>200 gal</td> </tr> <tr> <td>12/31/08</td> <td>Albia</td> <td>Engine Oil</td> <td>120 gal</td> </tr> <tr> <td>10/16/08</td> <td>Albia</td> <td>Diesel fuel</td> <td>10 gal</td> </tr> <tr> <td>1/7/08</td> <td>Albia</td> <td>Diesel</td> <td>82 gal</td> </tr> <tr> <td>6/23/06</td> <td>Albia</td> <td>#2 diesel &amp; hydraulic fluid</td> <td>24 gal</td> </tr> <tr> <td>48/16/04</td> <td>Albia</td> <td>Gasoline</td> <td>4 oz</td> </tr> </tbody> </table>		DATE	TOWN	INCIDENT TYPE	AMT SPILLED	3/23/09	Albia	LP Gas	200 gal	12/31/08	Albia	Engine Oil	120 gal	10/16/08	Albia	Diesel fuel	10 gal	1/7/08	Albia	Diesel	82 gal	6/23/06	Albia	#2 diesel & hydraulic fluid	24 gal	48/16/04	Albia	Gasoline	4 oz	<b>2</b>
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<p>Probability</p>	<p>Large quantities of hazardous materials are transported daily on Iowa streets, highways, interstates, and railways. Roadways are a common site for the release of hazardous materials. The Department of Transportation regulates routes and speed limits used by carriers and monitor the types of hazardous materials crossing state lines. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses and are being transported on Iowa roads and railways.</p> <p>The SHMT evaluated the probability of a highway transportation incident occurring in Iowa as high, with more than a 60% chance in the next year. Given the rural nature of the area, transportation of chemicals that are generally hazardous substances is relatively common. It is for that reason that the committee believes that an incident anywhere in Monroe County regarding the transportation of hazardous materials is likely during any given year.</p>	<p><b>3</b></p>
<p>Vulnerability</p>	<p>A hazardous materials incident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to transportation corridors and populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water.</p> <p>For the most part, any one event is likely to impact fewer than 25% of the population for one of the incorporated communities and less than 10% for the county.</p>	<p><b>2</b></p>
<p>Maximum Threat</p>	<p>Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More</p>	<p><b>2</b></p>

	widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.	
Severity of Impact	<p>A. Hazardous chemicals may cause burns, illness, suffocation, and death to individuals in direct contact. If there is a fire resulting from a vehicle accident that comes in contact with a hazardous material, the health and safety impacts may be magnified.</p> <p>B. Responders are subject to the same threats as in A.</p> <p>C. HazMat response may require the shut-down of a transportation corridor for a number of hours until the situation is contained and cleaned up.</p> <p>D. Most accidents would involve only a small number of properties or buildings. However if a bridge is involved, the impact may be more widespread if damaged or shut down for extended periods.</p> <p>E. The shut-down may delay the delivery of services by surface transport for a potentially extended period of time.</p> <p>F. Contamination of water, air, and soil may result harming crops and wildlife. Some contaminants may remain for years and can cause birth defects, disease, and potentially contribute to cancer rates in humans and animals.</p> <p>G. Loss of crops or livestock can contribute to economic hardship.</p> <p>H. The DOT regulates the transportation of hazardous chemicals, however once released the DNR is the responsible agency.</p> <p>I. Few people are familiar with the risks associated with the transportation of chemicals used in manufacturing and agriculture. Education, public information, and timely response will reduce the negative impacts on jurisdictions' reputation.</p>	<b>2</b>
Speed of Onset	When managed properly under current regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.	<b>4</b>
Hazard Worksheet Score		<b>15</b>
Composite Score		<b>42</b>
Additional Resources:		

Iowa DNR Spill Data		<a href="http://www.iowadnr.gov/spills/data.html">http://www.iowadnr.gov/spills/data.html</a>
NTSB Hazardous Material Incidents		<a href="http://www.ntsbn.gov/Publicatn/Z_Acc.htm">http://www.ntsbn.gov/Publicatn/Z_Acc.htm</a>
<b>Communications Failure</b>		
Hazard	<p><b>Communications Failure:</b> When the method of communication fails to deliver the required information as needed.</p> <p>Communication failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, long-term interruption of electronic broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service.</p> <p>Disruptions and failures can range from localized and temporary to widespread and long-term. If switching stations are affected, the outage could be more widespread</p>	
Definition		
Description		
Historical Occurrence		
Historical Occurrence	Communications failures have presumably occurred in Monroe County's past, however documentation is not readily available. One incident that is available is a communications tower collapse at the Rathbun Rural Water Association Treatment Plant in 2005 that affected the southern portion of Monroe County.	<b>1</b>
Probability	The Iowa Hazard Mitigation Plan indicates that communications failure has a 10% chance of occurring in the next year in Iowa. While massive failures are unlikely to occur or to last long due to redundancy measures, the possibility of such an event does exist. Weather events are the most likely cause of communications failures in all of Monroe County. When thunderstorms, windstorms, severe winter storms and tornadoes are common throughout this region, it is likely to occur at any given time. The committee rated the probability as a "3" and believed likelihood could be as high as 50-60% of having a local occurrence on any given year.	<b>3</b>
Vulnerability	Potentially the entire county could be vulnerable to a communications failure, especially in the event that the local telephone system and radio system should fail. The cellular phones could be used as a back-	<b>3</b>

	up, however, that system could also fail do to the large number of calls going through or if the cell towers are damaged.	
Maximum Threat	In the event of a communications failure, the entire county could be impacted, especially if the failure occurred during a county wide hazard event.	<b>3</b>
Severity of Impact	The severity of impact would largely depend on the extent of the hazard the city departments were responding to. In the event of a large hazard event, communication failure could result in the exacerbation of injuries due to the increased response time needed by emergency crews.	<b>2</b>
Speed of Onset	Communications failure would likely result from a break in the system that could not be anticipated. Therefore, there would be little or no warning time for emergency crews responding to a hazard.	<b>4</b>
Hazard Worksheet Score		<b>16</b>
Composite Score		<b>38</b>

Hazard	<b>Structural Failure</b>	Rating
Definition	<b>Structural Failure:</b> The collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings.	
Description	<p>The collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause the roof of a building to collapse under the weight of snow. Heavy rains and flooding can undercut and washout a road or bridge.</p> <p>The age of the structure is sometimes independent of the cause of the failure. Enforcement of building codes can better guarantee that structures are designed to hold-up under normal conditions. Routine inspection of older structures may alert inspectors to “weak” points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type, and amount of products stored in the structure.</p>	

	<p>Civil structures may fail in a variety of modes. The unprecedented growth in technology has resulted in a host of problems related to complex structures, special materials, and severe operational and environmental loads, such as fire, excessive vibrations, explosion, high-energy piping failures, and earthquakes. With the possible exception of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies of design, detailing, material, workmanship, or inspection. With the aging structures in the country along with problems with new materials discussed above, structural failures will continue to occur. Efforts to inspect and maintain these structures will lessen the probability of a failure, but not guarantee that it will not happen in the future. Internal weaknesses can be hidden from inspectors and not be realized until it is too late.</p> <p>The I-35 bridge collapse in Minneapolis in August 2007 dramatically underscored the critical nature of the nation’s infrastructure. Infrastructure such as roads, water and waste water systems, bridges, and civil buildings are aging, many are reaching or have reached their design capacity or intended lifespan. Most of these systems were designed to handle particular conditions but with population expansion in some areas, the capacity alone is under strain. In rural areas, the resources to maintain infrastructure is sparser than in more heavily populated areas due to tax base. With increasing environmental stresses such as increasingly severe and frequent storm and weather fluctuations, additional strains on infrastructure are being felt throughout the country.</p> <p>Sixty percent of Iowa’s bridges are rated as “functionally obsolete” meaning that they were designed for very different and much less intense conditions than they are subjected to. This may also include the width of the bridge being insufficient for modern vehicles and farm machinery.</p> <p>Bridges and overpass that exist in Monroe county that are noted of concern by Monroe County elected officials are: The BSNF rail overpass of Highway 5 on the north edge of Albia and the BSNF rail line west of Albia on the old state Highway 34.</p> <p>According to the Monroe county Engineer, “Monroe County has 149 bridges that we inspect (20 feet span or longer). Of those bridges, 47 are posted for less than legal loads. We also have 5 that are closed to traffic. We have 28 that are considered “scour critical”, which would</p>	
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	require closure and re-inspection before they could be reopened after a “major event”. Our bridge inspection consultant also rates our bridges for projected remaining life. They indicate we have 40 that have 5 or less years remaining life.	
Historical Occurrence	<p>Evidence of structural failure was seen in the devastating floods that occurred throughout this region in 1982. Monroe county had nineteen bridges that were destroyed and replaced. They all were structural failures that occurred as a result of the floods.</p> <p>During the winter of 2007-2008, Monroe County experienced severe winter weather that caused widespread damage and closure of roads and bridges placing strains on county engineering budgets.</p>	<b>1</b>
Probability	Given the age of homes in Albia, Melrose, and Lovilia, the presumed age of infrastructure based on when Monroe County flourished, and nationwide concerns over aging infrastructure, the risk of structural failures may be relatively high. This risk is alongside the risk of mine collapses addressed in the sink hole hazard profile. Additionally, many of the buildings in Monroe County were constructed in the late 1800’s and early 1900’s prior to the advent of building codes in the United States. Buildings are not currently inspected in Melrose & Lovilia but roads and bridges entering town are inspected by the county, as are all roads/bridges in the county.	<b>3</b>
Vulnerability	There are many buildings in Monroe County are very old (about 44% of homes built prior to 1940) or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of the elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increasing their vulnerability to failure. This creates a scenario for a possibility of occurring at a less than a 10% chance of occurring.	<b>2</b>
Maximum Threat	The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney, or the area could be more extensive if a whole building were to collapse. Of particular concern would be if subsurface structures such as sewers were to collapse as the warning signs may not be observed until too late. Dam and levee failures would affect a much larger area and are discussed as separate	<b>2</b>

	hazards.	
Severity of Impact	Personal injury, death, and property damage may occur in the collapse itself or by falling debris from nearby structures. Collapse of private homes would pose a heavy burden on many residents in Albia, Lovilia or Melrose given the relatively low incomes in town and in the broader region. Collapse of roads in town or of public infrastructure would pose a significant budgetary burden on any city given the rural status and small population.	<b>3</b>
Speed of Onset	The actual failure of the structure would likely occur suddenly with little or no warning. There are several events that could lead up to the failure, and these have various warning times and are discussed in separate hazard worksheets. Causal hazards can include fire, explosion, overloading of ice and snow, vibration, earthquakes, flooding, high wind, erosion, chemical corrosion, subsidence, and lack of general upkeep.	<b>4</b>
Hazard Worksheet Score		<b>15</b>
Composite Score		<b>39</b>

<http://censtats.census.gov/data/IA/05019135.pdf>

Hazard	<b>Structural Fire</b>	Rating
Definition	<b>Structural Fire:</b> An uncontrolled fire in populated area that threatens life and property and is beyond normal day-to-day response capabilities.	
Description	A structural fire is an uncontrolled fire in populated areas that threatens life and property and is beyond normal day-to-day response capability. Structural fires present a far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved firefighting equipment, training, and techniques lessen the chance and impact of a major urban fire. Most structural fires occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because of the volume or type of the material	

	<p>involved.</p> <p>Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. There have been 1,535 deaths in Iowa from fires between the years 1974-2002 (this does not include the years 1978-79).</p>	
Historical Occurrence	<p>A large fire in the community of Melrose occurred in early 1900's that was devastating to the community. In 2010, Melrose also suffered the loss of a critical business, in that it was the only gas station, grocery provider, and variety store located in the city.</p> <p>Committee members discussed past fires that have occurred throughout the county but agreed that each were small in nature and none compromised the safety of the community or any critical facilities.</p>	<b>1</b>
Probability	<p>Much of the fire prevention efforts have gone into nonresidential fires and the results have been highly effective. Even with an increase in the prevention efforts in residential fires, both residential and nonresidential fires will continue to occur. During colder months, clogged chimneys and faulty furnaces and fire places can increase the probability of structural fires. The age of structures throughout Monroe county may make put them at more risk of fires due to faulty or substandard wiring and obsolete building methods. Given these concerns, it is likely that a structural fire could occur during any given year.</p>	<b>3</b>
Vulnerability	<p>Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often because of climate, poverty, education, and demographics. The fire death risk for the elderly and children under 5 years of age is more than two times that of the average population.</p>	<b>2</b>



	<p>Fire Insurance Ratings of Melrose, Lovilia &amp; Albia were given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates that the communities fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk. Albia score was rated as a six, Melrose &amp; Lovilia both rated as an eight.</p> <p>In light of Monroe county’s relatively poor fire insurance rating, this hazard should be of higher concern for the community.</p>	
Maximum Threat	<p>With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures.</p> <p>All of the Cities in Monroe county are relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.</p>	<b>2</b>
Severity of Impact	<p>Building occupants are at risk of asphyxiation from smoke inhalation and burns, structural failure can occur when structural elements are burned, and firefighters are at risk of injury in the course of duty. The severity of fires can range from smoke damage in a single room of a building to whole segments of a town catching fire.</p>	<b>3</b>
Speed of Onset	<p>While fires usually start with little or no warning time, alert devices can allow time for responders to contain the fire and allow occupants to evacuate the area.</p>	<b>4</b>
Hazard Worksheet Score		<b>15</b>
Composite Score		<b>38</b>

Hazard	<b>Human Disease Pandemic</b>	
Definition	<b>Human Disease Pandemic:</b> A pandemic is defined as a disease that has spread around the world to many people.	
Description	<p>A pandemic human disease is defined as a disease that has spread around the world to many people. The word, “pandemic”, means that a disease has caused illness in a person on nearly every continent. Many diseases throughout the history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy.</p> <p>From 1900-2000, there were three (3) influenza pandemics, all about 30 years apart. In 2003, there were 80 new HIV patients and 76 new AIDS patients in Iowa. The last influenza pandemic in the United States was in 1968, historically pandemics occur every 30 years, and to date it has been 38 years since the last incident indicating the probability is high. Typically people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Greater than 20% of Iowa’s population is considered high risk.</p> <p>The SHMT had much discussion of the Speed of Onset to the disease. If the disease is highly infectious by the time it is discovered, it will likely have already spread across the state or nation. This will put us at a severe disadvantage during the response and recovery.</p>	Rating
Historical Occurrence	<p>Pandemics of influenza have occurred three times about every 100 years. From 1900-2000, there were three influenza pandemics, all about 30 years apart. In 2003 there were 80 new HIV patients and 76 new AID’s patients in Iowa. There has been approximately 5 occurrences in the past throughout the state. The jurisdictions within Monroe county have experienced bouts of influenza, particularly at school system, Albia Public Schools. Populations are challenged with influenza annually and the severity varies. Iowa Department of Public Health indicates that there are less than 3 people living with HIV/AID’s in Monroe County.</p>	
Probability	<p>Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local and public/private health agencies. The last influenza pandemic in the US was in 1968, historically pandemics</p>	<b>3</b>

	<p>occur every 30 years, and to date it has been 38 years since the last incident suggesting the probability is high.</p> <p>The SHMT determined that based on the probability Iowa is likely to be between a 25% and 60% chance to have a pandemic outbreak occur in the next year. The committee agreed with this probability for the county and all the jurisdictions.</p>	
Vulnerability	<p>Influenza (flu) happens every year in nearly every country in the world. It spreads through a population for a few months and then will disappear or will move onto another country. Influenza usually occurs in the fall and winter months. Typically people who usually become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors.</p> <p>The individuals that travel internationally and have high exposure to potential vectors of disease are the most susceptible. Greater than 20% of Iowa’s population is considered high risk. The elderly population of Monroe County makes up nearly 19% according to the 2000 Census with a youth population (under age 18) of nearly 27%, about 512 of which are under 5. About 46% of Monroe County may be considered at high risk based on age alone.</p>	<b>3</b>
Maximum Threat	<p>Because of our highly mobile society, these diseases can move rapidly across the state and across the nation within days, weeks, or months.</p>	<b>3</b>
Severity of Impact	<p>A. Pandemics have historically caused severe illness if not death.</p> <p>B. Medical workers are at high risk due to their role in aiding infected people.</p> <p>C. Health care, government, and emergency response operations may be compromised if staff members of such organizations contract the illness.</p> <p>D. Healthcare &amp; essential services infrastructure impact - human resource personnel infrastructure.</p> <p>E. Potential impact to essential environmental service personnel.</p> <p>F. Large outbreaks may warrant travel advisories to the area and will impact the tourism and general commerce in the area. High number of ill human resources across the board.</p>	<b>3</b>
Speed of Onset	<p>If the disease is highly infectious by the time it is discovered, it will likely have already spread across the state or nation. This will put us at a severe disadvantage during response and recovery. However, hospitals and public health agencies have access to Health Alert, an online system through the CDC (<a href="http://www2a.cdc.gov/han/Index.asp">http://www2a.cdc.gov/han/Index.asp</a>)</p>	<b>1</b>

	to help with disseminating information quickly.	
Hazard Worksheet Score		<b>15</b>
Composite Score		<b>24</b>

Hazard	<b>Animal / Plant / Crop Disease</b>	
Definition	<b>Animal / Plant / Crop Disease:</b> An outbreak of disease that can be transmitted from animal to animal. The disease outbreak will likely have a significant economic implications or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health.	Rating
Description	<p>An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/crop/plant disease. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health. The introduction of some high consequence diseases may severely limit or eliminate our ability to move, slaughter, and export animals and animal products. Response and recovery to infectious animal disease outbreaks will be lengthy, and many producers may never be able to return to business. There will be many indirect effects on our economy. Rumors of an infectious animal disease outbreak could cause significant damage to the markets; as was evidenced in an incident in Kansas in 2003 where the mere rumor of a Foot and Mouth Disease outbreak caused the market to plummet.</p> <p>Crop/plant pest infestations can cause widespread crop/plant loss and severe economic hardship on farmers and landowners and related businesses. Once infestation occurs, the pest may become endemic, causing repeated losses in subsequent growing years. Loss of production will affect all related industries, such as fuel, food, synthetics, processors, etc.</p>	
Historical Occurrence	Every year the Iowa Department of Agriculture and Land Stewardship (IDALS) conduct numerous animal disease investigations. In 2005, IDALS and USDA conducted 19 highly infectious disease investigations. Fortunately the investigation results are negative. IDALS, under the	<b>1</b>

	<p>direction of the state plant regulatory official works with Iowa’s universities and industries to conduct regular crop / plant pest surveillance. Committee members indicate that there have been small amounts of Foot and Mouth Disease and random other disease the livestock can contract over the years. The incidents are small in numbers and where of no major concerns that have ever developed from them.</p>	
Probability	<p>Disease/pests are present in many other areas of the country/world. Many disease/pests are easily transmitted therefore the probability of introduction is high. Iowa leads the nation in production of pork, soybeans, eggs, and corn and is among the leading beef production states. Human disease outbreaks can have an economic impact on agricultural products as well as recently seen with the H1N1 scare and the resulting aversion to pork products or even eradication of pigs in areas around the world. With the millions of animals and animal products that move across our state yearly, probability is high.</p> <p>The SHMT analysis evaluated the probability that an animal/crop/plant disease infestation is highly likely to occur in Iowa next year with more than a 60% chance. Iowa is a productive agricultural state producing both crop and livestock. Due to the severity of potential agricultural losses this hazard ranked high. The committee discussed the fact that a large population of livestock and crops exist throughout the county (and jurisdictions) certainly places them at risk for Animal/Plant/Crop disease. However, it is the committee’s belief that with current regulations, laws, and chemicals/medication, it is unlikely that a large outbreak would occur to the extent it would affect the economy or public health in this area.</p>	<b>1</b>
Vulnerability	<p>The movement of people, animals, animal products, wildlife, plants, crops and potential disease/pest vectors could all cause the introduction of diseases/pests. Diseases/pests could also be introduced naturally, for example by hurricanes or jet streams. Emerging disease is also a threat such as West Nile Virus, new more virulent influenza strains, etc. Because many diseases/pests are not present in Iowa, our populations of animals, crops, and plants have no immunity and are highly susceptible.</p>	<b>1</b>
Maximum Threat	<p>The impact will vary by disease/pest and the type of animal/crop/plant infected/infested. When the United Kingdom faced an outbreak of Foot and Mouth Disease in 2001, the total economic loss to that</p>	<b>2</b>

	<p>country exceeded \$7 billion. This incident was one of the most economically significant historically, second only to World War II. Several states are currently dealing with an Emerald Ash Borer infestation and some threat now exists in northeastern Iowa along the Wisconsin-Iowa border. To date the state and federal governments have spent in excess of \$550 million to detect, delimit, control and eradicate the pest. Should the disease/pest have public health implications, the economic and social impact would be even greater. A changing climate increases the risk of pests and diseases spreading in agricultural sectors as well as in human populations.</p> <p>On average, the 699 acknowledged Monroe County farms have an annual agricultural product value of about <u>\$49,000</u>. (2007 Agricultural Census, USDA).</p>	
Severity of Impact	The severity will vary by disease/pest. The types of animals, crops, or plants affected will also significantly influence the severity. [This hazard element reflects the description in the State Hazard Mitigation Plan which does not break severity of impact out further than this.]	<b>2</b>
Speed of Onset	If the diseases / pests are highly infectious (many animals that are infected with disease can be transmitting disease before they show clinical signs), by the time they are discovered, they will likely have spread across the state or nation. This will put us at a severe disadvantage during response and recovery.	<b>1</b>
Hazard Worksheet Score		<b>8</b>
Composite Score		<b>19</b>

*Table 36: Monroe County Farm Statistics*

<b>Number of Farms</b>	
<b>Monroe County</b>	699
<b>Iowa</b>	90,655
<b>% of Iowa Farms in Monroe County</b>	0.90%
<b>Average Farm Size (acres)</b>	
<b>Monroe County</b>	354
<b>Iowa</b>	350
<b>% size of Monroe Co Farms to Iowa average</b>	70%
Source: USDA, National Agricultural Statistical Service, 2006	

Note: for the following terrorism-related hazards, caution is necessary in defining what constitutes an act of terrorism. Each profile includes a definition; however care in application is needed to determine when a particular incident is a criminal act or an act of terrorism. The reason for this concern is that the penalties for terrorism are potentially more severe and comprehensive than for criminal acts. There are appropriate applications of the more severe penalties but if they are applied to simple criminal activities, the effects may be unjustly extreme. U.S criminal and terrorism law takes precedence over this caution which is intended for use in simply profiling the terrorism-hazards locally.

Hazard	<b>Agro-Terrorism</b>	
Definition	<p><b>Agro-Terrorism:</b> An action causing intentional harm to an agricultural product or vandalism of an agricultural / animal related facility for the purposes of intimidation, coercion, or ransom. An example of this may be sabotaging crops or property of agro-businesses or farms that are seeking expansion or permits to open new facilities.</p>	Rating
Description	<p>This category covers a large variety of incidents from potential intentional introduction of disease; vandalism of facilities; theft of agricultural products, machinery, or chemicals; release of animals; and contamination of agricultural products. Depending upon the type of action taken, the implications will vary greatly. The common thread between these activities is the intention of causing fear in order for the perpetrators to obtain their objectives.</p>	
Historical Occurrence	<p>Incidents such as this have occurred in the state of Iowa. Over the past 10 years Iowa has experienced at least 10 incidents in which animal rights activists have vandalized or released animals in our agricultural facilities. Additionally, vandalism to agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products. There are frequent cases of theft of agricultural machinery, products, and chemicals. There have been no incidents in Monroe County or any participating jurisdiction that have documented Agro-Terrorism occurring in this region.</p>	<b>1</b>
Probability	<p>The farms in Monroe County are smaller than the Iowa average and less than 1% of all of Iowa’s farms located in the county (see <i>Table 37: Monroe County Farm Statistics</i>). This makes Monroe County less attractive than other parts of Iowa for significant agro-terrorist activities, however local vandalism may still occur out of local issues. With no recent history of such event, it is unlikely to have an incident</p>	<b>1</b>



	in Monroe County or any of the participating jurisdictions.	
Vulnerability	Usually these incidents have a limited area of impact. They may involve one herd of animals, one facility, one field of crops, etc. In most cases, the human impact would be limited to a small proportion of the population.	<b>2</b>
Maximum Threat	Usually these incidents have a limited area of impact. They may involve one herd of animals, one facility, one field of crops, etc.	<b>2</b>
Severity of Impact	In most cases the severity of impact would be limited.	<b>2</b>
Speed of Onset	In most incidents we would have no warning time. The only exception would be if someone called in a threat.	<b>2</b>
Hazard Worksheet Score		<b>10</b>
Composite Score		<b>22</b>

*Table 37: Monroe County Farm Statistics*

Number of Farms	
Monroe County	699
Iowa	90,655
% of Iowa Farms in Monroe County	0.90%

Average Farm Size	
Monroe County	354
Iowa	350
% size of Monroe Farms to Iowa average	70%

Source: USDA, National Agricultural Statistical Service

Hazard	<b>Biological Terrorism</b>		
Definition	<b>Biological Terrorism:</b> Use of biological agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom.		
Description	<p>Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point or line sources such as munitions, covert deposits and moving sprayers. Biological agents may pose viable threats from hours to years depending upon the agent and the conditions in which it exits.</p> <p>Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infections can be spread via human or animal vectors. Argo-terrorism is the direct, generally covert contamination of food supplies or introduction of pests or disease agents to crops and livestock.</p>		Rating
Historical Occurrence	Iowa has not been immune to acts of terrorism or sabotage. The state has experienced many threats in the past. Most incidents have been limited to reported “suspect” powders, actual threats and hoaxes. Beginning in October 2001, following the original “Amerithrax” scares, we experienced a large number of responses for suspicious powders. Following the development of a threat assessment/response protocol the number of responses was reduced, and now averages a few responses each month. No reported Biological Terrorism has occurred in Albia, Lovila, Melrose or throughout Monroe County.		<b>1</b>
Probability	<p>Internationally, such acts have, unfortunately, become quite commonplace, as various religious, ethnic, and nationalistic groups have attempted to alter and dictate political and social agendas, seek revenge for perceived past wrongdoing, or intentionally disrupt the political, social, and economic infrastructure of individual businesses, units of government, or nations. Unfortunately, there will never be a way to totally eliminate all types of these clandestine activities. Persons inclined to cause death and destruction, are often capable of finding a way to carry out their plans. As perpetrators of terrorism improve their ability to collect information, raise money and issue rhetoric, implementation of effective counter measures becomes even more important.</p> <p>Monroe County may be unlikely to be an attractive target for biological terrorism due to its relatively small population. However, Monroe</p>		<b>1</b>

	County is within 200 miles to at least two major cities, Kansas City and Des Moines.	
Vulnerability	Innocent people are often victims of terrorist activity targeted at certain organizations and activities. Based on the method of delivery, the general public is vulnerable to bioterrorism. State and local agencies developed the Biological Chemical Threat Agent (BCTA) Protocol Model to guide response agencies. The American public is not vaccinated for many of the agents used as weapons by terrorist groups. Iowa vaccinated volunteers against smallpox at 15 hospitals in early 2003. The U.S. Postal Service installed Bio-Detection Systems (BDS) in 2005-2006 in several postal sorting facilities in Iowa, to address early detection since many of the threats have used the postal system for delivery.	<b>2</b>
Maximum Threat	Because of the characteristics of the weapons terrorists use, the area can be limited to a room, building, or the entire community. Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread via wind and water. Infections can be spread via human or animal vectors. Because of the variables described above, the geographic extent can become quite broad before the incident is recognized as a terrorist act.	<b>2</b>
Severity of Impact	The intent of the terrorist is to cause fear based on illness, injury, and death. A bioterrorism incident would likely result in illness at a minimum, with multiple deaths and long-term health problems as a worst-case. In addition to persons exposed to the release of biological agents, first responders would likely be at risk without knowing the nature of the incident. Depending on the nature of the agent used, environmental contamination may occur thus potentially posing a longer-term threat of exposure to humans and animals.	<b>2</b>
Speed of Onset	Acts of terrorism can be immediate and often come after little or no warning. There are occasions when terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Terrorists threaten people and facilities through "bomb threats" and other scare tactics. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.	<b>2</b>
Hazard Worksheet Score		<b>10</b>
Composite Score		<b>13</b>

Hazard	<b>Chemical Terrorism</b>	
Definition	<b>Chemical Terrorism:</b> Use or threat of chemical agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom.	
Description	Liquid/aerosol, or dry contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/containers; or munitions. Other dispersal methods may include intentional releases from petro-chemical facilities or intentional releases during rail or truck transportation. Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Contamination can be carried out of the initial target area by persons, vehicles, water and wind. Chemicals may be corrosive or otherwise damaging over time if not mitigated.	
Historical Occurrence	Iowa has not been immune to acts of terrorism or sabotage. The chemical terrorism history, fortunately, has been limited. The state has experienced at least one event in 2005, where a subject mailed “rat poison” to a number of state and local officials. One of the letters was torn open in a mail sorting machine in Des Moines, that lead to the closure of the Main Post Office and the Emergency Room of Mercy Medical Center. Iowa experienced at least one event where subjects broke into a city’s water supply and it was suspected that chemicals may have been deposited in the water supply. Iowa experienced many releases of anhydrous ammonia by persons engaged in clandestine drug manufacturing. There have been no incidents in Monroe County or any participating jurisdiction that have documented Chemical Terrorism occurring in this region.	<b>1</b>
Probability	<p>Unfortunately, there will never be a way to totally eliminate all types of these clandestine activities. Persons inclined to cause death and destruction is usually capable of finding a way to carry out their plans. As perpetrators of terrorism improve their ability to collect information, raise money and issue rhetoric, implementation of effective counter measures becomes even more important.</p> <p>Given that Monroe County communities are relatively small size and relative lack of regionally significant political, military, or social facilities, there is unlikely to be much threat of direct chemical attack.</p>	<b>1</b>

Rating

Vulnerability	Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Shielding in the form of sheltering in place can protect people and property from harmful effects. There are a limited number of antidotes available to reduce the vulnerability from chemical agents.	2
Maximum Threat	Contamination can be carried out of the initial target area by persons, vehicles, water and wind. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. The extent is largely determined by the type of chemical, the method of dispersal, and the conditions at the time it is released.	2
Severity of Impact	Because the public may be the target of the attack, the terrorists will try to maximize injuries, illnesses, and deaths among the population. First responders may not be aware of the nature of the attack and thus may be exposed to harm as well. The economic impacts of a chemical attack may be more significant than the bodily harm caused. This is due to the need to evacuate and time needed to decontaminate property that is exposed to the chemicals.	2
Speed of Onset	Acts of terrorism can be immediate and often come after little or no warning. There are occasions where terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.	2
Hazard Worksheet Score		<b>10</b>
Composite Score		<b>14</b>

Hazard	<b>Fixed Hazardous Materials</b>	Rating
Definition	<p><b>Hazardous Materials:</b> Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants.</p> <p><b>Methamphetamine Lab:</b> Methamphetamine is made mostly from common household ingredients. When these ingredients are mixed and "cooked" together they make a dangerous drug and potentially harmful chemical</p>	

	<p>mixtures that can remain on household surfaces for months or years after "cooking" is over. There may be health effects in people exposed to lab chemicals before, during and after the drug-making process. Therefore, each drug lab is a potential hazardous waste site, requiring evaluation, and possibly cleanup, by hazardous waste (HazMat) professionals.</p>	
<p>Description</p>	<p>A fixed hazardous materials incident is the accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during production or handling at a fixed facility. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever-increasing types and quantities, each year, over 1,000 new synthetic chemicals are introduced, and as many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals". Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.</p> <p>During the period 2002-2005, fixed facilities experienced 1,888 incidents according to the Iowa Department Natural Resources (DNR). Fixed facility releases accounted for about 71% of total releases. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic activities. This situation is made worse by the density of people and hazardous materials in Iowa.</p> <p>A large amount of hazardous waste is created as a by-product of the illegal production of methamphetamine. These meth lab sites contain much hazardous waste and require specialized teams and equipment for proper clean-up and disposal of the waste materials. Meth labs are of particular concern in rural areas where smaller populations and remote places reduce the risk of being caught for meth producers.</p> <p>There are no Superfund Sites in Monroe County for various hazardous materials releases on file with the EPA.</p>	
<p>Historical Occurrence</p>	<p>Of the 20 hazardous materials releases on file with the DNR between 2000 and 2008, two were transportation related and are addressed in the respective hazard profile. Nine of the incidents involve petroleum products but none are related to illegal dumping.</p> <p>There has been five meth labs discovered in Monroe County in the last two years (see Appendix BB: Iowa Meth Labs by County). The manufacturing</p>	<p><b>4</b></p>

plants, automobile repair, and gas stations are potential sites for hazardous materials incidents in Monroe County.

Spill Date	Town	Incident Type	Amount spilled
4/17/09	Eddyville	Fermentation Broth	9,000 gal
12/1/08	Eddyville	Anhydrous Ammonia	135 lbs
11/27/08	Melrose	Manure	1000 gal
11/10/08	Eddyville	Hydrochloric Acid	0cf
8/13/08	Eddyville	Anhydrous Ammonia	43 lbs
6/2/08	Albia	Ag Lime	5,200 gal
4/28/08	Eddyville	Wastewater	1E +06 gal
1/28/08	Eddyville	Chlorine Bleach	1500 gal
12/2/08	Eddyville	Fermentation Broth	2000 gal
11/7/08	Eddyville	Fructose	153,000 gal
8/15/08	Eddyville	Fermentation Broth	2000 gal
3/19/08	Moravia	Manure	1000 gal
9/4/07	Eddyville	Steep Water	500 gal
8/4/06	Eddyville	Ammonia	2700 gal
7/28/06	Rural co	Sludge from water water	1000 gal
7/24/06	Eddyville	Raw waste water	1 unk
4/4/05	Eddyville	Anhydrous Ammonia	810 lbs
11/12/04	Eddyville	Steep Water	1000 gal
11/11/03	Eddyville	Cracked corn & process water	3000 gal
11/11/03	Eddyville	Lysine/Process Water	1000 gal
6/25/03	Eddyville	Fermentation Broth	----
4/3/03	Albia	Manure	2000 gal
11/13/03	Albia	Anhydrous Ammonia	---
9/10/03	Albia	Anhydrous Ammonia	1900 gal
9/1/02	Eddyville	Fermentation Broth	9000 gal
1/30/02	Eddyville	Process water	1700 gal
11/8/01	Eddyville	Beet Molasses	515 gal
10/17/00	Eddyville	Ammonia	3589 lbs
8/26/00	Eddyville	Lite Steep water	10,000 gal
8/25/00	Eddyville	Corn mash	1,000 gal
4/15/00	Lovilia	Transformer oil/PCB	2 gal

Probability

Anecdotal evidence suggests that meth use and production is not uncommon in Monroe County. Chemical spills can occur anytime there is a traffic accident as oil, gasoline, and other fluids used in vehicles are released. Dumping of household cleaners, paints, and old oil can happen at any time and are more likely in areas where people do not understand hazardous materials laws.

**4**

	<p>A number of homes (57.6%) in Monroe County use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.</p>	
<p>Vulnerability</p>	<p>A hazardous materials accident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water.</p> <p>Facilities are required to have an off-site consequence plan that addresses the population of the surrounding area. Responding personnel are required to be trained to HAZMAT Operations Level to respond to the scene, and those personnel that come into direct contact with the substances released are required to have HAZMAT Technician level training. Albia hosts an industrial site that is home to such businesses as RELCO, A.Y.M, Chicago Rivet &amp; Machine, Superior Machine, Quiktron, L &amp; S Tools, Iowa Aluminum, Hawkeye Molding, Walker Chemical Corp and Kness Manufacturing. These industries combined off employment to 550 individuals in this area.</p> <p>Two large industries are located in the far Northeast corner of Monroe county. The physical addresses place both of them near the City of Eddyville but on right on the edge of the Monroe County line. The Cargill plant offers employment to more than 550 residents from a large area. The Cargill plant is a processing plant that produces pet food and various other products for human consumption. Ajinomoto Heartland is global leaders of feed-grade amino acid manufacturing. Representing Ajinomoto Animal Nutrition in North America, Ajinomoto Heartland LLC manufactures and distributes cost effective feed-grade amino acids and is the frontrunner in amino acid nutritional research and technical expertise. This industry employs approximately 75 employees. Ajinomoto Food Ingredients produces supplemental food ingredients for human consumption. This division employs about 100 individuals. Each of these</p>	<p><b>2</b></p>



	<p>sites has a personnel member that has HAZMAT training and certification. Each site offers a safety protocol and evacuation plan for its employees. The emergency procedures are held confidential at each location and both were reluctant to give any information. Local emergency personnel have been working to build a relationship with the site managers so that they could better support the facility in the event of an emergency. This has been a lengthy and difficult process but there are discussions of hosting a joint meeting with intentions of establishing a better support system for each location.</p>	
<p>Maximum Threat</p>	<p>The maximum threat of a hazardous material spill or event would depend upon the size of the spill. A large spill or leak of a hazardous gas could result in the evacuation of entire neighborhoods or the rerouting of the local roads, highways, and/or the interstate.</p> <p>Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.</p>	<p><b>1</b></p>
<p>Severity of Impact</p>	<ul style="list-style-type: none"> <li>A. The release of some toxic gases may cause immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Some chemicals may cause painful and damaging burns to skin if they come in direct contact with your body.</li> <li>B. Specialized training is needed to respond to these types of incidents. If inadequately trained personnel attempt to respond, the impacts could be the same as those for the general public exposed to the toxic materials. Proper training and equipment greatly reduce the risk to response personnel.</li> <li>C. Damage is usually limited to the immediate property involved. Proper decontamination is needed before the facilities go back in service.</li> <li>D. Contaminated water resources may be unsafe and unusable, depending on the amount of contaminant.</li> <li>E. Contamination of air, ground, or water may result in harm to fish, wildlife, livestock, and crops. The release of hazardous materials into the environment may cause debilitation, disease, or birth defects over a long period of time.</li> <li>F. Loss of livestock and crops may lead to economic hardships within the community.</li> </ul>	<p><b>2</b></p>

	G. Safe and timely response will greatly limit any damage to the jurisdiction’s reputation. Proper warning and public information before, during, and after the incident can also limit reputation damage.	
Speed of Onset	Most hazardous materials events happen suddenly and unexpectedly from transportation or other accidents. When managed properly under regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.	<b>4</b>
Hazard Worksheet Score		<b>17</b>
Composite Score		<b>32</b>

Additional Resources:	
National Priority Sites in Iowa	<a href="http://www.epa.gov/superfund/sites/npl/ia.htm">http://www.epa.gov/superfund/sites/npl/ia.htm</a>
US EPA Enviromapper	<a href="http://www.epa.gov/enviro/html/em/">http://www.epa.gov/enviro/html/em/</a>
IA DNR Spill Response	<a href="http://www.iowadnr.gov/spills/data.html">http://www.iowadnr.gov/spills/data.html</a>

Hazard	Pipeline Incident	Rating
Definition	<b>Pipeline Incident:</b> A break in a pipeline creating a potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation.	
Description	A Pipeline Incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.  According to the Iowa Utilities Board (IUB), 186 pipeline accidents, incidents, or service outages were reported between 2000 and 2005,	

	<p>resulting in a total of 29 injuries and six (6) fatalities. Across the nation, hundreds of deaths and many more injuries have been caused by underground pipeline incidents. The vast majority of pipeline incidents that occur are caused by third party damage to the pipeline, often due to construction or some other activity that involves trenching or digging operations. With development occurring at an unprecedented rate and the ground becoming more and more congested with utilities, the probability of an underground pipeline incident is significant.</p> <p>Petroleum and natural gas pipeline accidents occur with some regularity, but they usually have a limited impact and are quickly and adequately handled by pipeline company emergency crews and local and state responders. Pipeline operators are required to coordinate all safety preparedness and response activities with the communities. Continuing to plan, train, and exercise emergency procedures help to limit the occurrence and severity of incidents.</p> <p>The SHMT evaluated the probability a Pipeline Incident will occur in Iowa is more than a 60% chance in the next year.</p> <p>Iowa is served by many high pressure pipelines to residents and industries.</p>	
<p>Historical Occurrence</p>	<p>According to the National Transportation Safety Board (NTSB), there have been no pipeline incidents in Monroe County since 1969. However, there have been pipeline explosions and fires in Iowa during this time period.</p>	<p><b>1</b></p>
<p>Probability</p>	<p>The vast majority of pipeline incidents that occur are caused by third-party damage to the pipeline, often due to construction or some other activity that involves trenching or digging operations. With development occurring at an unprecedented rate and the ground becoming more and more congested with utilities, the probability of an underground pipeline incident is significant. The committee members believe that the highest probability of an accident in this county could occur by a farmer hitting a line while building a fence.</p> <p>Petroleum and natural gas pipeline accidents occur with some regularity, but they usually have a limited impact and are quickly and adequately handled by pipeline company emergency crews and local and state responders. Pipeline operators are required to coordinate all safety preparedness and response activities with the communities.</p>	<p><b>2</b></p>

	<p>Planning, training, and exercising of emergency procedures with all involved parties help to limit the occurrence and severity of incidents.</p>	
Vulnerability	<p>About 5 interstate pipelines operate in the state under federal pipeline jurisdiction. There are many high-pressure gas mains throughout the state which supply residential and industrial users. People and property with pipelines on their land or nearby are the most at risk. People excavating earth near a pipeline are also at risk. Whether the greater hazard is posed to those upwind or downwind from a site depends on the product spilled, for example - natural gas is lighter than air. Private homes and business served by natural gas have smaller diameter pipelines connected to their structure.</p> <p>The underground pipelines cross public streets, roads, and highways as well as streams. Iowa’s natural environment is also vulnerable to contamination from an underground pipeline incident. One natural gas pipeline runs parallel to Highway 5 and enters the south edge of the City of Albia. This line extends approximately 10 miles from the south edge of the county into Albia. Another natural gas line enters the county from the north (adjacent to Highway 5) for 2 miles in order to provide service to the city of Lovilia.</p>	<b>1</b>
Maximum Threat	<p>Though often overlooked, petroleum and natural gas pipelines pose a real threat in the community. Most incidents affect only the area directly above or near the damaged pipeline. Depending on the size of pipeline and amount of product released, the extent of impact could be several hundred feet in diameter. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure. Pipelines have automatic shutoff valves installed so that damaged sections can be isolated and the volume of product escaping can be limited. Identification and caution signs are posted wherever pipelines pass under roads, streams, fence lines, or at any aboveground utilities.</p>	<b>1</b>
Severity of Impact	<p>All petroleum liquids pose dangers from fire or explosion and the fire may produce poisonous or irritating gasses. Toxic fumes and direct contact can cause health hazards. Vapor clouds can travel a distance and settle in low-lying areas where the fumes may overcome people and animals. Released products should be treated as any other hazardous material. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure.</p>	<b>3</b>

	Severity of impact could range from localized fire and hazardous fumes to closure of the county and state highways that accesses each of the three communities.	
Speed of Onset	<p>A pipeline incident may occur suddenly, but sight, sound, and smell can alert individuals that there may have been damage done to a pipeline in the area.</p> <p>Products may bubble up from the ground or collect in low-lying areas, a roaring or hissing noise may be heard, and most products give off a distinct odor. These warning signs can alert individuals not to use any devices that may act as ignition sources and cause a fire or explosion.</p>	<b>4</b>
Hazard Worksheet Score		<b>12</b>
Composite Score		<b>22</b>

Additional Resources:	
NTSB Pipeline Accidents	<a href="http://www.nts.gov/Publictn/P_Acc.htm">http://www.nts.gov/Publictn/P_Acc.htm</a>
Note LUST sites: <a href="http://programs.iowadnr.gov/ims/website/lust_sites/viewer.htm">http://programs.iowadnr.gov/ims/website/lust_sites/viewer.htm</a> for hazardous materials plus EPA release inventory? - <a href="http://www.iowadnr.com/mapping/index.html">http://www.iowadnr.com/mapping/index.html</a>	

## 5. Vulnerability Assessment

The vulnerability assessment describes the impact each identified hazard may have on the community to greater detail by identifying and quantifying populations, buildings, critical facilities, and other community assets. The assessment follows the methodology described in FEMA – How-To Guide #2: *Understanding Your Risks: Identifying hazards and Estimating Losses*.

This assessment was conducted based on the best available data and the significance of the hazard. Data sources included: Iowa Homeland Security and Emergency Management; Iowa Hazard Mitigation Plan, September 2007; and other agencies as cited in the body of this section.

The assessment will have 3 components of community assets (A), vulnerability by hazard (B), and land use/Development Trends (C).

### A. Community Assets

This section describes the assets at risk in Monroe County, including the total exposure to people and property, critical facilities, and infrastructure. It will also address other important assets in the county that may be at risk from natural hazards.

#### 1. Total Exposure of Population and Structures and Vulnerability

##### UNINCORPORATED COUNTY

The following tables provide information about Maximum Population and Building Exposure, Housing Units by community and age of housing in the Unincorporated Region.

Information on the maximum population and building exposure was provided by Monroe County. The information was gathered primarily through the assessor’s office and the 2000 US census. The maximum population and building exposure represents the count for the entire hazard area, not the numbers exposed in a single event.

The following table summarizes the maximum population and building exposure for events that the HMGP committee determined that could happen anywhere in the region. These hazards include: Windstorm/High wind event, severe winter storms, thunderstorms/lightning, hailstorms, tornado, earthquake and all forms of Terrorism.

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Unincorp	# in Planning Area	% in Planning Area	\$ in Unincorp area	\$ in Planning Area	% in Planning Area	# in Unincorp	# in Planning Area	% in Planning Area
Residential	843	843	100%	\$44,598,400.00	\$44,598,400.00	100%	3597	3597	100%
Commercial	99	99	100%	\$40,018,241.00	\$40,018,241.00	100%			100%
Industrial	120	120	100%	\$131,308,228.00	\$131,308,228.00	100%	-	-	-
Agricultural	905	905	100%	\$57,938,330.00	\$57,938,330.00	100%	-	-	-
Religious /	4	4	100%						

Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

**1. Hailstorm Vulnerability** - Hailstorms develop from severe thunderstorms and wide region can be vulnerable to such a storm. Although they occur in every state on the mainland, hailstorms occur primarily in the Midwestern states. Since 1961 there have been 34 recorded hail storms in Monroe County. The largest noted hailstorm occurred in Hiteman during May 2008. The storm produced 3.25 inch hail stones that created \$100,000 damage in personal property damage, as well as \$25,000 in crop damage. The cumulative damage of these events on property amounted to \$297 thousand and \$150 thousand in crop losses. The greatest risk in Monroe County is to crops and structures. Severe crop damage can occur as a result of storm with hail diameters of .8 inches. There is also a risk of injury to humans; however the risk of serious injury is slight. Damage to vehicles and structures is usually covered by private insurance.

**2. Tornado Vulnerability** – Monroe County is located in the path known as “Tornado Alley” in the United States in which tornadoes are most frequent. Tornado damage can be minimal from minor roof damage, broken glass, and windows to the extreme of total destruction. People living in manufactured homes are particularly vulnerable to extreme wind events or tornadoes. Older homes in deteriorating condition are also vulnerable, however there is no information about the number of homes needing rehabilitated. There are 843 housing units located in the unincorporated areas of the County. It was acknowledged by the HMGP committee that there are many variables that dictate the vulnerability of structures or injured people. These factors include wind speed, time on the ground, length/width of the cell, population density, building density, age & construction of buildings and time of day. It was determined regardless of the strength; the most vulnerable population is the elderly, very young, people with disabilities, mobile homes, and structures that are prior to 1950’s.

Population 65yrs & older	Population 18 years & younger	Population living below poverty guidelines	Residents living with a diagnosed disability
74	869	27	807

Number of Mobile Homes	Number of homes built prior to 1950		
11	741		2000 C ensus

**3. Wind Storm / High Wind Event Vulnerability** – High winds can cause minor damage to major damage to homes and other buildings. Outdoor furniture, trash cans, yard debris, out buildings and other materials in the immediate vicinity of homes can become air borne missiles

and dangerous to people and livestock. Loose shingles, broken tree limbs or trees down are also highly possible.

People living in mobile homes, homes that are built prior to building codes and homes in deteriorating conditions are particularly vulnerable to high winds. People in automobiles and campground are also at a greater risk. Generally an injury is minor and seldom is death associated with a wind storm.

Committee members discussed the most vulnerable locations as the campground at Lake Miami and the mobile homes located throughout the county. Also of critical concern is the aged (and possibly weak) housing structure in the area.

Number of Mobile Homes	Number of homes built prior to 1950	Number of Camp slots at Lake Miami	
11	741	25	2000 US Census

**4. Severe Winter Storm Vulnerability** – The entire planning area is vulnerable to the effects of severe winter storms. Winter storms tend to make driving more treacherous and can impact the response time of emergency vehicles. The probability of utility and infrastructure abruption or outages, increases during winter storms due to freezing rain accumulation on power lines. Elderly populations are especially vulnerable to the impacts of winter storms. Winter storms increase wear and tear on roadways also, but it is difficult to determine the amount of the expenses to maintain or recover from a storm.

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms. Businesses experience loss of income as a result of closure due to power outages. Overhead power lines and infrastructure are also vulnerable to damages from winter storms. The weight from of the ice accumulation creates damage to power lines, as well as, damage to the lines and equipment from falling trees and/or tree limbs due to the weight. Potential losses would include the cost of repair or replacement of damaged facilities and lost economic opportunities. Secondary effects of loss of power could include ruptured water pipes in homes without electricity. Public safety hazards also include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables with this hazard. The loss of use estimates are provided in the table below and were calculated using FEMA’s publication “*What is a Benefit? Guidance on Benefit-Cost Analysis of Hazard Mitigation Project, June 2009*”. The loss of use is provided in the heading s the loss of use cost per person per day of loss. The estimated loss of use provided for each jurisdiction represents the loss of service of the indicated utility for one day for 10 percent of the population. It is understood that in rural areas the typical loss of use may be for a longer period of time and a larger percentage of the population. These figures do not take into account the physical damage to utility equipment and infrastructure.



Jurisdiction	Population (2000)	Estimated Affected Population (10%)	Electric loss of use estimates @ \$128/person/day
Unincorporated	3675	368	\$47,040/day
	46%		

2000 US Census

It is difficult to estimate the precise totals of damage to Monroe County because of the widespread nature of severe winter storms. There have been 50 recorded snow and ice events that have included Monroe County since 1993 including freezing rain, snow, ice storms, and winter storms. Six deaths are associated with these events and property damage totaling \$41.94 million are recorded. In 1995 two snow events that affected Monroe County, were recorded for a larger part, or all of Iowa totaling \$65 million in property damage for all included areas.

Monroe County was affect twice in December 2007 by 2 separate ice storms. The combined loss for this area was more than \$150,000 in personal property.

Between February 1995 and January 1997, there have been nine recorded events of extreme wind chill and extreme cold that impacted Monroe County and the surrounding area. These 9 events are attributed for \$1.8 million in property damage, one death and no injuries.

The population most vulnerable and are most at risk to Severe Winter Storms are the elderly. The following table summarizes the number of residents that are over 65 years and what percentage of the county this comprises.

<i>Location</i>	<i>Population over 65yrs</i>	<i>Percentage of Population over 65yrs</i>
Unincorporated county	674	20%

2000 US Census

**5. Flash Flood Vulnerability** - The table below summarizes the maximum population and building exposure for flood events. The estimate of maximum population and building exposure based on an estimate of the Special Flood Hazard Areas of the unincorporated county. Monroe county LEPC specifically sites the locations of Middle Avery Creek along “Smokey Hollow”; White Creek Valley; and Cedar Creek Valley in the rural regions of the county is particularly vulnerable to flash flooding. Primary damage along these valleys results in roadway and agriculture damage. Also, Cedar Creek commonly experiences flash flooding as it flows north to south and crosses approximately 75% the county’s length. This creek can solely affect 5 villages

in the unincorporated region. There are structures in low lying areas along Cedar and White Creek. Cedar Creek extends from the west county line to near the middle of Monroe County, then northwest to the north county line. Along this path, potential flash flooding could affect 12 county bridges, 1 road area, and 1 state highway bridge. White Creek extends from the west county line to the northeast and joins Cedar Creek. There are approximately 8 county bridges that could be impacted and 2 possible road areas that could experience a slide potential.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Flash Flooding</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	84	\$4,459,840	359
Agricultural Buildings	90	\$5,793,833	
Commercial	9	\$4,001,824	
Industrial	12	\$13,130,822	

**6. Extreme Heat Vulnerability** - The table below summarizes the maximum population and building exposure to Extreme Heat. The health of the public and the economic impact on the agricultural community are the primary concerns with extreme heat. The segments of the public most at risk from extreme heat are the elderly, the very young, and individuals living below the poverty line. The estimated number of affected people in the table below is derived from the 2000 US census. Those included in this calculation are residents over 65 years, children under 5 years, individuals living below the poverty line and people living with a diagnosed disability. Economic impact on the agricultural sector could result from the damage to animals and crops. Livestock is particularly vulnerable to the effects of the extreme heat and there are approximately 30,000 cattle and 14,000 hogs. Roads, bridges, and railroad tracks are also susceptible to damage from extreme heat. The HMGP committee believes that the major effect of an extreme heat will be on livestock and crops. Livestock is particularly vulnerable. The 2007 Agricultural Census reports that the estimated market value of all livestock, poultry, and products in Monroe County is \$21.7 million. Transportation facilities are also vulnerable to extreme heat. Most common type of damage is road buckles; however Monroe County has not tracked the damage expenses directly related to this hazard.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Extreme Heat</b>			
<b>Population 65yrs &amp; older</b>	<b>Population 5 years &amp; younger</b>	<b>Population living below poverty guidelines</b>	<b>Residents living with a diagnosed disability</b>
674	869	27	807

**7. Dam Failure Vulnerability** - The following chart summarizes the maximum population and building exposure to dam failure. Dam failure is the uncontrolled release of impounded water resulting in downstream flooding which can affect life and property. Flooding, earthquakes, blockages, lack of maintenance, improper operation and poor construction, vandalism, or terrorism cause dam failures. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation and recreation. The most direct impact of a dam failure of Lake Miami would be one a section of the unincorporated region of Monroe County. It is also recognized as a “Significant Hazard Dam” in the State of Iowa Mitigation plan. A significant hazard dam is determined if it’s located in an area where failure may dam failure may damage isolated homes or cabins, industrial/commercial buildings, moderately traveled roads or railroads, interrupts major utility services, but without substantial risk of loss of human life. In addition, structures where the dam and its impoundment are of themselves of public importance, such as dams associated with public water supply systems, public recreation, etc. The topography of the area between Albia and the lake would dissipate the water. The only structure at risk of damage would be a rural bridge located downstream.

There are 45 low hazard dams identified throughout the county, but primary damage would occur to the unincorporated region of the county. A Low Hazard dam is defined if it is located in an area where damages from a failure would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands and lesser used roads and where loss of human life is considered unlikely. Maximum risk would be to the roadways and bridges throughout the county. For example, a breach of Albia Reservoir dam would release water to a rural region of the county. A larger concern would be the impact that could occur to highway 34 and a few rural homes.

<i>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Dam Failure</i>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	84	\$4,459,840	360
Agricultural Buildings	90	\$5,793,833	
Commercial	9	\$4,001,824	
Industrial	12	\$13,130,822	

**8. Drought Vulnerability** - Droughts can be spotty or widespread and last from weeks to a period of years. A prolonged drought can have serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops

or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

A severe drought, such as the event in 1988-1990 would have the greatest impact on agriculture crops, livestock, wildlife, and stream flows, as well as, the entire community. The agricultural would be the most severely impacted. Increased demand for water and electricity could result in shortages and rationing. The number and severity of fires may also increase.

The result of the drought on the economic impact would depend on the severity and length of the drought. A severe drought would have the greatest impact, but any reduction in agricultural income could result in reduced revenues for the agricultural and retail and service sectors. According to the 2007 Agricultural Census, Monroe County had 85,537 harvested acres of land in farms in Monroe County to account for approximately 43% of the 201,204 acres of land on farmsteads. State-wide drought damages noted in the NCDC database range from % of the crop damaged. The committee noted that these are statewide numbers and include the central section of the state which was the most severely damage

Droughts rarely result in the loss of life, although the high heats that contribute to the droughts may also contribute to heat related illnesses and even death. In addition, property damage is not a direct impact of droughts, but drought conditions that may increase the fire hazard could be an indirect impact.

**9. Sink Hole Vulnerability** - The table below displays the maximum population and building exposure at risk with sink holes. In the late 1880' and the turn of the century there were as many as 288 coal mines operating throughout Monroe County ("**Historical Sketch Book of Albia & Monroe County**", Albia Centennial Corp 1859-1959.) Historical data collected gives estimated locations of such mines but there is no precise mapping to be able to identify target areas. It is known that mines were in operation near the now un-incorporated towns of Hiteman, Avery and Fredric. There is also documentation of eleven (11) mines in the outer lying areas of Albia in the rural region of the county.

Sinkholes, also known as subsidence, come in two primary forms in Iowa, Karst subsidence and Mine subsidence. Mines subsidence occurs when a mine or part of a mine collapses causing surface land to create a basin or hole. Karst subsidence occurs as water dissolves underlying rock creating a gap that ultimately collapses. Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has a potential impact on groundwater quality.

The prevalence of mines under a large proportion of the communities provides the potential of large areas within the county being damaged by mine cave ins. The Iowa Department of Natural Resources monitors and maps sinkholes and mines in Iowa. Not all of the mines under Monroe County are fully mapped; the extents of some mines are estimated. Based on these mapping limitations, the condition of at least some of the mines is presumably not fully known.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Sink Holes</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	253	\$13,349,520	1079
Agricultural Buildings	272	\$17,381,499	
Commercial	30	\$1,200,547	
Industrial	36	\$39,392,468	

**10. River Flooding Vulnerability** - The 100 year floodplain estimates that 4.7% of the county is located in this potential flood zone (“**A HAZUA-MH Assessment of Iowa’s Vulnerability to Flooding**”). Nearly all of this area of concern is located in the rural region of the county. The most vulnerable regions of the unincorporated community is Hiteman of greatest concern because it lies just on the outer edge of the 100 year flood plain. Also at risk are the seasonal residents that reside in the regions of Green Acres, Lazy Daz Ranch, and Lazy Daz Ranch Estates because of their location near the tributaries that lead into the adjacent tail waters of Lake Rathbun. The following chart displays effects of river flooding. The Monroe County 100 year estimated flood plain map is in Appendix T. The estimate of population and building exposure and damage estimates are based on the estimates prepared by the Monroe County Engineer and the HMGP committee. Past flooding events of 2008 and 2010 have primarily affected the roads and agricultural land. There are no repetitive loss properties identified at this time.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure River Flooding</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	84	\$4,459,840	360
Agricultural Buildings	90	\$5,793,833	
Commercial	9	\$4,001,824	
Industrial	12	\$13,130,822	

**11. Radon or Lead Vulnerability** - The maximum population and building exposure related to the concerns of Radon or Lead are shown below. Sinks holes can place an estimated 15% to 20% of homes in Monroe County have elevated levels of Radon so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. Approximately 55% of the residence in the rural region of Monroe County date prior to 1970 and this places them at a higher risk of containing Lead. The mobile home park of “Halley’s” is included in this inventory due to the age of the structures.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Radon or Lead</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	464	\$24,529,120	1978
Agricultural Buildings	453	\$28,969,165	
Commercial	49	\$20,009,120	
Industrial	60	\$65,654,114	

**12. Grass or Wildfire Vulnerability** - The table below summarized the maximum population and building exposure to Grass or Wildfire. Older structures with dated electrical systems that are not built to fire codes are at a particular risk. When a fire is occurring, it was acknowledged by the HMGP committee, that elderly, children and people with disabilities are at greatest risk of death due to the fire. However, the unincorporated region has a low population density and the risk is very low. Agricultural land where CRP land is burned and rural areas where debris is burned are very vulnerable to a Grass or Wildfire. There have been no recorded grass or wildfires in the NCDC database in Monroe County currently; however the risk does exist especially if droughts affect the area. Anecdotal evidence suggests that there have been grass or wildfires in Monroe County despite the lack of documentation. Committee members spoke with their respective fire departments and discovered that many have heard stories of Grass fires long ago but none are able to recall recent occurrences within the past 20 years or find documentation to support. The committee did agree that agricultural areas where CRP land is burned, rural areas where debris is burned and the wild land-urban interface areas are the most vulnerable. Of the approximate 201,204 acres in farms, approximately 18% is conservation and recreational areas. The HMPG committee estimated approximately 50% of residential structures, commercial structures, and industrial structures are in the Grass or Wildfire Hazard Area.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Grass or Wildlife Vulnerability</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	422	\$22,299,200	1790
Agricultural Buildings	453	\$28,969,165	
Commercial	50	\$20,009,121	
Industrial	60	\$65,654,114	

**13. Waterway Incident Vulnerability** - Risk of a waterway incident can occur in many locations throughout the un-incorporated region of Monroe County and the following chart displays the maximum population at risk (Source 2000 US Census). There are numerous farm ponds, seven creeks, Lake Miami, and near-by Lake Rathbun that has tail waters extending into Monroe County. A drowning or contamination spill has the potential of occurring at any of these. The seasonal residents of Lazy Daz Ranch and Green Acres could be affected by a waterway incident because the proximity to tributaries and tail waters of Lake Rathbun.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Waterway Incident 2000 US Census</b>				
<b>Total Population</b>	<b>Population 65yrs &amp; older</b>	<b>Population 18 years &amp; younger</b>	<b>Population living below poverty guidelines</b>	<b>Residents living with a diagnosed disability</b>
3597	674	869	27	807

**14. Rail Transportation Incident Vulnerability** - Maximum Population and building exposure for rail transportation incident is displayed below. Multiple rail lines in the unincorporated region of Monroe County place many at risk in the event of a rail transportation incident and the maximum population and building exposures are show in the table below. There are three railroad companies that operate lines in Monroe County: BNSF, APNC, and IMRL. The IMRL crosses the southeast corner of rural Monroe County near the un-incorporated communities of Foster and Brompton. APNC’s rail line enters the county from the south and runs parallel to highway 5 into the City of Albia only affecting the unincorporated area of Selection. BNSF hosts the highest miles of rail line throughout Monroe County. There are 5 rail lines that exit the RELCO rail yard in Albia. Three BNSF lines extend to the northeast region of the county to affect the unincorporated communities Maxon, Avery, Lockman, and Frederic.

One BNSF line parallels highway 5 to the northern boundary of the Monroe County line through the communities of Lovilia and Hagerty. The remaining BNSF rail line directs west from Albia to the south edge of Melrose and exits parallel to highway 34 at the west limit of Monroe/Lucas county line. The communities Halpin, Tower Station, and Tyrone are also affected by this line. There are numerous crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely.

<i>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Rail Transportation Incident</i>			
Type of Structure	# of Structures	Value of Structures	# of People
Residential	253	\$13,379,520	1079
Agricultural Buildings	272	\$17,381,499	
Commercial	30	\$1,200,547	
Industrial	36	\$39,392,468	

**15. Human Disease Incident & Human Disease Pandemic Vulnerability** – An

incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. A pandemic human disease is defined as a disease that has spread around the world to many people. The word, “pandemic”, means that a disease has caused illness in a person on nearly every continent. Many diseases throughout the history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy. Considering that the manner that the diseases can spread so quickly, all residents can be considered at risk, however, the most vulnerable population considered are the elderly, youth and disabled residents.

The individuals that travel internationally and have high exposure to potential vectors of disease are the most susceptible. Greater than 20% of Iowa’s population is considered high risk. The elderly population of Monroe County makes up nearly 19% according to the 2000 Census with a youth population (under age 18) of nearly 27%, about 512 of which are under 5. About 46% of Monroe County may be considered at high risk based on age alone.



Particular locations that are susceptible to such diseases would include assisted care facilities and school districts. There are 4 retirement homes or assisted care facilities in Monroe County, however, none of them are located in the unincorporated regions of Monroe County. The children attending Albia Community Schools are located throughout the region and 869 of them reside in the unincorporated region of this county.

Monroe County (Unincorporated) Maximum Population & Building Exposure Human Disease Incident & Human Disease Pandemic 2000 US Census				
Location	# of residents with Disabilities	# of residents over 65 yrs	# of residents 18yrs and under	Total # of Vulnerable People
Unincorp	807	674	869	2350

**16. Energy Failure Vulnerability** - An extended interruption of service electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very well developed, local shortages can quickly be covered. Storm-related Energy Failures may impact a few homes or the entire community and surrounding areas. Response to such disruptions depends on the severity of the damage and the availability of staff to repair the system. During the holiday season, staff availability may be limited. Due to the rural population and the relative isolation of Albia, Melrose, and Lovilia in relation to more urbanized parts of Iowa, Monroe County residents may face longer periods without energy. Much like the storms in the winter of 2007, Monroe County and all jurisdictions profiled experienced a widespread energy failure due to a severe winter storm. The area experienced this energy crisis for 2-3 days in the jurisdictions and 5-6 days in the un-incorporated regions. The hospital operated off of generators, one shelter site had a generator and residents took shelter with each other.

**17. Transportation of Radiological Material Vulnerability** - The maximum population and building exposure to transportation of radiological materials is shown in the chart below.

The county has three state highways that are identified in the county. Highway 5 transports traffic north and south across the county and Highway 34 extends east and west through Monroe county. State Highway 137 branches off of highway 5 on the north edge of Albia and continues northeasterly to the city of Eddyville. Additional risks of transportation of radiological material can occur along the rail lines in Monroe County. There are three railroad companies that operate lines in Monroe County: BNSF, APNC, and IMRL. They total approximately 90 miles of rail line throughout the county. Industries located in the Northeast region of the county have potential exposure due to State Highway 137 that is adjacent each property. It is estimated that only the north half of each location (that closest the roadway) would be affected.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Transportation Radiological Material</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	42	\$2,229,920	180
Agricultural Buildings	45	\$2,896,917	
Commercial	5	\$2,000,912	
Industrial	6	\$6,565,411	

**18. Air Transportation Incident Vulnerability** - Maximum population and building exposure to an air transportation incident. Albia Municipal Airport is owned and operated by the City of Albia. It is described as a “Basic Service Airport” by the National Plan of Integrated Airport System (NPIAS). It is located in the unincorporated area just southeast of Albia.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Air Transportation Incident</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	42	\$2,229,920	180
Agricultural Buildings	45	\$2,896,917	
Commercial	5	\$2,000,912	
Industrial	6	\$6,565,411	

**19. Highway Transportation Incident Vulnerability** - is displayed below. The chart displays the number of structures that are located within 50 yards of a highway and could

potentially be affected by a Highway Transportation Incident. Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has three state highways that are identified in the county. Highway 5 transports traffic north and south across the county and Highway 34 extends east and west through Monroe county. State Highway 137 branches off of highway 5 on the north edge of Albia and continues northeasterly to the city of Eddyville. More than 20% of the serious accidents in Monroe County have occurred at intersections between 2004 and 2008. During that time, 30% of the accidents had be speed related.

<i>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Highway Transportation Incident</i>			
Type of Structure	# of Structures	Value of Structures	
Residential	253	\$13,379,520	
Agricultural Buildings	272	\$17,381,499	
Commercial	30	\$1,200,547	
Industrial	36	\$39,392,468	

**20. Transportation of Hazardous Materials Vulnerability** - summarized in the table below that depicts the maximum threat to the population and building exposures. Iowa State Highways 5 and 34 offers an increased potential for a transportation of Hazardous materials incident. As well as, semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks.

<i>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Transportation of Hazardous Materials</i>			
Type of Structure	# of Structures	Value of Structures	# of People
Residential	253	\$13,379,520	1079
Agricultural Buildings	272	\$17,381,499	
Commercial	30	\$1,200,547	
Industrial	36	\$39,392,468	

**21. Communication Failure Vulnerability** - Communication failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, long-term interruption of electronic

broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service

Potentially the entire county could be vulnerable to a communications failure, especially in the event that the local telephone system and radio system should fail. The cellular phones could be used as a back-up, however, that system could also fail do to the large number of calls going through or if the cell towers are damaged.

**22. Structural Failure Vulnerability** - A summary of the maximum population and building exposure for structural failure are stated in the table below. Given the age of homes in Albia, Melrose, Lovilia, and the unincorporated region, the risk of structural failures may be relatively high. Additionally, many of the buildings in Monroe County were constructed in the late 1800’s and early 1900’s prior to the advent of building codes in the United States. There are other concerns of the aging infrastructure in the communities throughout the region. All participating jurisdictions used vitrified clay tile to construct waste water and storm sewer drains when the communities were developed in the mid to late 1800’s. Many of these drainage systems in this area are deteriorating and crumbling and leaving communities in desperation. Albia has received pervious funding to replace portions of their storm drainage system.

According to the Monroe county Engineer, “Monroe County has 149 bridges that we inspect (20 feet span or longer). Of those bridges, 47 are posted for less than legal loads. We also have 5 that are closed to traffic. We have 28 that are considered “scour critical”, which would require closure and re-inspection before they could be reopened after a “major event”. Our bridge inspection consultant also rates our bridges for projected remaining life. They indicate we have 40 that have 5 or less years remaining life.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Structural Failure</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	379	\$20,069,280	1619
Agricultural Buildings	407	\$26,072,248	
Commercial	45	\$18,008,208	
Industrial	54	\$59,088,703	

**23. Structural Fire Vulnerability** - Structural Fire is a great concern in this area and is summarized in the table below. Monroe County unincorporated area is relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.

Fire Insurance Ratings were given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk.

<i>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Structural Fire</i>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	379	\$20,069,280	1619
Agricultural Buildings	407	\$26,072,248	
Commercial	45	\$18,008,208	
Industrial	54	\$59,088,703	

**24. Animal/Plant/Crop Disease Vulnerability** - An outbreak of disease that can be transmitted from animal to animal. The disease outbreak will likely have a significant economic implications or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health.

The movement of people, animals, animal products, wildlife, plants, crops and potential disease/pest vectors could all cause the introduction of diseases/pests. Diseases/pests could also be introduced naturally, for example by hurricanes or jet streams. Emerging disease is also a threat such as West Nile Virus, new more virulent influenza strains, etc. Because many diseases/pests are not present in Iowa, our populations of animals, crops, and plants have no immunity and are highly susceptible.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Animal/Plant/Crop Disease</b>				
<b>660 Farms in Monroe County</b>	<b>Estimated Market Values per farm</b>		<b>Type of Livestock</b>	<b>Estimated number in Monroe County</b>
Land & buildings	\$688,899		Cattle & calves	29,443
Machinery & Equipment	\$75,532		Hogs & pigs	14,333
Ag product Sold	\$70,000			

**25. Fixed Hazardous Materials Vulnerability** - The table below summarizes the maximum threat to residents and structures that can be affected by fixed hazardous materials. The manufacturing plants, automobile repair, gas stations, and farm yards are potential sites for hazardous materials incidents in Monroe County. Also, two large industries are located in the far Northeast corner of Monroe County. The physical addresses place both of them near the City of Eddyville but on right on the edge of the Monroe County line. The Cargill plant offers employment to more than 550 residents from a large area. The Cargill plant is a processing plant that produces pet food and various other products for human consumption. Ajinomoto Heartland is global leaders of feed-grade amino acid manufacturing. Representing Ajinomoto Animal Nutrition in North America, Ajinomoto Heartland LLC manufactures and distributes cost effective feed-grade amino acids and is the frontrunner in amino acid nutritional research and technical expertise. This industry employs approximately 75 employees. Ajinomoto Food Ingredients produces supplemental food ingredients for human consumption. This division employs about 100 individuals. There is an increase of traffic and potentially hazardous materials incident on State Highway 137 connecting the industries of Cargill and Ajinomoto. Each location has a host of chemicals and hazardous materials on site that are critical to their industrial process.

<b>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Fixed Hazardous Materials</b>			
<b>Type of Structure</b>	<b># of Structures</b>	<b>Value of Structures</b>	<b># of People</b>
Residential	84	\$4,459,840	360
Agricultural Buildings	90	\$5,793,833	
Commercial	9	\$4,001,824	
Industrial	12	\$13,130,822	

**26. Pipeline Incident Vulnerability** - A Pipeline Incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

About 5 interstate pipelines operate in the state under federal pipeline jurisdiction. There are many high-pressure gas mains throughout the state which supply residential and industrial users. People and property with pipelines on their land or nearby are the most at risk. People excavating earth near a pipeline are also at risk. Whether the greater hazard is posed to those upwind or downwind from a site depends on the product spilled, for example - natural gas is lighter than air. Private homes and business served by natural gas have smaller diameter pipelines connected to their structure.

The underground pipelines cross public streets, roads, and highways as well as streams. Iowa’s natural environment is also vulnerable to contamination from an underground pipeline incident. One natural gas pipeline runs parallel to Highway 5 and enters the south edge of the City of Albia. This line extends approximately 10 miles from the south edge of the county into Albia. Another natural gas line enters the county from the north (adjacent to Highway 5) for 2 miles in order to provide service to the city of Lovilia.

<i>Monroe County (Unincorporated) Maximum Population &amp; Building Exposure Pipeline Incident</i>			
Type of Structure	# of Structures	Value of Structures	# of People
Residential	84	\$4,459,840	360
Agricultural Buildings	90	\$5,793,833	
Commercial	9	\$4,001,824	
Industrial	12	\$13,130,822	

**a. INCORPORATED JURISDICTIONS**

The following tables provide information about Maximum Population and Building Exposure, Housing Unites by jurisdiction and age of housing by community.

The table below summarizes the maximum population and building exposure for events that the HMGP committee determined could occur anywhere in Monroe County. These hazards include: Windstorm/High wind event, severe winter storms, thunderstorms/lightning, hailstorms, tornado, earthquake and all forms of Terrorism.

The number of residential structures and the number of people exposed were based on the 2000 census. The value of residential, commercial and industrial structures was based on Monroe County’s assessor’s data for 2010. The number of structure and the number of people were based on the city, county or committee’s estimates.

1. **Hailstorm Vulnerability** - Hailstorms develop from severe thunderstorms and wide region can be vulnerable to such a storm. Although they occur in every state on the mainland, hailstorms occur primarily in the Midwestern states. Since 1961 there have been 34 recorded hail storms in Monroe County. The largest noted hailstorm occurred in Hiteman during May 2008. The storm produced 3.25 inch hail stones that created \$100,000 damage in personal property damage, as well as \$25,000 in crop damage. The cumulative damage of these events on property amounted to \$297 thousand and \$150 thousand in crop losses. The greatest risk in Monroe County is to crops and structures. Severe crop damage can occur as a result of storm with hail diameters of .8 inches. There is also a risk of injury to humans; however the risk of serious injury is slight. Damage to vehicles and structures is usually covered by private insurance.
2. **Tornado Vulnerability** – Monroe County is located in the path known as “Tornado Alley” in the United States in which tornadoes are most frequent. Tornado damage can be minimal from minor roof damage, broken glass, and windows to the extreme of total destruction. People living in manufactured homes are particularly vulnerable to extreme wind events or tornadoes. Older homes in deteriorating condition are also vulnerable, however there is no information about the number of homes needing rehabilitated. It was acknowledged by the HMGP committee that there are many variables that dictate the vulnerability of structures or injured people. These factors include wind speed, time on the ground, length/width of the cell, population density, building density, age & construction of buildings and time of day. It was determined regardless of the strength; the most vulnerable population is the elderly, very young, people with disabilities, mobile homes, and structures that are prior to 1950’s.

Jurisdiction	Population 65yrs & older	Population 18 years & younger	Population living below poverty guidelines	Residents living with a diagnosed disability
Albia	804	971	318	838
Lovilia	70	172	42	113
Melrose	26	25	27	43
Albia Community School	4	1271	384	154
				2000 US Census

Jurisdiction	Number of Mobile Homes	Number of homes built prior to 1960
Albia	73	1120
Lovilia	40	151
Melrose	11	51



**3. Wind Storm / High Wind Event Vulnerability** - – High winds can cause minor damage to major damage to homes and other buildings. Outdoor furniture, trash cans, yard debris, out buildings and other materials in the immediate vicinity of homes can become air borne missiles and dangerous to people and livestock. Loose shingles, broken tree limbs or trees down are also highly possible.

People living in mobile homes, homes that are built prior to building codes and homes in deteriorating conditions are particularly vulnerable to high winds. People in automobiles and campground are also at a greater risk. Generally an injury is minor and seldom is death associated with a wind storm.

Committee members discussed the most vulnerable locations as the campground at Lake Miami and the mobile homes located throughout the county. Also of critical concern is the aged (and possibly weak) housing structure in the area. The estimated number of mobile homes and aging structures can be seen in the previous table under “Tornado Vulnerability”.

**4. Severe Winter Storm Vulnerability** – The entire planning area is vulnerable to the effects of severe winter storms. Winter storms tend to make driving more treacherous and can impact the response time of emergency vehicles. The probability of utility and infrastructure abruption or outages, increases during winter storms due to freezing rain accumulation on power lines. Elderly populations are especially vulnerable to the impacts of winter storms. Winter storms increase wear and tear on roadways also, but it is difficult to determine the amount of the expenses to maintain or recover from a storm.

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms. Businesses experience loss of income as a result of closure due to power outages. Overhead power lines and infrastructure are also vulnerable to damages from winter storms. The weight from of the ice accumulation creates damage to power lines, as well as, damage to the lines and equipment from falling trees and/or tree limbs due to the weight. Potential losses would include the cost of repair or replacement of damaged facilities and lost economic opportunities. Secondary effects of loss of power could include ruptured water pipes in homes without electricity. Public safety hazards also include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables with this hazard. The loss of use estimates are provided in the table below and were calculated using FEMA’s publication “*What is a Benefit? Guidance on Benefit-Cost Analysis of Hazard Mitigation Project, June 2009*”. The loss of use is provided in the heading s the loss of use cost per person per day of loss. The estimated loss of use provided for each jurisdiction represents the loss of service of the indicated utility for one day for 10 percent of the population. It is

understood that in rural areas the typical loss of use may be for a longer period of time and a larger percentage of the population. These figures do not take into account the physical damage to utility equipment and infrastructure.

Jurisdiction	Population (2000)	Estimated Affected Population (10%)	Electric loss of use estimates @ \$128/person/day
Albia	3706	370	\$47,360/day
Lovilia	583	58	\$7,424/day
Melrose	130	13	\$1,664/day
Albia Community School	1275	128	\$16,384/day

It is difficult to estimate the precise totals of damage to Monroe County because of the widespread nature of severe winter storms. There have been 50 recorded snow and ice events that have included Monroe County since 1993 including freezing rain, snow, ice storms, and winter storms. Six deaths are associated with these events and property damage totaling \$41.94 million are recorded. In 1995 two snow events that affected Monroe County, were recorded for a larger part, or all of Iowa totaling \$65 million in property damage for all included areas.

Monroe County was affect twice in December 2007 by 2 separate ice storms. The combined loss for this area was more than \$150,000 in personal property.

Between February 1995 and January 1997, there have been nine recorded events of extreme wind chill and extreme cold that impacted Monroe County and the surrounding area. These 9 events are attributed for \$1.8 million in property damage, one death and no injuries.

The population most vulnerable and are most at risk to Severe Winter Storms are the elderly. The following table summarizes the number of residents that are over 65 years and what percentage of the county this comprises.

<i>Location</i>	<i>Population over 65yrs</i>	<i>Percentage of Population over 65yrs</i>
Albia	804	23%
Lovilia	70	15%

Melrose	26	19%
Albia Community School	4	.3%

2000 US Census

Maximum Population and Building Exposure Hazard Area 100% of Jurisdiction									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	133	\$82,023,571	3706	266	\$19,367,563		36	\$6,290,486	
Lovilia	223	\$9,481,231	583	40	\$721,589		40	\$78,656	
Melrose	60	\$1,833,750	130	6	\$60,834		0	0	0
Albia Community Schools	0	0	0	5	\$31,922,371	1,286	0	0	0

**5. Flash Flooding Vulnerability-** Flash flooding occurs as a result of heavy rains over a short period of time and occurs without sufficient warning for the communities or individuals to take emergency protective measures. During periods of heavy rain the communities noted particular areas of concern in the northeast portion of Albia, the southern edge of Melrose, and Lovilia has limited concern at various locations throughout the city. Floodplain mapping is available for Melrose and is shown in Appendix U. Flash flooding that does occur outside of this region but it limited in nature. The most common impacts are minor street flooding, sewer infiltration and minimal basement flooding. A summary of flash flooding history is contained in the respective hazard profile. Flash flooding was given a rating of high concern throughout Monroe County. The communities of Albia experiences flash flooding in the northeast quarter of the City. The flooding occurs due to problems with poor storm water drainage system in that area. This places about 15% of the residential structures at risk of experiencing flooding damage.

The City of Melrose has the southern 20% of the community lying in the flood plain as mapped in the FEMA FIRM (See Appendix U). This region has historically experienced flash flooding and continues to be at risk. This does include possible damage to the BNSF rail system, the MFA propane containers, potentially the community’s sewer lift station, a critical bridge and 2 structures that are on the private properties of the railroad and the MFA business.

Maximum Population and Building Exposure Flash Flooding							
Community	Residential		Commercial		Industrial		
	Structures	People	Structures	People	Structures	People	

	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	200	\$12,303,536	556	13	\$968,378		2	\$314,524	
Lovilia	11	\$474,062	29	2	\$36,079		2	\$3,933	
Melrose	12	\$366,750	26	1	\$3,042		1	\$7,099	
Albia Community Schools	0	0	0	3	\$25,000,000	983	0	0	0

**6. Extreme Heat Vulnerability** - The table below summarizes the maximum population and building exposure to Extreme Heat. The health of the public and the economic impact on the agricultural community are the primary concerns with extreme heat. The segments of the public most at risk from extreme heat are the elderly, the very young, and individuals living below the poverty line. The estimated number of affected people in the table below is derived from the 2000 US census. Those included in this calculation are residents over 65 years, children under 5 years, individuals living below the poverty line and people living with a diagnosed disability. Economic impact on the agricultural sector could result from the damage to animals and crops. Livestock is particularly vulnerable to the effects of the extreme heat. Roads, bridges, and railroad tracks are also susceptible to damage from extreme heat. The HMGP committee believes that the major effect of an extreme heat will be on livestock and crops. Transportation facilities are also vulnerable to extreme heat. Most common type of damage is road buckles; however Monroe County has not tracked the damage expenses directly related to this hazard.

Monroe County (Unincorporated) Maximum Population & Building Exposure Extreme Heat				
Jurisdiction	Population 65yrs & older	Population 18 years & younger	Population living below poverty guidelines	Residents living with a diagnosed disability
Albia	804	971	318	838
Lovilia	70	172	42	113
Melrose	26	25	27	43
Albia Community School	4	1271	384	154

2000 Census

**7. Drought Vulnerability** - Droughts can be spotty or widespread and last from weeks to a period of years. A prolonged drought can have serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

A severe drought, such as the event in 1988-1990 would have the greatest impact on agriculture crops, livestock, wildlife, and stream flows, as well as, the entire community. The agricultural would be the most severely impacted. Increased demand for water and electricity could result in shortages and rationing. The number and severity of fires may also increase.

The result of the drought on the economic impact would depend on the severity and length of the drought. A severe drought would have the greatest impact, but any reduction in agricultural income could result in reduced revenues for the agricultural and retail and service sectors. According to the 2007 Agricultural Census, Monroe County had 85,537 harvested acres of land in farms in Monroe County to account for approximately 43% of the 201,204 acres of land on farmsteads. State-wide drought damages noted in the NCDRC database range from % of the crop damaged. The committee noted that these are statewide numbers and include the central section of the state which was the most severely damage.

Droughts rarely result in the loss of life, although the high heats that contribute to the droughts may also contribute to heat related illnesses and even death. In addition, property damage is not a direct impact of droughts, but drought conditions that may increase the fire hazard could be an indirect impact.

**8. Sink Hole Vulnerability** - The table below displays the maximum population and building exposure at risk with sink holes. In the late 1880' and the turn of the century there were as many as 30 coal mines operating throughout Monroe County ("**Historical Sketch Book of Albia & Monroe County**", Albia Centennial Corp 1859-1959.) Historical data collected gives estimated locations of such mines but there is no precise mapping to be able to identify target areas.

Anyone is vulnerable to sinkholes should they occur in a developed area. Buildings and infrastructure such as roads, underground pipes, and railroad lines face potentially severe damage from mine subsidence. In the Melrose, Albia and Lovilia area the potentially for damage from Karst subsidence is low given the soil composition of the area (i.e. a lack of Karst soils). Personal injury or even death is possible should a cave in happen suddenly; indirect injury or death is possible from building collapse or damage to infrastructure. The maximum threat of subsidence would be if one or more of the underlying mines were to

collapse damaging homes, businesses, and infrastructure. The worst case scenario is if subsidence or a full cave-in were to happen on Albia’s historic square where a number of old, and presumably unreinforced (due to age), brick buildings are located. One building could lead to structural damage to adjacent structures as many buildings are attached.

Maximum Population and Building Exposure Sink Holes									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	601	\$36,910,607	1668	120	\$8,715,403		16	\$2,830,719	
Lovilia	112	\$4,740,616	292	20	\$360,795		20	\$39,328	
Melrose	30	\$916,875	65	3	\$30,417		1	\$70,988	
Albia Community Schools	0	0	0	5	\$31,922,371	1,286	0	0	0

**9. Radon or Lead Vulnerability** - The maximum population and building exposure related to the concerns of Radon or Lead are shown below. Sinks holes can place an estimated 15% to 20% of homes in Monroe County have elevated levels of Radon so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. The presence of the mines under the cities may also elevate this estimated proportion.

Maximum Population and Building Exposure Radon or Lead									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	1001	\$61,517,678	2780	133	\$9,683,782		18	\$3,145,243	
Lovilia	156	\$6,636,861	410	20	\$360,795		20	\$39,328	
Melrose	48	\$1,647,000	104	5	\$48,667		1	\$70,988	

Jurisdiction	Number of Mobile Homes	Number of homes built prior to 1960	Proportion of housing stock
Albia	73	1120	66%+
Lovilia	40	151	60%+
Melrose	11	51	72%+

**10. Grass or Wildfire Vulnerability** - The table below summarized the maximum population and building exposure to Grass or Wildfire. Older structures with dated electrical systems that

are not built to fire codes are at a particular risk. When a fire is occurring, it was acknowledged by the HMGP committee, that elderly, children and people with disabilities are at greatest risk of death due to the fire. However, the unincorporated region has a low population density and the risk is very low. Agricultural land where CRP land is burned and rural areas where debris is burned are very vulnerable to a Grass or Wildfire. There have been no recorded grass or wildfires in the NCDC database in Monroe County currently; however the risk does exist especially if droughts affect the area. Anecdotal evidence suggests that there have been grass or wildfires in Monroe County despite the lack of documentation. Committee members spoke with their respective fire departments and discovered that many have heard stories of Grass fires long ago but none are able to recall recent occurrences within the past 20 years or find documentation to support.

It was agreed by committee members that a grass fire can happen anywhere but that those structures on the edge of the city limits (near open grass plains) would be at a higher risk. It was estimated that approximately 25% of each community could be included in that description.

Maximum Population and Building Exposure Grass or Wildfire									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	334	\$20,505,893	927	67	\$4,841,891	--	9	\$1,572,622	--
Lovilia	55	\$2,370,300	146	10	\$180,397	--	10	\$19,644	--
Melrose	15	\$458,438	33	1	\$15,209	--	1	\$35,494	--

**11. Rail Transportation Incident Vulnerability** - Maximum Population and building exposure for rail transportation incident is displayed below. Multiple rail lines in the unincorporated region of Monroe County place many at risk in the event of a rail transportation incident and the maximum population and building exposures are show in the table below. There are three railroad companies that operate lines in Monroe County: BNSF, APNC, and IMRL. APNC’s rail line enters the county from the south and runs parallel to highway 5 into the City of Albia. BNSF hosts the highest miles of rail line throughout Monroe County. There are 5 rail lines that exit the RELCO rail yard in Albia. Three BNSF lines extend to the northeast region of the county to affect the unincorporated communities Maxon, Avery, Lockman, and Frederic. One BNSF line parallels highway 5 to the northern boundary of the Monroe County line through the communities of Lovilia and Hagerty. The remaining BNSF rail line directs west from Albia to the south edge of Melrose and exits parallel to highway 34 at the west limit of Monroe/Lucas county line. There are numerous crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely.

Maximum Population and Building Exposure Rail Transportation Incident									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	467	\$8,202,357	1297	26	\$1,936,756		4	\$629,048	
Lovilia	100	\$4,266,554	264	16	\$288,636		16	\$31,462	
Melrose	9	\$275,063	20	1	\$6,083		1	\$70,989	

**12. Human Disease Incident & Human Disease Pandemic Vulnerability – An**

incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. A pandemic human disease is defined as a disease that has spread around the world to many people. The word, “pandemic”, means that a disease has caused illness in a person on nearly every continent. Many diseases throughout the history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy. Considering that the manner that the diseases can spread so quickly, all residents can be considered at risk, however, the most vulnerable population considered are the elderly, youth and disabled residents.

The individuals that travel internationally and have high exposure to potential vectors of disease are the most susceptible. Greater than 20% of Iowa’s population is considered high risk. The elderly population of Monroe County makes up nearly 19% according to the 2000 Census with a youth population (under age 18) of nearly 27%, about 512 of which are under 5. About 46% of Monroe County may be considered at high risk based on age alone.

Particular locations that are susceptible to such diseases would include assisted care facilities and school districts. There are 4 retirement homes or assisted care facilities in Albia. The children (age 18 and under) attending Albia Community Schools are located throughout the communities include: Albia 971, Lovilia 172, and Melrose 25.

Maximum Population and Building Exposure Human Disease Incident & Human Disease Pandemic				
Jurisdiction	Population 65yrs & older	Population 18 years & younger	Population living below poverty	Residents living with a diagnosed disability



			guidelines	
Albia	804	971	318	838
Lovilia	70	172	42	113
Melrose	26	25	27	43
Albia Community School	4	1271	384	154
				2000 US Census

**13. Energy Failure Vulnerability** - An extended interruption of service electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very well developed, local shortages can quickly be covered. Storm-related Energy Failures may impact a few homes or the entire community and surrounding areas. Response to such disruptions depends on the severity of the damage and the availability of staff to repair the system. During the holiday season, staff availability may be limited. Due to the rural population and the relative isolation of Albia, Melrose, and Lovilia in relation to more urbanized parts of Iowa, Monroe County residents may face longer periods without energy. Much like the storms in the winter of 2007, Monroe County and all jurisdictions profiled experienced a widespread energy failure due to a severe winter storm. The area experienced this energy crisis for 2-3 days in the jurisdictions and 5-6 days in the un-incorporated regions. The hospital operated off of generators, one shelter site had a generator and residents took shelter with each other.

**14. Transportation of Radiological Material Vulnerability** - The maximum population and building exposure to transportation of radiological materials is shown in the chart below. The county has three state highways that are identified in the county. Highway 5 transports traffic north and south across the county and Highway 34 extends east and west through Monroe county. State Highway 137 branches off of highway 5 on the north edge of Albia and continues northeasterly to the city of Eddyville. Additional risks of transportation of radiological material can occur along the rail lines in Monroe County. There are three railroad companies that operate lines in Monroe County: BNSF, APNC, and IMRL. They total approximately 90 miles of rail line throughout the county. Industries located in the Northeast region of the county have

potential exposure due to State Highway 137 that is adjacent each property. It is estimated that only the north half of each location (that closest the roadway) would be affected.

Maximum Population and Building Exposure Transportation of Radiological Materials									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	467	\$82,023,571	1297	26	\$1,936,756		4	\$629,048	
Lovilia	100	\$4,266,554	264	16	288,636		16	\$31,462	
Melrose									
Albia Community Schools	0	0	0	2	\$19,500,000	738	0	0	0

**15. Highway Transportation Incident Vulnerability** - is displayed below. Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has three state highways that are identified in the county. Highway 5 transports traffic north and south across the county and Highway 34 extends east and west through Monroe county. State Highway 137 branches off of highway 5 on the north edge of Albia and continues northeasterly to the city of Eddyville

Maximum Population and Building Exposure Highway Transportation Incident									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	334	\$20,505,893	927	40	\$2,905,134	--	4	\$629,048	--
Lovilia	100	\$4,266,554	262	16	\$288,636		16	\$31,462	
Albia Community Schools	0	0	0	1	\$4,500,000	185	0	0	0

**16. Communications Failure Vulnerability** - Communication failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, long-term interruption of electronic broadcast services, emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service

Potentially the entire county could be vulnerable to a communications failure, especially in the event that the local telephone system and radio system should fail. The cellular phones could be used as a back-up, however, that system could also fail do to the large number of calls going through or if the cell towers are damaged.

**17. Structural Failure Vulnerability** - A summary of the maximum population and building exposure for structural failure are stated in the table below. Given the age of homes in Albia, Melrose, and Lovilia, the presumed age of infrastructure based on when Monroe County flourished, and nationwide concerns over aging infrastructure, the risk of structural failures may be relatively high. Additionally, many of the buildings in Monroe County were constructed in the late 1800’s and early 1900’s prior to the advent of building codes in the United States.

According to the Monroe county Engineer, “Monroe County has 149 bridges that we inspect (20 feet span or longer). Of those bridges, 47 are posted for less than legal loads. We also have 5 that are closed to traffic. We have 28 that are considered “scour critical”, which would require closure and re-inspection before they could be reopened after a “major event”. Our bridge inspection consultant also rates our bridges for projected remaining life. They indicate we have 40 that have 5 or less years remaining life.

Maximum Population and Building Exposure Structural Failure									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	667	\$41,011,786	1853	133	\$9,683,782		18	\$3,145,243	
Lovilia	112	\$4,740,616	290	20	\$360,795		20	\$39,328	
Melrose	30	\$916,875	65	3	\$30,417		1	\$70,988	
Albia Community Schools									

**18. Structural Fire Vulnerability** - Structural Fire is a great concern in this area and is summarized in the table below. Monroe County unincorporated area is relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.

Fire Insurance Ratings were given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates

that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk.

Maximum Population and Building Exposure Structural Fire									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	667	\$41,011,786	1853	133	\$9,683,782		18	\$3,145,243	
Lovilia	112	\$4,740,616	290	20	\$360,795		20	\$39,328	
Melrose	30	\$916,875	65	3	\$30,417		1	\$70,988	
Albia Community Schools									

**19. Animal/Plant/Crop Disease Vulnerability** - An outbreak of disease that can be transmitted from animal to animal. The disease outbreak will likely have a significant economic implications or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage. The crop/plant pests may also have implications for public health.

The movement of people, animals, animal products, wildlife, plants, crops and potential disease/pest vectors could all cause the introduction of diseases/pests. Diseases/pests could also be introduced naturally, for example by hurricanes or jet streams. Emerging disease is also a threat such as West Nile Virus, new more virulent influenza strains, etc. Because many diseases/pests are not present in Iowa, our populations of animals, crops, and plants have no immunity and are highly susceptible.

Monroe County (Unincorporated) Maximum Population & Building Exposure Animal/Plant/Crop Disease				
660 Farms in Monroe County	Estimated Market Values per farm		Type of Livestock	Estimated number in Monroe County
Land & buildings	\$688,899		Cattle & calves	29,443
Machinery & Equipment	\$75,532		Hogs & pigs	14,333
Ag product Sold	\$70,000			

--	--	--	--	--

**20. Fixed Hazardous Materials Vulnerability** - The table below summarizes the maximum threat to residents and structures that can be affected by fixed hazardous materials. The manufacturing plants, automobile repair, gas stations, and farm yards are potential sites for hazardous materials incidents in Monroe County. There are nine gas and farm stores located in Albia, two in Lovilia, and one in Melrose that are at a higher rate for possible incident.

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during production or handling at a fixed facility. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever-increasing types and quantities, each year, over 1,000 new synthetic chemicals are introduced, and as many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals”. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

Chemical spills can occur anytime there is a traffic accident as oil, gasoline, and other fluids used in vehicles are released. Dumping of household cleaners, paints, and old oil can happen at any time and are more likely in areas where people do not understand hazardous materials laws.

A number of homes (57.6%) in Monroe County use LP Gas for heating fuel. Liquid petroleum is not by nature toxic, but can cause asphyxiation through oxygen deprivation. LP Gas is heavier than air so it will sink to the lowest places possible and is flammable. Stores of anhydrous ammonia in the county pose health and safety threats to potentially large areas of the county and are potential targets for meth producers as a source of raw materials.

Maximum Population and Building Exposure Fixed Hazardous Materials									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	67	\$4,101,179	185	13	\$968,378		2	\$314,524	
Lovilia	22	\$948,123	58	4	\$72,158		4	\$7,865	
Melrose	6	\$183,375	13	1	\$6,083		1	\$70,989	

**21. Pipeline Incident Vulnerability** - A Pipeline Incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

About 5 interstate pipelines operate in the state under federal pipeline jurisdiction. There are many high-pressure gas mains throughout the state which supply residential and industrial users. People and property with pipelines on their land or nearby are the most at risk. People excavating earth near a pipeline are also at risk. Whether the greater hazard is posed to those upwind or downwind from a site depends on the product spilled, for example - natural gas is lighter than air. Private homes and business served by natural gas have smaller diameter pipelines connected to their structure.

The underground pipelines cross public streets, roads, and highways as well as streams. Iowa’s natural environment is also vulnerable to contamination from an underground pipeline incident. One natural gas pipeline runs parallel to Highway 5 and enters the south edge of the City of Albia. This line extends approximately 10 miles from the south edge of the county into Albia. Another natural gas line enters the county from the north (adjacent to Highway 5) for 2 miles in order to provide service to the city of Lovilia.

Maximum Population and Building Exposure Pipeline Incident									
Community	Residential			Commercial			Industrial		
	Structures		People	Structures		People	Structures		People
	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	67	\$4,101,179	185	13	\$968,378		2	\$314,524	
Lovilia	11	\$474,062	29	2	\$36,079		2	\$3,933	

**22. Transportation of Hazardous Materials Vulnerability** - summarized in the table below that depicts the maximum threat to the population and building exposures. Iowa State Highways 5 and 34 offers an increased potential for a transportation of Hazardous materials incident. As well as, semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks.

Maximum Population and Building Exposure Transportation of Hazardous Materials						
Community	Residential		Commercial		Industrial	
	Structures	People	Structures	People	Structures	People

	Number	Value	Number	Number	Value	Number	Number	Value	Number
Albia	334	\$82,023,571	927	40	\$2,905,134	--	4	\$629,048	--
Lovilia	100	\$4,266,554	262	16	\$288,626	--	16	\$31,462	--
Melrose	6	\$6,083	13	1	\$6,083	--	1	\$14,198	--
Albia Community Schools	0	0	0	2	\$19,500,000	738	0	0	0

### A. Inventory of Assets and Critical Facilities

In order to identify the most appropriate mitigation techniques and projects, the city determined to identify the assets in the community. Included in this is a preliminary inventory of critical facilities, structures and infrastructure that is determined to be important to target for protection from hazard damage or that may serve a hazard response or mitigation purpose.

### B. Critical Facilities

The Monroe County Planning Committee named various buildings and infrastructure in a preliminary discussion of critical facilities. Committee members were advised to consider buildings and infrastructure that represent health and welfare of unincorporated residents and residents in communities, high potential loss facilities, hazardous materials storage, emergency access, and lifeline facilities such as drinking water and power supply. This advice was derived from the FEMA guidance document Understanding Your Risk: Identifying Hazards and Estimating Losses (FEMA 386-2, August 2001). See *Appendix Q: Community Assets and Critical Facilities* for location of critical facilities.

A full assessment of the critical facilities has not been completed, but preliminary information is available. The following chart shows the types of information that would be useful in estimating potential losses and thus help in prioritizing mitigation actions. The information was supplied by the city clerk in each respective community. It is recognized that there are blank fields and the jurisdictions will work to provide that information in future updates.

## Melrose

### Structural Inventory

**\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					

Sewer Station	Lift		X							
Quality Ag	502 Ave	Erin			X				\$141,977	
Melrose Market	115 St	Erin								

## Albia

### Structural Inventory

**\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideratio	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Albia City Hall/Community Center	120 S A St	X			X		3332sq ft	\$223,574	\$45,026	
Brees Rest Home	210 Washington Ave		X				2686sq ft	\$43,280		
Monroe Co Care Center	120 N 13 <sup>th</sup> St		X				22,076sq ft	\$1,069,175		
Oakwood Nursing & Rehab	200 16 <sup>th</sup> Ave East		X				24,570sq ft	\$690,971		
Parkview Cottage	645 8 <sup>th</sup> St		X				4469sq ft	\$289,093		
Monroe Co Hospital	6580 165 <sup>th</sup> St	X	X				72,788sq ft	\$9,651,518		
Monroe co Medical Clinic	Avery Rd		X				8830sq ft	Included in hosp		
Albia Fire station	115 2 <sup>nd</sup> Ave	X			X		6000sq ft	\$121,692		
Monroe Co Sheriff's office/Albia Police Dept	103 2 <sup>nd</sup> Ave	X			X		4608sq ft	\$122,331		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
First Responder bldg (Ambulance)							3399sq ft	\$115,215		
Sewage Disposal Plant	120 S A St	X								
Albia Sewage Lagoon	Hwy 137	X					2100sq ft	\$282,548	\$30,000	
Albia Sewer	Hwy 137	X					486sq ft	\$145,954	\$90,000	
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Albia Municipal	120 S A St	X						\$99,190		



waterworks										
Chariton Valley Electric Coop	2090 Hwy 5 South	X		X			13,779sq ft	\$599,315		
Lift stations	SE/NE/ SW/ NW	X						\$115,627		
Iowa Telecommunications	202 Washington Ave East	X		X			5076sq ft			
Quality Ag Services	6385 196 <sup>th</sup> St			X				\$277,260		
Casey's	1117 S Clinton Ave			X			2376 sq ft	\$207,933		
Kum & Go	204 S Main St			X			2052sq ft	\$120,278		
Casey's	122 N Main St			X			1920 sq ft	\$124,832		
Albia Amoco	21 A Ave East			X			1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5			X			2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5			X						
Ferrellgas	121 10 <sup>th</sup> St			X				\$15,933		
McGee Sanitation	16 Washington Ave	X		X			12,144sq ft	\$65,985		
Relco-Locomotives	1 Relco Ave			X				\$7,092,511		
Burlington Northern- Santa Fe Railway	300 A St N			X						
Dollar General	900 Princeton Dr			X			10,458sq ft	\$306,453		
Jim & Charlie's AFF Foods	121 N Clinton			X			8592sq ft	\$111,294		
Hy-Vee	Hwy 34			X			19,927sq ft	\$733,530		
Pamida	Hwy 34			X			26,817sq ft	\$495,770		
Snack Shack	906 S Clinton St			X			1200sq ft	\$67,975		
Vitko's Sinclair	113 Benton Ave W			X			2031sq ft	\$82,014		
Preferred Wholesale	201 S Main St			X						
Trailer court	South Hwy 5		X							
Albia Historic Square	Hwy 5 & Benton Ave					X				
Albia Industrial park (8 businesses)	South Hwy 5			X						

## Lovilia

### Structural Inventory

**\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Lagoon	6057 115 <sup>th</sup> Trail	X					375 sq ft	132,490	--	
Gas & Go	1604 Highway 5			X			2063sq ft	\$92,838		
Casey's	1807 Highway 5			X			1962sq ft	\$102,125		

## Albia Community School

### Structural Inventory

**\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office. Insured value is according to the school's insurance policy.**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Insured value	Occupancy or capacity
Albia High	503 B Ave		X				60,830sq	\$1,122,999	\$17.5M	

School	East, Albia					ft			
Albia Jr. High School	505 C Ave East, Albia		X			35,454sq ft	In HS	Included in HS	
Lincoln Center	222 N 2 <sup>nd</sup> St, Albia		X			40,723sq ft	\$1,562,453	\$7.5M	
Grant Elementary	520 S Clinton St, Albia		X			17,622sq ft	\$729,989	\$4.5M	
Kendall Elementary	701 Washington Ave, Albia		X			10,574sq ft	\$369,581	\$2.0M	

### C. Community Assets by Hazard

This section describes the assets at risk for Monroe County (Unincorporated), Melrose, Albia, Lovilia, and Albia Community Schools including the total exposure of people and structures from hazards. The following table summarizes community assets that would be affected in the event of a widespread hazard that would affect the entire community. The tables display the maximum population and building exposure for the hazard events that the Planning Committee determined could occur anywhere within the Monroe County (unincorporated), Albia, Melrose, and Lovilla. The maximum population and exposure represents the count for the entire planning or hazard area.

These hazards include: High Wind Events, Severe Winter Storms, Thunderstorms/Lightning, Hailstorms, Drought, Excessive Heat, and Earthquakes among others. In these events, the entire Communities are the “Hazard Area.” This also includes events that do not have likely locations for potential occurrence such as Tornadoes, Structural Fire, or Air Transportation Incidents, among others. Government structures include City Hall, the post office, the City Shop, and the Lift Station; this differs from the feedback received from the County Assessor in order to account for the presence of these facilities which may be treated differently by the Assessor’s Office. There are few maps available to illustrate the location of hazards. When available, such as Flood plain maps (See *Appendix T, U, and Z*), calculations of the numbers of structures within hazard areas are estimated.

These estimates of structures and people within hazard areas are preliminary for this plan due to data limitations on the actual hazard areas and mapping data available. Valuations of tax exempt and utility properties are not readily separated by jurisdiction from data provided by the Monroe County Assessor’s office contributing to the lack of some value estimates. Alternate forms of estimating such valuations (as well as occupancy, square footage, replacement value, etc.) exist but were not employed for this version of the Monroe County Plan due to challenges with obtaining the necessary information, see *Appendix EE: Alternate Facility Valuation Estimate Tools*. Obtaining this information will be important for updates to this plan and efforts will be made to obtain it for the Monroe County Multi-Jurisdiction Hazard Mitigation Plan.

No significant changes to the number of buildings or infrastructure in hazard areas are expected based on population and development trends. However with improved hazard mapping, when undertaken, the estimates of vulnerable buildings and infrastructure may change; these changes will be addressed in future updates to the Monroe County Multi-Jurisdiction Hazard Mitigation Plan.

**UNINCORPORATED COUNTY AREA – Communitywide hazards** that could potentially affect all structures, land and/or people. (Windstorm/High Wind Event, Severe Winter Storms, Thunderstorms/Lightning, Hailstorms, Drought, Extreme Heat, Earthquake, Tornado, Structural Fire, all forms of Terrorism, Human Disease Incident, Human disease Pandemic, Animal/Plant/Crop Disease, Energy Failure and Communication failure )

**Estimated loss in unincorporated area due to large community wide hazard:**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Unincorp	# in Planning Area	% in Planning Area	\$ in Unincorp area	\$ in Planning Area	% in Planning Area	# in Unincorp	# in Planning Area	% in Planning Area
Residential	843	843	100%	\$44,598,400.00	\$44,598,400.00	100%	3597	3597	100%
Commercial	99	99	100%	\$40,018,241.00	\$40,018,241.00	100%			100%
Industrial	120	120	100%	\$131,308,228.00	\$131,308,228.00	100%	-	-	-
Agricultural	905	905	100%	\$57,938,330.00	\$57,938,330.00	100%	-	-	-
Religious / Non-profit	4	4	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

**Unincorporated County Structural Inventory**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)	Scattered locations	X						\$1M/ea	
Landfill				X					
Lake Miami Campground	N Hwy 5		X						
Rural Water towers (3)	Scattered location	X						\$1M/ea	
IDOT roads maintenance shop	South Hwy 5			X					

Lake Miami dam	N Hwy 5				X				
Halley's Trailer Park (35 homes)	East Hwy 34		X					\$68,890 land \$90,041 bldgs	
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$80,026,460	
Lazy-Daz Ranch (91 structures)	Melrose		X		X			\$2,058,658	
Green Acres Mobile homes (108 structures)	Melrose		X		X			\$3,467,566	
Monroe County Fairgrounds (land & structures)	North Hwy 5			X				\$310,613	
Lazy Daz Ranch Estates (21 structures)	Melrose		X		X			\$758,831	
Willow Park	Melrose		X		X			\$169,790	
Wacker Chemical Corp	NE corner of county			X	X			\$5,114,095	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$29,733,719	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$22,895,026	

**ALBIA – Communitywide hazards** that could potentially affect all structures, land and/or people. (Windstorm/High Wind Event, Severe Winter Storms, Thunderstorms/Lightning, Hailstorms, Drought, Extreme Heat, Earthquake, Tornado, Structural Fire, all forms of Terrorism, Human Disease Incident, Human disease Pandemic, Animal/Plant/Crop Disease, Energy Failure and Communication failure)

**Estimated loss in Albia due to large community wide hazard:**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Planning Area	% in Planning Area	\$ in City	\$ in Planning Area	% in Planning Area	# in City	# in Planning Area	% in Planning Area
Residential	1335	1335	100%	\$82,023,571	\$82,023,571	100%	3706	3706	100%

Commercial	266	266	100%	\$19,367,563	\$19,367,563	100%			100%
Industrial	36	36	100%	\$6,290,486	\$6,290,486	100%	-	-	-
Agricultural	-	-	-			100%	-	-	-
Religious / Non-profit									
Government									
Education	6	6	100%	\$31.9M	\$31.9M	100%	1275	1275	100%
Utilities	-	-	-	-	-	-	-	-	-

**Albia’s critical asset that can be affected by a large community wide hazard:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Albia City Hall/Community Center	120 S A St	X			X		3332sq ft	\$223,574	\$45,026	
Brees Rest Home	210 Washington Ave		X				2686sq ft	\$43,280		
Monroe Co Care Center	120 N 13 <sup>th</sup> St		X				22,076sq ft	\$1,069,175		
Oakwood Nursing & Rehab	200 16 <sup>th</sup> Ave East		X				24,570sq ft	\$690,971		
Parkview Cottage	645 8 <sup>th</sup> St		X				4469sq ft	\$289,093		
Monroe Co Hospital	6580 165 <sup>th</sup> St	X	X				72,788sq ft	\$9,651,518		
Monroe co Medical Clinic	Avery Rd		X				8830sq ft	Included in hosp		
Albia Fire station	115 2 <sup>nd</sup> Ave	X			X		6000sq ft	\$121,692		
Monroe Co Sheriff’s office/Albia Police Dept	103 2 <sup>nd</sup> Ave	X			X		4608sq ft	\$122,331		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
First Responder bldg (Ambulance)							3399sq ft	\$115,215		
Sewage Disposal Plant	120 S A St	X								
Albia Sewage Lagoon	Hwy 137	X					2100sq ft	\$282,548	\$30,000	
Albia Sewer	Hwy 137	X					486sq ft	\$145,954	\$90,000	
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Albia Municipal waterworks	120 S A St	X						\$99,190		

Chariton Valley Electric Coop	2090 Hwy 5 South	X		X				13,779sq ft	\$599,315		
Lift stations	SE/NE/ SW/ NW	X							\$115,627		
Iowa Telecommunications	202 Washington Ave East	X		X				5076sq ft			
Quality Ag Services	6385 196 <sup>th</sup> St			X					\$277,260		
Casey's	1117 S Clinton Ave			X				2376 sq ft	\$207,933		
Kum & Go	204 S Main St			X				2052sq ft	\$120,278		
Casey's	122 N Main St			X				1920 sq ft	\$124,832		
Albia Amoco	21 A Ave East			X				1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5			X				2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5			X							
Ferrellgas	121 10 <sup>th</sup> St			X					\$15,933		
McGee Sanitation	16 Washington Ave	X		X				12,144sq ft	\$65,985		
Relco-Locomotives	1 Relco Ave			X					\$7,092,511		
Burlington Northern- Santa Fe Railway	300 A St N			X							
Dollar General	900 Princeton Dr			X				10,458sq ft	\$306,453		
Jim & Charlie's AFF Foods	121 N Clinton			X				8592sq ft	\$111,294		
Hy-Vee	Hwy 34			X				19,927sq ft	\$733,530		
Pamida	Hwy 34			X				26,817sq ft	\$495,770		
Snack Shack	906 S Clinton St			X				1200sq ft	\$67,975		
Vitko's Sinclair	113 Benton Ave W			X				2031sq ft	\$82,014		
Preferred Wholesale	201 S Main St			X							
Trailer court	South Hwy 5		X								
Albia Historic Square	Hwy 5 & Benton Ave						X				
Albia Industrial park (8 businesses)	South Hwy 5			X							
Albia Community Schools	Scattered	X	X	X	X	X			\$31.9M		

**MELROSE – Communitywide hazards** that could potentially affect all structures, land and/or people. (Windstorm/High Wind Event, Severe Winter Storms, Thunderstorms/Lightning, Hailstorms, Drought, Extreme Heat, Earthquake, Tornado, Structural Fire, all forms of Terrorism, Human Disease Incident, Human disease Pandemic, Animal/Plant/Crop Disease, Energy Failure and Communication failure)

**Estimated loss in Melrose due to large community wide hazard:**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Planning Area	% in Planning Area	\$ in City	\$ in Planning Area	% in Planning Area	# in City	# in Planning Area	% in Planning Area
Residential	60	60	100%	\$1,833,750	\$1,833,750	100%	130	130	100%
Commercial	6	6	100%	\$60,834	\$60,834	100%			100%
Industrial	2	2	100%	\$141,977	\$141,977	-	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

**Melrose’s critical asset that can be affected by a large community wide hazard:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Sewer Lift Station		X								
Quality Ag	502 Erin Ave			X				\$141,977		
Melrose Market	115 Erin St									

**LOVILIA – Communitywide hazards** that could potentially affect all structures, land and/or people. (Windstorm/High Wind Event, Severe Winter Storms, Thunderstorms/Lightning, Hailstorms, Drought, Extreme Heat, Earthquake, Tornado, Structural Fire, all forms of Terrorism,



Human Disease Incident, Human disease Pandemic, Animal/Plant/Crop Disease, Energy Failure and Communication failure)

**Estimated loss in Lovilia due to large community wide hazard:**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Planning Area	% in Planning Area	\$ in City	\$ in Planning Area	% in Planning Area	# in City	# in Planning Area	% in Planning Area
Residential	223	223	100%	\$9,481,231	\$9,481,231	100%	583	583	100%
Commercial	40	40	100%	\$721,589	\$721,589	100%			100%
Industrial	40	40	100%	\$78,656	\$78,656	100%	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%			100%			100%
Education	1	1	100%			100%			100%
Utilities	-	-	-	-	-	-	-	-	-

**Lovilia’s critical asset that can be affected by a large community wide hazard:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Lagoon	6057 115 <sup>th</sup> Trail	X					375 sq ft	132,490	--	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**ALBIA –estimated loss due to Flash flooding**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in	# in	% in	\$ in City	\$ in Hazard	% in	# in	# in	% in

	City	Hazard Area	Hazard Area		Area	Hazard Area	City	Hazard Area	Hazard Area
Residential	1335	200	15%	\$82,023,571	\$12,303,536	15%	3706	556	15%
Commercial	266	13	5%	\$19,367,563	\$968,378	5%			
Industrial	36	2	5%	\$6,290,486	\$314,524	5%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education	6	1	15%	\$31.9M	\$4.5M	15%	1275	192	15%
Utilities	-	-	-	-	-	-	-	-	-

The community of Albia has experienced flash flooding in the northeast quarter of the City. The flooding occurs due to problems with poor storm water drainage system in that area. This places about 15% of the residential structures at risk of experiencing flooding damage.

Flash flooding can occur anywhere when there is an unseasonable amount of precipitation. The city has experienced some of this problem in the past and a particular concerns exist in the northeast quarter of the City. The flooding occurs due to problems with poor storm water drainage system in that area. Although there has not been recent damage to the school structures the potential still exists for any of the locations.

**Albia’s critical asset that can be affected by flash flooding:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Sewage Plant Disposal	120 S A St	X								
Albia Sewage Lagoon	Hwy 137	X					2100sq ft	\$282,548	\$30,000	
Albia Sewer	Hwy 137	X					486sq ft	\$145,954	\$90,000	
Lift stations	SE/NE/ SW/ NW							\$115,627		
Albia Community Schools	Scattered	X	X	X	X	X		\$31.9M		

**ALBIA – estimated loss due to Sink holes**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	601	45%	\$82,023,571	\$36,910,607	45%	3706	1668	45%
Commercial	266	120	45%	\$19,367,563	\$8,715,403	45%			
Industrial	36	16	45%	\$6,290,486	\$2,830,719	45%	-	-	-

Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education	6	3	45%	\$31.9M	\$14.4M	45%	1275	574	45%
Utilities	-	-	-	-	-	-	-	-	-

In the late 1880’ and the turn of the century there were as many as 30 coal mines operating throughout Monroe County (“**Historical Sketch Book of Albia & Monroe County**”, Albia Centennial Corp 1859-1959.) Historical data collected gives estimated locations of such mines but there is no precise mapping to be able to identify target areas. There is documentation of eleven (11) mines in the outer lying areas of Albia in the rural region of the county. It is stated that there was a mine shaft within a mile south of the public square.

**Albia’s critical asset that can be affected by sink holes:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideratio	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Albia City Hall/Community Center	120 S A St	X			X		3332sq ft	\$223,574	\$45,026	
Brees Rest Home	210 Washington Ave		X				2686sq ft	\$43,280		
Monroe Co Care Center	120 N 13 <sup>th</sup> St		X				22,076sq ft	\$1,069,175		
Oakwood Nursing & Rehab	200 16 <sup>th</sup> Ave East		X				24,570sq ft	\$690,971		
Parkview Cottage	645 8 <sup>th</sup> St		X				4469sq ft	\$289,093		
Monroe Co Hospital	6580 165 <sup>th</sup> St	X	X				72,788sq ft	\$9,651,518		
Monroe co Medical Clinic	Avery Rd		X				8830sq ft	Included in hosp		
Albia Fire station	115 2 <sup>nd</sup> Ave	X			X		6000sq ft	\$121,692		
Monroe Co Sheriff’s office/Albia Police Dept	103 2 <sup>nd</sup> Ave	X			X		4608sq ft	\$122,331		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
First Responder bldg (Ambulance)							3399sq ft	\$115,215		
Sewage Disposal Plant	120 S A St	X								
Albia Sewage Lagoon	Hwy 137	X					2100sq ft	\$282,548	\$30,000	

Albia Sewer	Hwy 137	X					486sq ft	\$145,954	\$90,000	
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Albia Municipal waterworks	120 S A St	X						\$99,190		
Chariton Valley Electric Coop	2090 Hwy 5 South	X		X			13,779sq ft	\$599,315		
Lift stations	SE/NE/ SW/ NW	X						\$115,627		
Iowa Telecommunications	202 Washington Ave East	X		X			5076sq ft			
Quality Ag Services	6385 196 <sup>th</sup> St			X				\$277,260		
Casey's	1117 S Clinton Ave			X			2376 sq ft	\$207,933		
Kum & Go	204 S Main St			X			2052sq ft	\$120,278		
Casey's	122 N Main St			X			1920 sq ft	\$124,832		
Albia Amoco	21 A Ave East			X			1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5			X			2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5			X						
Ferrellgas	121 10 <sup>th</sup> St			X				\$15,933		
McGee Sanitation	16 Washington Ave	X		X			12,144sq ft	\$65,985		
Relco-Locomotives	1 Relco Ave			X				\$7,092,511		
Burlington Northern- Santa Fe Railway	300 A St N			X						
Dollar General	900 Princeton Dr			X			10,458sq ft	\$306,453		
Jim & Charlie's AFF Foods	121 N Clinton			X			8592sq ft	\$111,294		
Hy-Vee	Hwy 34			X			19,927sq ft	\$733,530		
Pamida	Hwy 34			X			26,817sq ft	\$495,770		
Snack Shack	906 S Clinton St			X			1200sq ft	\$67,975		
Vitko's Sinclair	113 Benton Ave W			X			2031sq ft	\$82,014		
Preferred Wholesale	201 S Main St			X						
Trailer court	South Hwy 5		X							
Albia Historic Square	Hwy 5 & Benton Ave					X				

Albia Industrial park (8 businesses)	South Hwy 5			X					
Albia Community Schools	Scattered	X	X	X	X	X		\$31.9M	

**ALBIA – estimated loss due to Rail Transportation Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	467	35%	\$82,023,571	\$8,202,357	35%	3706	1297	35%
Commercial	266	26	10%	\$19,367,563	\$1,936,756	10%			
Industrial	36	4	10%	\$6,290,486	\$629,048	10%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education	6	2	33%	\$31.9M	\$10.5M	33%	1275	420	33%
Utilities	-	-	-	-	-	-	-	-	-

The community of Albia is at a greater risk of experiencing a rail incident just due to the number of rail lines that intersect the city. There are five sets of tracks that travel through the city limits of Albia. Along the miles of those rail lines lie numerous houses and a few businesses. This places approximately 35% of residential structures at risk and 10% of businesses. One rail line is within two city blocks of Kendall Elementary and the Jr. High section of the Jr/Sr High School building.

**Albia’s critical asset that can be affected by Rail Transportation Incident:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Albia City Hall/Community Center	120 S A St	X			X		3332sq ft	\$223,574	\$45,026	
Brees Rest Home	210 Washington Ave		X				2686sq ft	\$43,280		
Monroe Co Care Center	120 N 13 <sup>th</sup> St		X				22,076sq ft	\$1,069,175		
Oakwood Nursing & Rehab	200 16 <sup>th</sup> Ave East		X				24,570sq ft	\$690,971		
Parkview Cottage	645 8 <sup>th</sup> St		X				4469sq ft	\$289,093		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
Chariton Valley	2090 Hwy 5						13,779sq	\$599,315		

Electric Coop	South						ft			
Iowa Telecommunications	202 Washington Ave East						5076sq ft			
Quality Ag Services	6385 196 <sup>th</sup> St							\$277,260		
Albia Amoco	21 A Ave East						1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5						2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5									
Ferrellgas	121 10 <sup>th</sup> St							\$15,933		
McGee Sanitation	16 Washington Ave						12,144sq ft	\$65,985		
Relco-Locomotives	1 Relco Ave							\$7,092,511		
Burlington Northern- Santa Fe Railway	300 A St N									
Dollar General	900 Princeton Dr						10,458sq ft	\$306,453		
Preferred Wholesale	201 S Main St									
Trailer court	South Hwy 5		X							
Albia Industrial park (8 businesses)	South Hwy 5			X						
Albia Community Schools	Scattered	X	X	X	X	X		\$31.9M		

**ALBIA – estimated loss to Transportation of Radiological Materials**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	467	35%	\$82,023,571	\$8,202,357	35%	3706	1297	35%
Commercial	266	26	10%	\$19,367,563	\$1,936,756	10%			
Industrial	36	4	10%	\$6,290,486	\$629,048	10%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education	6	3	50%	\$31.9M	\$15.9M	50%	1275	637	50%
Utilities	-	-	-	-	-	-	-	-	-

The community of Albia is at a greater risk of experiencing an incident related to Radiological Materials due to the number of rail lines that intersect the city. There are five sets of tracks that travel through the city limits of Albia. Along the miles of those rail lines lie numerous houses and a

few businesses. This places approximately 35% of residential structures at risk and 10% of businesses.

Iowa State Highways 5 and 34 pass through (and intersect) in Albia’s City limits to offer an increased potential for a transportation of radiological materials incident. State Highway 5 intersects the City of Albia from north to south and is adjacent to Grant Elementary near the heart of the city of Albia. There are also five sets of tracks that travel through the city limits of Albia. One rail line is within two city blocks of Kendall Elementary and the Jr. High section of the Jr/Sr High School building that could potentially create a radiological incident affecting the school system.

**Albia’s critical asset that can be affected by Transportation of Radiological Materials:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Albia City Hall/Community Center	120 S A St	X			X		3332sq ft	\$223,574	\$45,026	
Brees Rest Home	210 Washington Ave		X				2686sq ft	\$43,280		
Monroe Co Care Center	120 N 13 <sup>th</sup> St		X				22,076sq ft	\$1,069,175		
Oakwood Nursing & Rehab	200 16 <sup>th</sup> Ave East		X				24,570sq ft	\$690,971		
Parkview Cottage	645 8 <sup>th</sup> St		X				4469sq ft	\$289,093		
Monroe Co Hospital	6580 165 <sup>th</sup> St	X	X				72,788sq ft	\$9,651,518		
Monroe co Medical Clinic	Avery Rd		X				8830sq ft	Included in hosp		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
Chariton Valley Electric Coop	2090 Hwy 5 South						13,779sq ft	\$599,315		
Iowa Telecommunications	202 Washington Ave East						5076sq ft			
Quality Ag Services	6385 196 <sup>th</sup> St							\$277,260		
Albia Amoco	21 A Ave East						1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5						2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5									

Ferrellgas	121 10 <sup>th</sup> St							\$15,933		
McGee Sanitation	16 Washington Ave						12,144sq ft	\$65,985		
Relco-Locomotives	1 Relco Ave							\$7,092,511		
Burlington Northern- Santa Fe Railway	300 A St N									
Dollar General	900 Princeton Dr						10,458sq ft	\$306,453		
Preferred Wholesale	201 S Main St									
Trailer court	South Hwy 5		X							
Albia Historic Square	Hwy 5 & Benton Ave					X				
Albia Industrial park (8 businesses)	South Hwy 5			X						
Albia Community Schools	Scattered	X	X	X	X	X		\$31.9M		

**ALBIA – estimated loss due to Fixed Hazardous Materials**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	67	5%	\$82,023,571	\$4,101,179	5%	3706	185	5%
Commercial	266	13	5%	\$19,367,563	\$968,378	5%			
Industrial	36	2	5%	\$6,290,486	\$314,524	5%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

The manufacturing plants, automobile repair, and gas stations are potential sites for hazardous materials incidents in Monroe County. There are approximately 9 locations in Albia that contain fixed hazardous materials available for purchase. This does include gas stations and farm supply businesses that are scattered throughout the community. Albia hosts an industrial site that is home to such businesses as RELCO, A.Y.M, Chicago Rivet & Machine, Superior Machine, Quiktron, L & S Tools, Iowa Aluminum, Hawkeye Molding, Walker Chemical Corp and Kness Manufacturing. These industries combined off employment to 550 individuals in this area.

**Albia’s critical asset that can be affected by Fixed Hazardous Materials:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*



Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Chariton Valley Electric Coop	2090 Hwy 5 South						13,779sq ft	\$599,315		
Quality Ag Services	6385 196 <sup>th</sup> St							\$277,260		
Casey's	1117 S Clinton Ave						2376 sq ft	\$207,933		
Kum & Go	204 S Main St						2052sq ft	\$120,278		
Casey's	122 N Main St						1920 sq ft	\$124,832		
Albia Amoco	21 A Ave East						1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5						2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5									
Ferrellgas	121 10 <sup>th</sup> St							\$15,933		
Relco-Locomotives	1 Relco Ave							\$7,092,511		
Burlington Northern- Santa Fe Railway	300 A St N									
Vitko's Sinclair	113 Benton Ave W						2031sq ft	\$82,014		
Albia Industrial park (8 businesses)	South Hwy 5			X						

**ALBIA – estimated loss due to Highway Transportation Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	334	25%	\$82,023,571	\$82,023,571	25%	3706	927	25%
Commercial	266	40	15%	\$19,367,563	\$2,905,134	15%			
Industrial	36	4	10%	\$6,290,486	\$629,048	10%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education	6	1	17%	\$31.9M	\$5.4M	17%	1275	217	17%
Utilities	-	-	-	-	-	-	-	-	-

The probability of highway transportation incidents is often higher on heavily used roads. However, more than 20% of the serious accidents in Monroe County have occurred at intersections between 2004 and 2008. Albia has one of the busiest intersections in the County on the south

edge of the City limits. Iowa State Highways 5 and 34 pass through (and intersect) to offer an increased potential for an incident, although an accident can happen anywhere.

**Albia’s critical asset that can be affected by Highway Transportation Incident:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideratio	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Chariton Valley Electric Coop	2090 Hwy 5 South						13,779sq ft	\$599,315		
Casey’s	1117 S Clinton Ave						2376 sq ft	\$207,933		
Kum & Go	204 S Main St						2052sq ft	\$120,278		
Casey’s	122 N Main St						1920 sq ft	\$124,832		
Albia Stop & Shop	300 N Hwy 5						2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5									
Burlington Northern- Santa Fe Railway	300 A St N									
Dollar General	900 Princeton Dr						10,458sq ft	\$306,453		
Hy-Vee	Hwy 34						19,927sq ft	\$733,530		
Pamida	Hwy 34						26,817sq ft	\$495,770		
Snack Shack	906 S Clinton St						1200sq ft	\$67,975		
Vitko’s Sinclair	113 Benton Ave W						2031sq ft	\$82,014		
Preferred Wholesale	201 S Main St									
Trailer court	South Hwy 5		X							
Albia Historic Square	Hwy 5 & Benton Ave					X				
Albia Industrial park (8 businesses)	South Hwy 5			X						
Albia Community Schools	Scattered	X	X	X	X	X		\$31.9M		

**ALBIA – estimated loss due to Transportation of Hazardous Materials**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	334	25%	\$82,023,571	\$82,023,571	25%	3706	927	25%
Commercial	266	40	15%	\$19,367,563	\$2,905,134	15%			
Industrial	36	4	10%	\$6,290,486	\$629,048	10%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education	6	1	17%	\$31.9M	\$5.4M	17%	1275	217	17%
Utilities	-	-	-	-	-	-	-	-	-

Iowa State Highways 5 and 34 pass through (and intersect) in Albia’s City limits to offer an increased potential for a transportation of Hazardous materials incident. Semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks. State Highway 5 intersects the City of Albia from north to south and is adjacent to Grant Elementary near the heart of the city of Albia.

**Albia’s critical asset that can be affected by Hazardous Materials:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Chariton Valley Electric Coop	2090 Hwy 5 South						13,779sq ft	\$599,315		
Quality Ag Services	6385 196 <sup>th</sup> St							\$277,260		
Casey’s	1117 S Clinton Ave						2376 sq ft	\$207,933		
Kum & Go	204 S Main St						2052sq ft	\$120,278		
Casey’s	122 N Main St						1920 sq ft	\$124,832		
Albia Stop & Shop	300 N Hwy 5						2981sq ft	\$100,236		
Smith Grain &	805 N Hwy									

Fertilizer	5								
Ferrellgas	121 10 <sup>th</sup> St							\$15,933	
Relco-Locomotives	1 Relco Ave							\$7,092,511	
Dollar General	900 Princeton Dr						10,458sq ft	\$306,453	
Hy-Vee	Hwy 34						19,927sq ft	\$733,530	
Pamida	Hwy 34						26,817sq ft	\$495,770	
Vitko's Sinclair	113 Benton Ave W						2031sq ft	\$82,014	
Trailer court	South Hwy 5		X						
Albia Historic Square	Hwy 5 & Benton Ave					X			
Albia Industrial park (8 businesses)	South Hwy 5			X					
Albia Community Schools	Scattered	X	X	X	X	X		\$31.9M	

**ALBIA – estimated loss by Structural Failure**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	667	50%	\$82,023,571	\$41,011,786	50%	3706	1853	50%
Commercial	266	133	50%	\$19,367,563	\$9,683,782	50%			
Industrial	36	18	50%	\$6,290,486	\$3,145,243	50%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Given the age of homes in Albia, the presumed age of infrastructure based on when Monroe County flourished, and nationwide concerns over aging infrastructure, the risk of structural failures may be relatively high. Additionally, many of the buildings in Monroe County were constructed in the late 1800's and early 1900's prior to the advent of building codes in the United States.

Bridges and overpass that exist in Monroe County that are noted of concern by Monroe County elected officials are: The BSNF rail overpass of Highway 5 on the north edge of Albia and the BSNF rail line west of Albia on the old state Highway 34.

**Albia's critical asset that can be affected by structural failure:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Trailer court	South Hwy 5		X							
Albia Historic Square	Hwy 5 & Benton Ave					X				

**ALBIA – estimated loss due to Structural Fire**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	667	50%	\$82,023,571	\$41,011,786	50%	3706	1853	50%
Commercial	266	133	50%	\$19,367,563	\$9,683,782	50%			
Industrial	36	18	50%	\$6,290,486	\$3,145,243	50%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

All of the Cities in Monroe County are relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.

Fire Insurance Ratings of Albia was given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk. Albia score was rated as a six.

**Albia’s critical asset that can be affected by structural fire:**

**\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideratio	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Albia Historic Square	Hwy 5 & Benton Ave					X				
Albia Industrial park (8 businesses)	South Hwy 5			X						

**ALBIA – estimated loss due to Radon/Lead**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	1001	75%	\$82,023,571	\$61,517,678	75%	3706	2780	75%
Commercial	266	133	50%	\$19,367,563	\$9,683,782	50%			
Industrial	36	18	50%	\$6,290,486	\$3,145,243	50%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

An estimated 15% to 20% of homes in Monroe County have elevated levels of Radon/Lead so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. The presence of the mines under the cities may also elevate this estimated proportion. Approximately 75% of the residence in Albia date prior to 1970 and this places them at a higher risk of containing Radon/Lead or Lead.

**Albia’s critical asset that can be affected by Radon/Lead:**

**\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideratio	Historic/ Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		

Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Albia Historic Square	Hwy 5 & Benton Ave					X				

**ALBIA – estimated loss due to Pipeline Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1335	67	5%	\$82,023,571	\$4,101,179	5%	3706	185	5%
Commercial	266	13	5%	\$19,367,563	\$968,378	5%			
Industrial	36	2	5%	\$6,290,486	\$314,524	5%	-	-	-
Agricultural	-	-	-				-	-	-
Religious / Non-profit									
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

One natural gas pipeline runs parallel to Highway 5 and enters the south edge of the City of Albia. This line extends approximately 10 miles from the south edge of the county into Albia.

**Albia’s critical asset that can be affected by pipeline incident:**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg In Square feet	Replacement Value	Content Value	Occupancy or capacity
Albia Public Library	203 Benton Ave			X		X	6936sq ft	\$123,696		
Monroe Co Historical Museum	114 A Ave East			X		X	8678sq ft	\$46,951		
Albia City Hall/Community Center	120 S A St	X			X		3332sq ft	\$223,574	\$45,026	
Brees Rest Home	210 Washington Ave		X				2686sq ft	\$43,280		
Monroe Co Care Center	120 N 13 <sup>th</sup> St		X				22,076sq ft	\$1,069,175		
Oakwood Nursing & Rehab	200 16 <sup>th</sup> Ave East		X				24,570sq ft	\$690,971		
Parkview Cottage	645 8 <sup>th</sup> St		X				4469sq ft	\$289,093		
Monroe Co Hospital	6580 165 <sup>th</sup> St	X	X				72,788sq ft	\$9,651,518		
Monroe co Medical Clinic	Avery Rd		X				8830sq ft	Included in hosp		

Albia Fire station	115 2 <sup>nd</sup> Ave	X			X		6000sq ft	\$121,692		
Monroe Co Sheriff's office/Albia Police Dept	103 2 <sup>nd</sup> Ave	X			X		4608sq ft	\$122,331		
Benton Place Apts	520 Benton Ave West		X				33,586sq ft	\$852,280		
First Responder bldg (Ambulance)							3399sq ft	\$115,215		
Monroe Co Courthouse	10 Benton Ave East			X		X	18,669sq ft			
Albia Municipal waterworks	120 S A St							\$99,190		
Chariton Valley Electric Coop	2090 Hwy 5 South						13,779sq ft	\$599,315		
Quality Ag Services	6385 196 <sup>th</sup> St							\$277,260		
Casey's	1117 S Clinton Ave						2376 sq ft	\$207,933		
Kum & Go	204 S Main St						2052sq ft	\$120,278		
Casey's	122 N Main St						1920 sq ft	\$124,832		
Albia Amoco	21 A Ave East						1869sq ft	\$105,170		
Albia Stop & Shop	300 N Hwy 5						2981sq ft	\$100,236		
Smith Grain & Fertilizer	805 N Hwy 5									
Ferrellgas	121 10 <sup>th</sup> St							\$15,933		
McGee Sanitation	16 Washington Ave						12,144sq ft	\$65,985		
Relco-Locomotives	1 Relco Ave							\$7,092,511		
Vitko's Sinclair	113 Benton Ave W						2031sq ft	\$82,014		
Preferred Wholesale	201 S Main St									
Trailer court	South Hwy 5		X							
Albia Historic Square	Hwy 5 & Benton Ave					X				
Albia Industrial park (8 businesses)	South Hwy 5			X						

**MELROSE – estimated loss due to Flash Flooding**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area



Residential	60	12	20%	\$1,833,750	\$366,750	20%	130	26	20%
Commercial	6	1	5%	\$60,834	\$3,042	5%			
Industrial	2	1	5%	\$141,977	\$7,099	5%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

The City of Melrose has the southern 20% of the community lying in the flood plain as mapped in the FEMA FIRM (See Appendix U). This region has historically experienced flash flooding and continues to be at risk. This does include possible damage to the BNSF rail system, the MFA propane containers, and 2 structures.

**Melrose’s critical asset that can be affected by flash flooding:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Sewer Lift Station		X								
Quality Ag	502 Erin Ave			X				\$141,977		
Melrose Market	115 Erin St									

**MELROSE – estimated loss due to Sink holes**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	30	50%	\$1,833,750	\$916,875	50%	130	65	50%
Commercial	6	3	50%	\$60,834	\$30,417	50%			
Industrial	2	1	50%	\$141,977	\$70,988	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Mines operated throughout Monroe county in the late 1800's. Historical documents state that there were mines surrounding the community of Melrose, however, there are not precise documents that map out the locations of the mine shafts.

**Melrose's critical asset that can be affected by sink holes:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Sewer Lift Station		X								
Quality Ag	502 Erin Ave			X				\$141,977		
Melrose Market	115 Erin St									

**MELROSE – estimated loss due to Rail Transportation Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	9	15%	\$1,833,750	\$275,063	15%	130	20	15%
Commercial	6	1	10%	\$60,834	\$6,083	10%			
Industrial	2	1	50%	\$141,977	\$70,989	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

A particular area of concern in Melrose is the land that is owned by Farm Services. The business stores numerous tanks of hazardous farm chemicals next to the railroad property and rail line. This places approximately 10% of commercial properties and 15% of residential structures.

**Melrose's critical asset that can be affected by Rail Transportation Incident:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
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City Hall	117 Shamrock				X				
Fire Hall	100 Shamrock				X				
Sewer Lift Station		X							
Quality Ag	502 Erin Ave			X				\$141,977	
Melrose Market	115 Erin St								

**MELROSE- estimated loss due to Structural Failure**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	30	50%	\$1,833,750	\$916,875	50%	130	65	50%
Commercial	6	3	50%	\$60,834	\$30,417	50%			
Industrial	2	1	50%	\$141,977	\$70,988	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Given the age of homes in Melrose, the presumed age of infrastructure based on when Monroe County flourished, and nationwide concerns over aging infrastructure, the risk of structural failures may be relatively high. Additionally, many of the buildings in Monroe County were constructed in the late 1800’s and early 1900’s prior to the advent of building codes in the United States.

**Melrose’s critical asset that can be affected by structural failure:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Melrose Market	115 Erin St									

**MELROSE – estimated loss due to Transportation of Radiological Materials**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	9	15%	\$1,833,750	\$275,063	15%	130	20	15%
Commercial	6	1	10%	\$60,834	\$6,083	10%			
Industrial	2	1	50%	\$141,977	\$70,989	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

A rail line passes through the southern part of the community and could potential be transporting Radiological Materials. This places approximately 10% of commercial properties and 15% of residential structures.

**Melrose’s critical asset that can be affected by Transportation of Radiological Materials:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Quality Ag	502 Erin Ave			X				\$141,977		
Melrose Market	115 Erin St									

**MELROSE – estimated loss due to Structural Fire**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	30	50%	\$1,833,750	\$916,875	50%	130	65	50%
Commercial	6	3	50%	\$60,834	\$30,417	50%			
Industrial	2	1	50%	\$141,977	\$70,988	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

All of the Cities in Monroe County are relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.

Fire Insurance Ratings of Melrose was given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk. Melrose rated as an eight.

**Melrose’s critical asset that can be affected by structural fire:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Quality Ag	502 Erin Ave			X				\$141,977		
Melrose Market	115 Erin St									

**MELROSE – estimated loss due to Radon/Lead**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	48	80%	\$1,833,750	\$1,467,000	80%	130	104	80%
Commercial	6	5	80%	\$60,834	\$48,667	80%			
Industrial	2	1	50%	\$141,977	\$70,988	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

An estimated 15% to 20% of homes in Monroe County have elevated levels of Radon or Lead so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. The presence of the mines under the cities may also elevate this

estimated proportion. Approximately 80% of the residence in Melrose date prior to 1970 and this places them at a higher risk of containing Radon or Lead.

**Melrose’s critical asset that can be affected by Radon or lead:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	117 Shamrock				X					
Fire Hall	100 Shamrock				X					
Melrose Market	115 Erin St									

**MELROSE – estimated loss due to Fixed Hazardous Materials**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	60	6	10%	\$1,833,750	\$183,375	10%	130	13	10%
Commercial	6	1	10%	\$60,834	\$6,083	10%			
Industrial	2	1	50%	\$141,977	\$70,989	50%	-	-	-
Agricultural	-	-	-		-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

The manufacturing plants, automobile repair, and gas stations are potential sites for hazardous materials incidents in Monroe County. A particular area of concern in Melrose is the land that is owned by Farm Services. The business stores numerous tanks of hazardous farm chemicals next to the railroad property and rail line.

**Melrose’s critical asset that can be affected by fixed hazardous materials:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
Quality Ag	502 Erin Ave			X				\$141,977		

**LOVILIA – estimated loss due to Sink Holes**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	112	50%	\$9,481,231	\$4,740,616	50%	583	292	50%
Commercial	40	20	50%	\$721,589	\$360,795	50%			
Industrial	40	20	50%	\$78,656	\$39,328	50%	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

At one point in history, there were 8 coal mining operations in or around Lovilia. Documents state approximate location of mines during that era but mapping is unclear as to the exact location of each mine shaft but it is believed that much of the community could be at risk of a potential sink hole due to mine shafts collapsing.

**Lovilia’s critical asset that can be affected to sink holes:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Lagoon	6057 115 <sup>th</sup> Trail	X					375 sq ft	132,490	--	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Rail Transportation Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	100	45%	\$9,481,231	\$4,266,554	45%	583	264	45%
Commercial	40	16	40%	\$721,589	\$288,636	40%			
Industrial	40	16	40%	\$78,656	\$31,462	40%	-	-	-
Agricultural	-	-	-	-		-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

Lovilia also has a rail line that extends through the community from north to south. It runs parallel to state highway 5 and within 30 yards of it. This places travelers at risk, approximately 40% of businesses, and 45% of homes.

**Lovilia’s critical asset that can be affected by rail transportation incident:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Radon/Lead**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	156	70%	\$9,481,231	\$6,636,861	70%	583	410	70%
Commercial	40	20	50%	\$721,589	\$360,795	50%			
Industrial	40	20	50%	\$78,656	\$39,328	50%	-	-	-



Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

An estimated 15% to 20% of homes in Monroe County have elevated levels of Radon/Lead so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. The presence of the mines under the cities may also elevate this estimated proportion. Approximately 70% of the residence in Lovilia date prior to 1970 and this places them at a higher risk of containing Radon/Lead or Lead.

**Lovilia’s critical asset that can be affected by Radon/Lead:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	

**LOVILIA – estimated loss due to Transportation Radiological Material**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	100	45%	\$9,481,231	\$4,266,554	45%	583	264	45%
Commercial	40	16	40%	\$721,589	\$288,636	40%			
Industrial	40	16	40%	\$78,656	\$31,462	40%	-	-	-
Agricultural	-	-	-	-		-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

Lovilia also has a rail line that extends through the community from north to south. It runs parallel to State Highway 5 and within 30 yards of it. This places approximately 40% of businesses and 45%

of homes at risk if there were to be Radiological Material on board. An additional risk could be any Radiological materials that are transported on State Highway 5. This highway and rail line both dissect the city the entire length north to south.

**Lovilia’s critical asset that can be affected by transportation radiological material:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Flash Flooding**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	11	5%	\$9,481,231	\$474,062	5%	583	29	5%
Commercial	40	2	5%	\$721,589	\$36,079	5%			
Industrial	40	2	5%	\$78,656	\$3,933	5%	-	-	-
Agricultural	-	-	-	-		-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

Lovilia has had limited experience with flash flooding but it has occurred under record rainfall incidents in the past few years. Primarily the storm water drainage systems could not keep up so there was flooding in low lying areas throughout the community.

**Lovilia’s critical asset that can be affected by flash flooding:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Lagoon	6057 115 <sup>th</sup> Trail	X					375 sq ft	132,490	--	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Fixed Hazardous Materials**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	22	10%	\$9,481,231	\$948,123	10%	583	58	10%
Commercial	40	4	10%	\$721,589	\$72,158	10%			
Industrial	40	4	10%	\$78,656	\$7,865	10%	-	-	-
Agricultural	-	-	-	-		-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

The manufacturing plants, automobile repair, and gas stations are potential sites for hazardous materials incidents in Monroe County. There are two fuel stations along State Highway 5 that are located in the center of the community. An additional site that may contain hazardous materials would be a farm supply and grain store on the north edge of the community along Highway 5.

**Lovilia’s critical asset that can be affected by fixed hazardous materials:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey's	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Highway Transportation Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	100	45%	\$9,481,231	\$4,266,554	45%	583	262	45%
Commercial	40	16	40%	\$721,589	\$288,636	40%			
Industrial	40	16	40%	\$78,656	\$31,462	40%	-	-	-
Agricultural	-	-	-	-		-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

Iowa State Highways 5 passes through the entire length of the city from north to south and has increased potential for a highway transportation incident. However, an incident could happen anywhere.

**Lovilia’s critical asset that can be affected by highway transportation incident:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey's	1807						1962sq	\$102,125		

Highway 5						ft			
-----------	--	--	--	--	--	----	--	--	--

**LOVILIA – estimated loss due to Transportation of Hazardous Material**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	100	45%	\$9,481,231	\$4,266,554	45%	583	262	45%
Commercial	40	16	40%	\$721,589	\$288,636	40%			
Industrial	40	16	40%	\$78,656	\$31,462	40%	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

Iowa State Highway 5 offers an increased potential for a transportation of Hazardous materials incident. Semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks.

**Lovilia’s critical asset that can be affected by transportation of hazardous materials:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Lagoon	6057 115 <sup>th</sup> Trail	X					375 sq ft	132,490	--	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Structural Failure**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	112	50%	\$9,481,231	\$4,740,616	50%	583	292	50%
Commercial	40	20	50%	\$721,589	\$360,795	50%			
Industrial	40	20	50%	\$78,656	\$39,328	50%	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education	1	1	100%						
Utilities									

Given the age of homes in Lovilia, the presumed age of infrastructure based on when Monroe County flourished, and nationwide concerns over aging infrastructure, the risk of structural failures may be relatively high. Additionally, many of the buildings in Monroe County were constructed in the late 1800’s and early 1900’s prior to the advent of building codes in the United States.

**Lovilia’s critical asset that can be affected by structural failure:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
City Maintenance/Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	

**LOVILIA – estimated loss due to Pipeline Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	11	5%	\$9,481,231	\$474,062	5%	583	29	5%
Commercial	40	2	5%	\$721,589	\$36,079	5%			
Industrial	40	2	5%	\$78,656	\$3,933	5%	-	-	-
Agricultural	-	-	-	-	-	-	-	-	-
Religious / Non-profit	1	1	100%						

Government			100%						
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

A natural gas line enters the county from the north (adjacent to Highway 5) for 2 miles in order to provide service to the city of Lovilia.

**Lovilia’s critical asset that can be affected by pipeline incident:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/ Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
Water plant	606 W 17 <sup>th</sup> St	X					1088 sq ft	43,700	49,070	
Water tower	606 W 17 <sup>th</sup> St	X					--	285,600	--	
City Maintenance/ Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**LOVILIA – estimated loss due to Structural Fire**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	223	112	50%	\$9,481,231	\$4,740,616	50%	583	292	50%
Commercial	40	20	50%	\$721,589	\$360,795	50%			
Industrial	40	20	50%	\$78,656	\$39,328	50%	-	-	-
Agricultural	-	-	-	-		-	-	-	-
Religious / Non-profit	1	1	100%						
Government									
Education	1	1	100%						
Utilities	-	-	-	-	-	-	-	-	-

All of the Cities in Monroe County are relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that

hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.

Fire Insurance Ratings of Lovilia was given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk. Lovilia rated as an eight.

**Lovilia’s critical asset that can be affected by structural fire:**

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value	Occupancy or capacity
City Hall	1613 South E St				X		3186 sq ft	125,537	257,760	
Fire Hall	605 W 17 <sup>th</sup> St	X			X		1600 sq ft	68,840	97,500	
Community Bldg	608 W 17 <sup>th</sup> St				X					
City Maintenance/Storage	1611 E Ave So				X		1239 sq ft	54,838	22,000	
Gas & Go	1604 Highway 5						2063sq ft	\$92,838		
Casey’s	1807 Highway 5						1962sq ft	\$102,125		

**UNINCORPORATED COUNTY AREA – estimated loss due to River flooding**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	84	10%	\$44,598,400.00	\$4,459,840	10%	3597	359	10%
Commercial	99	9	10%	\$40,018,241.00	\$4,001,824	10%			10%
Industrial	120	12	10%	\$131,308,228.00	\$13,130,822	10%	-	-	-
Agricultural	905	90	10%	\$57,938,330.00	\$5,793,833	10%	-	-	-
Religious / Non-profit	4	1	10%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-



The 100 year floodplain estimates that 4.7% of the county is located in this potential flood zone (“**A HAZUA-MH Assessment of Iowa’s Vulnerability to Flooding**”). Nearly all of this area of concern is located in the rural region of the county. The unincorporated community of Hiteman is of greatest concern because it lies just on the outer edge of the 100 year flood plain. Also at risk are the seasonal residents that reside in the regions of Green Acres, Lazy Daz Ranch, and Lazy Daz Ranch Estates because of their location near the tributaries that lead into the adjacent tail waters of Lake Rathbun.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Lazy-Daz Ranch (40 structures)	Melrose		X		X			\$1,029,329	
Green Acres Mobile homes (54 structures)	Melrose		X		X			\$1,733,783	
Lazy Daz Ranch Estates(21 structures)	Melrose		X		X			\$379,416	
Willow Park	Melrose		X		X			\$169,790	

### UNINCORPORATED COUNTY AREA – estimated loss due to Sink Holes

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	253	30%	\$44,598,400.00	\$13,379,520	30%	3597	1079	30%
Commercial	99	30	30%	\$40,018,241.00	\$1,200,547	30%			
Industrial	120	36	30%	\$131,308,228.00	\$39,392,468	30%	-	-	-
Agricultural	905	272	30%	\$57,938,330.00	\$17,381,499	30%	-	-	-
Religious / Non-profit	4	1	30%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

In the late 1880’ and the turn of the century there were as many as 30 coal mines operating throughout Monroe County (“**Historical Sketch Book of Albia & Monroe County**”, Albia Centennial Corp 1859-1959.) Historical data collected gives estimated locations of such mines but there is no precise mapping to be able to identify target areas. It is known that mines were in operation near the now un-incorporated towns of Hiteman, Avery and Fredric. There is also documentation of eleven (11) mines in the outer lying areas of Albia in the rural region of the county.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)	Scattered locations	X						\$1M/ea	
Rural Water towers (3)	Scattered location	X						\$1M/ea	
IDOT roads maintenance shop	South Hwy 5			X					
Halley’s Trailer Park (35 homes)	East Hwy 34		X					\$68,890 land \$90,041 bldgs	
Lazy-Daz Ranch (91 structures)	Melrose		X		X			\$2,058,658	
Green Acres Mobile homes (108 structures)	Melrose		X		X			\$3,467,566	
Monroe County Fairgrounds (land & structures)	North Hwy 5			X				\$310,613	
Lazy Daz Ranch Estates(21 structures)	Melrose		X		X			\$758,831	
Willow Park	Melrose		X		X			\$169,790	

### UNINCORPORATED COUNTY AREA – estimated loss due to Flash Flooding

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard	# in region	# in Hazard	% in Hazard Area

		Area				Area		Area	
Residential	843	84	10%	\$44,598,400.00	\$4,459,840	10%	3597	359	10%
Commercial	99	9	10%	\$40,018,241.00	\$4,001,824	10%			10%
Industrial	120	12	10%	\$131,308,228.00	\$13,130,822	10%	-	-	-
Agricultural	905	90	10%	\$57,938,330.00	\$5,793,833	10%	-	-	-
Religious / Non-profit	4	1	10%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Monroe county LEPC specifically sites the locations of Middle Avery Creek along “Smokey Hollow”; White Creek Valley; and Cedar Creek Valley in the rural regions of the county are particularly vulnerable to flash flooding. Primary damage along these valleys result in roadway and agriculture damage. Also, Cedar Creek commonly experiences flash flooding as it flows north to south and crosses approximately 75% the county’s length. This creek can solely affect 5 villages in the unincorporated region.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
IDOT roads maintenance shop	South Hwy 5			X					
Lazy-Daz Ranch (45 structures)	Melrose		X		X			\$1,029,329	
Green Acres Mobile homes (54 structures)	Melrose		X		X			\$1,733,783	
Monroe County Fairgrounds (land& structures)	North Hwy 5			X				\$310,613	
Lazy Daz Ranch Estates(10 structures)	Melorse		X		X			\$379,416	
Willow Park	Melrose		X		X			\$169,790	

### UNINCORPORATED COUNTY AREA – estimated loss due to Radon/Lead

Type of	Number of	Value of Structures	Number of People
---------	-----------	---------------------	------------------

Structure	Structures			\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
	# in region	# in Hazard Area	% in Hazard Area						
Residential	843	464	55%	\$44,598,400.00	\$24,529,120	55%	3597	1978	55%
Commercial	99	49	50%	\$40,018,241.00	\$20,009,120	50%			50%
Industrial	120	60	50%	\$131,308,228.00	\$65,654,114	50%	-	-	-
Agricultural	905	453	50%	\$57,938,330.00	\$28,969,165	50%	-	-	-
Religious / Non-profit	4	2	50%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

An estimated 15% to 20% of homes in Monroe County have elevated levels of Radon/Lead so this estimate can be extrapolated to suggest the same proportion of homes in each Monroe county community are affected as well. The presence of the mines under the cities may also elevate this estimated proportion. Approximately 55% of the residence in the rural region of Monroe County date prior to 1970 and this places them at a higher risk of containing Radon/Lead or Lead. The mobile home park of “Halley’s” is included in this inventory due to the age of the structures.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Halley’s Trailer Park (35 homes)	East Hwy 34		X					\$90,041 bldgs	

### UNINCORPORATED COUNTY AREA – estimated loss due to Highway Transportation Incident

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	253	30%	\$44,598,400.00	\$13,379,520	30%	3597	1079	30%
Commercial	99	30	30%	\$40,018,241.00	\$1,200,547	30%			
Industrial	120	36	30%	\$131,308,228.00	\$39,392,468	30%	-	-	-

Agricultural	905	272	30%	\$57,938,330.00	\$17,381,499	30%	-	-	-
Religious / Non-profit	4	1	30%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Given the reliance on private vehicles and trucking in rural Iowa, the probability of an accident on any given roadway is relatively high. The county has three state highways that are identified in the county. Highway 5 transports traffic north and south across the county and Highway 34 extends east and west through Monroe county. State Highway 137 branches off of highway 5 on the north edge of Albia and continues northeasterly to the city of Eddyville.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Rural Water towers (3)	Scattered location	X						\$1M/ea	
IDOT roads maintenance shop	South Hwy 5			X					
Halley's Trailer Park (35 homes)	East Hwy 34		X					\$68,890 land \$90,041 bldgs	
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$80,026,460	
Monroe County Fairgrounds (land & structures)	North Hwy 5			X				\$310,613	
Wacker Chemical Corp	NE corner of county			X	X			\$5,114,095	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$29,733,719	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$22,895,026	

### UNINCORPORATED COUNTY AREA – estimated loss due to Transportation of Radiological Materials

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in	# in	% in	\$ in City	\$ in Hazard	% in	# in	# in	% in

	region	Hazard Area	Hazard Area		Area	Hazard Area	region	Hazard Area	Hazard Area
Residential	843	42	5%	\$44,598,400.00	\$2,229,920	5%	3597	180	5%
Commercial	99	5	5%	\$40,018,241.00	\$2,000,912	5%			
Industrial	120	6	5%	\$131,308,228.00	\$6,565,411	5%	-	-	-
Agricultural	905	45	5%	\$57,938,330.00	\$2,896,917	5%	-	-	-
Religious / Non-profit	4	1	5%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

The county has three state highways that are identified in the county. Highway 5 transports traffic north and south across the county and Highway 34 extends east and west through Monroe county. State Highway 137 branches off of highway 5 on the north edge of Albaia and continues northeasterly to the city of Eddyville. Additional risks of transportation of radiological material can occur along the rail lines in Monroe County. There are three railroad companies that operate lines in Monroe County: BNSF, APNC, and IMRL. They total approximately 90 miles of rail line throughout the county. Industries located in the Northeast region of the county have potential exposure due to State Highway 137 that is adjacent each property. It is estimated that only the north half of each location (that closest the roadway) would be affected.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$40,013,230	
Wacker Chemical Corp	NE corner of county			X	X			\$2,557,048	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$14,866,860	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$11,447,513	

### UNINCORPORATED COUNTY AREA - estimated loss due to Structural Fire

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard	% in Hazard	\$ in City	\$ in Hazard Area	% in Hazard	# in region	# in Hazard	% in Hazard Area

		Area	Area			Area		Area	
Residential	843	379	45%	\$44,598,400.00	\$20,069,280	45%	3597	1619	45%
Commercial	99	45	45%	\$40,018,241.00	\$18,008,208	45%			
Industrial	120	54	45%	\$131,308,228.00	\$59,088,703	45%	-	-	-
Agricultural	905	407	45%	\$57,938,330.00	\$26,072,248	45%	-	-	-
Religious / Non-profit	4	2	45%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

All of the Cities in Monroe County are relatively old indicating two things, 1) the wood and building materials used in its structures may be more flammable due to age and 2) structures may not meet more recent building and fire codes. Similarly, the absence of a zoning ordinance means that hazardous and flammable materials may be stored and used anywhere in town elevating the potential threat of fire spreading to homes that may not be otherwise subject to substantial fires.

Fire Insurance Ratings were given previously in this document. The ratings indicate reason for concern with Monroe County scoring the lowest possible at “10”. This score indicates that the community’s fire suppression program does not meet minimum requirements for the ISO. ISO is an organization that provides data, analysis, and decision-making support for various professions about risk.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)	Scattered locations	X						\$1M/ea	
IDOT roads maintenance shop	South Hwy 5			X					
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$80,026,460	
Wacker Chemical Corp	NE corner of county			X	X			\$5,114,095	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$29,733,719	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$22,895,026	

### UNINCORPORATED COUNTY AREA – estimated loss due to Dam Failure

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	84	10%	\$44,598,400.00	\$4,459,840	10%	3597	359	10%
Commercial	99	9	10%	\$40,018,241.00	\$4,001,824	10%			10%
Industrial	120	12	10%	\$131,308,228.00	\$13,130,822	10%	-	-	-
Agricultural	905	90	10%	\$57,938,330.00	\$5,793,833	10%	-	-	-
Religious / Non-profit	4	1	10%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Lake Miami’s Dam was completed in 1967 and the 50 year design life will be reached in 2017. This 140 acre body of water is governed and monitored by the Monroe County Conservation Board. This board has taken additional precautionary measure to alleviate potential problems with an inundation of water by developing four large ponds and a wetland area upstream from the lake.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Lake Miami Campground	N Hwy 5		X						
Lake Miami dam	N Hwy 5				X				

### UNINCORPORATED COUNTY AREA - estimated loss due to Transportation of Hazardous Materials

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	253	30%	\$44,598,400.00	\$13,379,520	30%	3597	1079	30%
Commercial	99	30	30%	\$40,018,241.00	\$1,200,547	30%			
Industrial	120	36	30%	\$131,308,228.00	\$39,392,468	30%	-	-	-
Agricultural	905	272	30%	\$57,938,330.00	\$17,381,499	30%	-	-	-
Religious / Non-profit	4	1	30%						



Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Iowa State Highways 5 and 34 offers an increased potential for a transportation of Hazardous materials incident. As well as, semis frequently transport along this roadway in addition to local farmers that commonly transport Anhydrous Ammonia tanks.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Landfill				X					
IDOT roads maintenance shop	South Hwy 5			X					
Lake Miami dam	N Hwy 5				X				
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$40,013,230	
Wacker Chemical Corp	NE corner of county			X	X			\$2,557,048	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$14,866,860	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$11,447,513	

### UNINCORPORATED COUNTY AREA – estimated loss due to Fixed Hazardous Materials

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	84	10%	\$44,598,400.00	\$4,459,840	10%	3597	359	10%
Commercial	99	9	10%	\$40,018,241.00	\$4,001,824	10%			10%
Industrial	120	12	10%	\$131,308,228.00	\$13,130,822	10%	-	-	-
Agricultural	905	90	10%	\$57,938,330.00	\$5,793,833	10%	-	-	-
Religious / Non-profit	4	1	10%						
Government									

t									
Education									
Utilities	-	-	-	-	-	-	-	-	-

The manufacturing plants, automobile repair, gas stations, and farm yards are potential sites for hazardous materials incidents in Monroe County. Also, two large industries are located in the far Northeast corner of Monroe County. The physical addresses place both of them near the City of Eddyville but on right on the edge of the Monroe County line. The Cargill plant offers employment to more than 550 residents from a large area. The Cargill plant is a processing plant that produces pet food and various other products for human consumption. Ajinomoto Heartland is global leaders of feed-grade amino acid manufacturing. Representing Ajinomoto Animal Nutrition in North America, Ajinomoto Heartland LLC manufactures and distributes cost effective feed-grade amino acids and is the frontrunner in amino acid nutritional research and technical expertise. This industry employs approximately 75 employees. Ajinomoto Food Ingredients produces supplemental food ingredients for human consumption. This division employs about 100 individuals. An increased change occurs on State Highway 137 connecting the industries of Cargill and Ajinomoto. Each location has a host of chemicals and hazardous materials on site that are critical to their industrial process.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Total Replacement Value	Content Value
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$80,026,460	
Wacker Chemical Corp	NE corner of county			X	X			\$5,114,095	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$29,733,719	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$22,895,026	

### UNINCORPORATED COUNTY AREA – estimated loss due to Pipeline Incident

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	84	10%	\$44,598,400.00	\$4,459,840	10%	3597	359	10%
Commercial	99	9	10%	\$40,018,241.00	\$4,001,824	10%			10%
Industrial	120	12	10%	\$131,308,228.00	\$13,130,822	10%	-	-	-

Agricultural	905	90	10%	\$57,938,330.00	\$5,793,833	10%	-	-	-
Religious / Non-profit	4	1	10%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

One natural gas pipeline runs parallel to Highway 5 and enters the south edge of the City of Albia. This line extends approximately 10 miles from the south edge of the county into Albia. Another natural gas line enters the county from the north (adjacent to Highway 5) for 2 miles in order to provide service to the city of Lovilia.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
IDOT roads maintenance shop	South Hwy 5			X					
Monroe County Fairgrounds (land & structures)	North Hwy 5			X				\$310,613	

### UNINCORPORATED COUNTY AREA – estimated loss due to Air Transportation Incident

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	42	5%	\$44,598,400.00	\$2,229,920	5%	3597	180	5%
Commercial	99	5	5%	\$40,018,241.00	\$2,000,912	5%			
Industrial	120	6	5%	\$131,308,228.00	\$6,565,411	5%	-	-	-
Agricultural	905	45	5%	\$57,938,330.00	\$2,896,917	5%	-	-	-
Religious / Non-profit	4	1	5%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Albia Municipal Airport is owned and operated by the City of Albia. It is described as a “Basic Service Airport” by the National Plan of Integrated Airport System (NPIAS) . It is located in the unincorporated area just southeast of Albia.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Electrical Substations (4)	Scattered locations	X						\$1M/ea	
Rural Water towers (3)	Scattered location	X						\$1M/ea	
Halley’s Trailer Park (35 homes)	East Hwy 34		X					\$68,890 land \$90,041 bldgs	

### UNINCORPORATED COUNTY AREA - estimated loss due to Rail Transportation Incident

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	253	30%	\$44,598,400.00	\$13,379,520	30%	3597	1079	30%
Commercial	99	30	30%	\$40,018,241.00	\$1,200,547	30%			
Industrial	120	36	30%	\$131,308,228.00	\$39,392,468	30%	-	-	-
Agricultural	905	272	30%	\$57,938,330.00	\$17,381,499	30%	-	-	-
Religious / Non-profit	4	1	30%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

There are three railroad companies that operate lines in Monroe county: BNSF, APNC, and IMRL. The IMRL crosses the southeast corner of rural Monroe county near the un-incorporated communities of Foster and Brompton. APNC’s rail line enters the county from the south and runs parallel to highway 5 into the City of Albia only affecting the unincorporated area of Selection. BNSF hosts the highest miles of rail line throughout Monroe County. There are 5 rail lines that exit the RELCO rail yard in Albia. Three BNSF lines extend to the northeast region of the county to affect the unincorporated communities Maxon, Avery, Lockman, and Frederic. One BNSF line

parallels highway 5 to the northern boundary of the Monroe County line through the communities of Lovilia and Hagerty. The remaining BNSF rail line directs west from Albia to the south edge of Melrose and exits parallel to highway 34 at the west limit of Monroe/Lucas county line. The communities Halpin, Tower Station, and Tyrone are also affected by this line. There are numerous crossings present the opportunity for train-vehicle or pedestrian accidents. Derailments are also possible, while major derailments are less likely.

### Unincorporated County Structural Inventory

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor's Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Total Replacement Value	Content Value
Cargill (Ag & Industrial)	N Hwy 34 Eddyville			X				\$80,026,460	
Monroe County Fairgrounds (land & structures)	North Hwy 5			X				\$310,613	
Wacker Chemical Corp	NE corner of county			X	X			\$5,114,095	
Ajinomoto Heartland, LLC	NE corner of county			X	X			\$29,733,719	
Ajinomoto USA Inc/ Ajinomoto Food	NE corner of the county			X	X			\$22,895,026	

### UNINCORPORATED COUNTY AREA - estimated loss due to Structural Failure

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	379	45%	\$44,598,400.00	\$20,069,280	45%	3597	1619	45%
Commercial	99	45	45%	\$40,018,241.00	\$18,008,208	45%			
Industrial	120	54	45%	\$131,308,228.00	\$59,088,703	45%	-	-	-
Agricultural	905	407	45%	\$57,938,330.00	\$26,072,248	45%	-	-	-
Religious / Non-profit	4	2	45%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Given the age of homes in Albia, Melrose, and Lovilia, the presumed age of infrastructure based on when Monroe County flourished, and nationwide concerns over aging infrastructure, the risk of

structural failures may be relatively high. Additionally, many of the buildings in Monroe County were constructed in the late 1800’s and early 1900’s prior to the advent of building codes in the United States.

According to the Monroe county Engineer, “Monroe County has 149 bridges that we inspect (20 feet span or longer). Of those bridges, 47 are posted for less than legal loads. We also have 5 that are closed to traffic. We have 28 that are considered “scour critical”, which would require closure and re-inspection before they could be reopened after a “major event”. Our bridge inspection consultant also rates our bridges for projected remaining life. They indicate we have 40 that have 5 or less years remaining life.

**UNINCORPORATED COUNTY AREA – estimated loss due to Waterway Incident**

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in region	# in Hazard Area	% in Hazard Area	\$ in City	\$ in Hazard Area	% in Hazard Area	# in region	# in Hazard Area	% in Hazard Area
Residential	843	84	10%	\$44,598,400.00	\$4,459,840	10%	3597	359	10%
Commercial	99	9	10%	\$40,018,241.00	\$4,001,824	10%			10%
Industrial	120	12	10%	\$131,308,228.00	\$13,130,822	10%	-	-	-
Agricultural	905	90	10%	\$57,938,330.00	\$5,793,833	10%	-	-	-
Religious / Non-profit	4	1	10%						
Government									
Education									
Utilities	-	-	-	-	-	-	-	-	-

Risk of a waterway incident can occur in many locations throughout the un-incorporated region of Monroe County. There are numerous farm ponds, seven creeks, Lake Miami, and near-by Lake Rathbun that has tail waters extending into Monroe County. A drowning or contamination spill has the potential of occurring at any of these. The seasonal residents of Lazy Daz Ranch and Green Acres could be affected by a waterway incident because the proximity to tributaries and tail waters of Lake Rathbun.

**Unincorporated County Structural Inventory**

*\*\*Estimates of Square footage and Replacement Value provided by Monroe County Assessor’s Office*

Name of Asset	Location	Critical Facility	Vulnerable population	Economic Asset	Special Consideration	Historic/Other	Size of Bldg	Replacement Value	Content Value
Lake Miami Campground	N Hwy 5		X						

Lake Miami dam	N Hwy 5				X				
Lazy-Daz Ranch (91 structures)	Melrose		X		X			\$2,058,658	
Green Acres Mobile homes (108 structures)	Melrose		X		X			\$3,467,566	
Lazy Daz Ranch Estates(21 structures)	Melrose		X		X			\$758,831	
Willow Park	Melrose		X		X			\$169,790	

## 6. Goals and Objectives

Once the Planning Committee had a sense for what threats face their jurisdictions based on research and prioritized hazards, the Committee considered what should be done. Three broad goals were decided on and then detailed with more specific objectives which can be measured by actions and projects designed to address them. Specific actions and projects are discussed in the next chapter along with alternatives discussed but set aside due to feasibility of completing them.

### ***Goal 1: Protect critical facilities, infrastructure, and other community assets from the impacts of hazards***

**Objective 1.1** Seek mitigation projects that provide the highest degree of hazard protection at the least cost.

**Objective 1.2** Strengthen partnerships and collaboration of jurisdictions, as well as, invite corporate partners, education systems, agencies and faith based representatives to participate in emergency planning and recovery.

**Objective 1.3** Utilize public funds/grant opportunities to protect critical facilities, public services & transportation entities.

### ***Goal 2: Protect the health, safety & quality of life for Monroe County residents by minimizing the vulnerability of people and property in Monroe County.***

**Objective 2.1** Ensure that property owners can maintain & improve their properties.

**Objective 2.2** Ensure that disaster recovery can proceed promptly following a disaster.

**Objective 2.3** Provide back-up energy supplies in all vital assets identified in this plan.

**Objective 2.4** Promote improving zoning codes, building codes, nuisance abatement, and health codes, especially in relation to areas with older buildings.

**Objective 2.5** Review the protocol, education & necessary medications/interventions to deal with airborne & human transmitted hazards that directly deal with impact of health & life.

### ***Goal 3: Reduce losses due to natural and man-made hazards.***

**Objective 3.1** Educate members of the county about hazards, how to be prepared, & shelter locations.

**Objective 3.2** Review & upgrade warning systems and communications for sufficient coverage

**Objective 3.3** Provide certified shelters/safe rooms

**Objective 3.4** Provide adequate training, equipment and exercises to train responding emergency personnel.

**Objective 3.5** Maintain current & create new planning and exercises related to any terrorism event.

**Objective 3.6** Identify and map locations of accidents in an annual public report in order to determine locations where improvements are necessary.



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## 7. Analysis of Mitigation Activities

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Once a comprehensive and quantitative analysis of the hazards that actually do or may affect residents in Monroe County was completed, mitigation decision making becomes possible. This section takes the analysis of the hazards to address current activities that address hazard events, most of this is through emergency response, and then addresses options discussed by the planning committee to address hazards in other ways.

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### A. Current Mitigation Activities

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Current mitigation activities were discussed in conjunction with brainstorming potential actions, below is a list of actions that were mentioned;

#### Un-incorporated County

- Monroe county Sherriff's office (in Albia) provides service to entire county
- Mobile communication trailer(s) located at Appanoose County Law Center; about 5-6 hours are needed to mobilize
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- HydroClean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions.
- County-wide Emergency Operations Plan (EOP) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Monroe county Supervisors' office.
- Tree trimming or management is currently handled by utility services provided throughout the county.

#### LOVILIA

- Fire Station has a storm warning system
- Mobile communication trailer(s) located at Appanoose County Law Center; about 5-6 hours are needed to mobilize
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- HydroClean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions.
- County-wide Emergency Operations Plan (EOP) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Monroe county Supervisors' office.
- Tree trimming or management is currently handled by utility services
- Fire fighters & emergency personnel have hand held radios

## Mitigation Strategies – Existing

### ALBIA

- Fire Station has a storm warning system
- Monroe County Sherriff's office & City of Albia police Department has contact information for Monroe county firefighters.
- Mobile communication trailer(s) located at Appanoose County Law Center; about 5-6 hours are needed to mobilize.
- Sand or blade trucks are / can be used to clear paths for first responders in the event of road blockage (debris or heavy snow).
- Legion Hall, Monroe county Community Church, and Community Center can / have been utilized as temporary shelters and gathering places in the event of disasters
- There is a yard clean-up ordinance, but it is very difficult to enforce (affects tornado and high-wind debris hazards).
- Railroad works well and promptly with the City of Monroe county on railroad incidents
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- HydroClean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions
- The City participates in the National Flood Insurance Program (NFIP) with a Flood Insurance Rate Map dated 6/10/1980, however few residents have purchased flood insurance
- The City requires mobile home tie-downs
- Tree trimming or management is currently handled to an extent by utility services in Monroe county
- County-wide Emergency Operations Plan (EOP) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Monroe county Supervisors' office.

### MELROSE

- Fire Station has a storm warning system
- Monroe County police patrol in the city limits
- Mobile communication trailer(s) located at Appanoose County Law Center; about 5-6 hours are needed to mobilize
- 28E agreements in place with surrounding jurisdictions for fire protection and hazardous materials containment.
- HydroClean, based in Des Moines, is the designated hazardous materials clean-up agent; local fire fighters perform containment actions.
- County-wide Emergency Operations Plan (EOP) is in place and maintained by ADLM Emergency Management; a copy of the plan is present in the Monroe county Supervisors' office.

- The City participates in the National Flood Insurance Program (NFIP) with a Flood Insurance Rate Map dated 7/2/1987
- Tree trimming or management is currently handled by utility services
- Fire fighters & emergency personnel have hand held radios

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## B. Mitigation Actions

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The Planning Committee focused mitigation strategies on the high-risk hazards where investments of time and other resources would be expected to make the greatest impact on protecting each jurisdiction. Some strategies are applicable to more than one hazard and may be applicable to the moderate- and acceptable-risk hazards as well. Mitigation alternatives began in a brainstorming activity during a meeting and then further supplemented by discussing alternatives listed in the FEMA publication *Mitigation Ideas: Possible Mitigation Measures by Hazard Type, FEMA-R5, 9/02*. This document was briefly presented in an early meeting and also left at City Hall for review by committee members and the public.

Select ideas from the FEMA document were proposed to the committee for mitigation selection, excluding actions that would require large changes to local culture (such as developing a zoning ordinance, development rights, or taxes/fees, among others) or would be particularly costly and not fit with smaller cities.

Each of the identified mitigation alternatives were considered and evaluated through the FEMA tool, STAPLEE. This acronym indicates the various factors that should be considered in planning decisions standing for Social, Technical, Administrative, Political, Legal, Economic, and Environmental elements. Each mitigation alternative was evaluated simply with plus signs, minus signs, or left blank during committee meetings. Plus signs indicate no adverse impact or positive impacts anticipated, minus signs indicate the anticipation of resistance, high cost, or conflict, and blank elements are not anticipated to have either positive or negative impacts or may be unknown.

These ratings, once compiled, were then quantified with 1 for a plus sign, 0 for a blank or neutral score and a -1 for a minus sign and then the elements of each action were summed up for a numerical rating. See *Appendix S: STAPLEE Worksheet* for a summary of the STAPLEE ratings.

### Explanation of STAPLEE

**Social:** Mitigation Actions are acceptable to the community if they do not adversely affect a 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.

**Technical:** Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.

**Administrative:** Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.

**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 of the action.

**Legal:** It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.

**Economical:** Budget constraints can significantly deter the implementation of mitigations actions. Hence, it is important to evaluate whether an action is cost effective, as determined by a cost-benefit review, and possible to fund.

**Environmental:** Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

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### C. Mitigation Strategies and Implementation

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During the meeting where actions were being evaluated, one option was excluded and not rated;

Tree management / trimming – the committee determined that as an ordinance, the Cities would be unable to enforce this strategy but that the utility company already undertakes some tree management where power supply impacts are anticipated.

All other mitigation actions considered by the committee were included in this plan and were then prioritized based on several criteria, whether or not they address a high risk hazard, how many hazards they address, how many objectives they address, the estimated timeline, the estimated cost, and the STAPLEE rating. The logic of this was much like ranking the hazards, the actions with the broadest positive impact would be naturally raised to the top of the list while those that would be costly or be limited in impact would naturally fall to the bottom.

This would mean that the actions toward the top of the list should be where the County's mitigation efforts should be directed, however where opportunities to pursue lower ranked actions arise, they should be taken so long as they do not preclude taking an action with a more broad positive impact is possible. For example, if grant funds for a project are available that would address an action ranked near the middle of the spectrum then the County or any jurisdiction should pursue the grant opportunity. If such a grant opportunity is presented and it could be used for two or more identified actions, then it should be directed toward the highest ranked of the potential projects where practicable.

Each action is profiled along similar lines as the hazards. Each action profile contains a description of the action, estimated cost with either an approximate dollar amount or listed as voluntary, minimal, moderate, or high. These categories are loosely defined as follows;

- Voluntary – reliant on donated time or resources
- Minimal – little or no cost, may be a nominal increase in day-to-day activities

- Moderate – would likely require outside funds potentially from multiple sources or potential tax / fee increases
- High – would require outside funds such as in the form of grant programs through State or Federal agencies

The timeframe in which mitigation actions are to be pursued have not been detailed in depth, however based on their relative complexity, cost, and whether or not they are dependent on outside funds, estimated timelines were suggested. These estimated timeframes are listed as follows;

- Ongoing – activities that are currently in practice or are suspected to have been implemented previously
- Short Term – relatively low cost, low complexity activities that may be implemented in the next year
- Medium Term – low to modest cost activities that may require more effort and / or time to properly implement such as review of regulatory measures for effectiveness or development of new regulations or programs, implementable within a period of 5 years and likely within 2-3 years
- Long Term – high cost and time-intensive activities that require outside funds, significant administrative investment (temporary or permanent), and generally involve construction, anticipated to take 5 years or more from time of initial planning to securing funding to completion of activity

Mitigation Actions can be grouped into six different categories as indicated in the State Plan and in FEMA guidance;

**Prevention:** Government administrative or regulatory measures or processes that influence the way land and buildings are developed and built. These measures also include public actions to reduce hazard losses to property and human health impacts. Examples include:

- Hazard mapping
- Studies/data collection and analysis to support prevention measures
- Floodplain regulations
- Multi-jurisdictional agreements that reduce hazard risks
- Other regulatory measures or processes that reduce hazard risks

**Property Protection:** Measures that involve modifying existing buildings or structures to protect them from a hazard, or removing buildings or structures from the hazard area, or providing insurance to cover potential losses. Examples include:

- Acquisition, elevation, or relocation of hazard-prone property
- Safe room/storm shelter retrofits
- Critical facility protection

- Risk reduction retrofits (modifications) to hazard prone properties
- Studies/data collection and analysis to develop property protection measures
- Continued National Flood Insurance Program (NFIP) participation

**Public Education and Awareness:** Measures to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Examples include:

- Programs to improve awareness of hazard risk
- Programs to improve awareness of hazard risk prevention and reduction
- Education programs directed toward specialized audience, i.e. buildings, developers, and hazard prone neighborhoods

**Natural Resource Protection:** Measures that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. Examples include:

- Sensitive areas ordinance (development restrictions)
- Stream corridor restoration, watershed management
- Forest and vegetation management
- Wetland restoration and preservation

**Emergency Services:** Measures taken before, during and after a hazard event to protect people, and property; although these measures are not typically considered “mitigation, they significantly minimize the events impact and preserve the community’s health and safety. Examples include:

- Emergency response facilities and personnel
- Hazard warning systems and equipment
- Health, safety, environmental risk prevention or reduction
- Emergency response infrastructure, equipment, planning, or training
- Emergency response services studies and data collection
- Emergency response communication systems

**Structural Projects:** These are measures that involve the construction and maintenance of structures and infrastructure that will reduce the impact of a hazard or redirect the impact away from people and property. Examples include:

- Channel modification/maintenance
- Dam and reservoir construction/maintenance
- Levee and floodwall construction and maintenance
- Safe room or storm shelter construction
- Infrastructure construction and maintenance
- Studies and data collection to develop structural projects

### Prioritized Mitigation Activities

Mitigation actions were evaluated by various factors as previously mentioned; each of the factors was assigned a numerical value to aid in ranking the actions according to their anticipated positive impacts and drawbacks. The numerical values that were substituted in for estimated cost and timelines are as follows;

#### Cost:

- Voluntary – 1
- Minimal – 0
- Moderate – minus one (-1)
- High – minus two (-2)

#### Timeline:

- Ongoing – 1
- Short Term – 0
- Medium Term – minus one (-1)
- Long Term – minus two (-2)

Where a cost or timeline spanned between two different ratings, the average of the two scores was used. For example an action that has a moderate to high cost and a medium to long term timeline would have -1.5 inserted for both categories. This ranking system is crude, but it helps to organize the actions in a way that begins to show a prioritization of what can provide the biggest positive impact for the effort required to implement them. A more sophisticated ranking system may include weighting for various factors depending on community priorities and concerns. A limited degree of weighting is present for cost as cost is one of the STAPLEE elements however.

The composite ranking of mitigation actions is as follows;

### Monroe County Mitigation Action Ranking

Public Outreach and Education	58
Community Emergency Response Team	56
Weather Radios	55
Continuity of Operations Planning	52
Hazard Occurrence data collection	52
NFIP Participation	47
Collection and protection of vital records	41
Generators	38
Maintenance of Older Buildings	31.5
Safe Rooms	30
Surge protectors/ Lightning protection	30
Snow Fence/ Barriers	30
Storm Warning systems	29.5

Search & Rescue training for first responders	29.5
Flood Insurance	29
Evacuation Plans	28.5
Smoke/Fire/CO Detectors/sprinkler Systems	28
Fireplace maintenance	28
Maintenance of heating/cooling systems	27.5
Manufactured homes tie-downs	26
Address vacant structures/collapsed buildings	25
Expanded hazard area mapping/mine evaluation	23.5
Tree management/trimming	23
Temporary Debris disposal plan	23
Digging Hotline/pipeline Safety regulations of pipelines	22.5
Hazardous material disposal	22.5
HazMat protection of storm shelters	22.5
Water storage or saving plans	22
Mass Casualty preparation	21.5
Radon/Lead Mitigation	21
Local HazMat Capabilities	20
New Storm Shelter	19.5
Critical Infrastructure protection from terrorism	17
Assessment risk for terrorism	17
Acquisition or relocation of buildings	16.5
Building Code Enforcement	16
Storm water management ordinance	15
Burying power lines	13
Immunizations	13
Dam/Levee Maintenance	12.5
Consider (Community Rating System) CRS participation	12
Burning restrictions	10
Waste disposal enforcement	9.5
Flood proofing (wet or dry)	7
Pest management	7
Review Floodplain ordinances for effectiveness	6

### D. Mitigation Alternatives

Each of the identified mitigation alternatives were considered and evaluated through the FEMA tool, STAPLEE. This acronym indicates the various factors that should be considered in planning decisions standing for Social, Technical, Administrative, Political, Legal, Economic, and Environmental elements. See *Appendix S: STAPLEE Worksheets* for details on how the alternatives were evaluated.



Below is a listing of the mitigation alternatives considered and where applicable, which jurisdictions they would be for.

**i. Constraints**

In the planning committee’s discussion of mitigation alternatives, certain constraints exist to the implementation of the various alternative strategies. One of the major constraints is availability of funding as the communities of Monroe County are small and lack the resources available in other areas of Iowa.

This and other constraints were taken into consideration through the STAPLEE process which helped to limit the list of alternatives to those that were deemed most likely to have a positive impact. The criteria for a positive impact includes greater overall benefits than the costs of the alternative, local capabilities to fund, administer, or obtain funds for the alternative, and public acceptance of the alternative.

**E. Mitigation Strategies and Implementation**

After the alternatives were discussed, the committee selected the following Mitigation strategies that could be addressed throughout Monroe County by giving priority to the highest impact STAPLEE action and composite ranking. Individual jurisdictions were provided with the opportunity to select the strategies that would be most beneficial for their community. A representative from each jurisdiction was allowed to review the Monroe County Hazard Mitigation draft Plan to confirm data and recommend the strategy the City Council chose to make a priority. The strategies considered and prioritized by the most feasible based on local considerations and resources. The selected alternatives are detailed in the following action profiles;

**i. All Hazards / General strategies**

Generators	
Program/Project Description	Acquisition of mobile and / or fixed generators for use at community buildings used for temporary storm shelters and / or for public facilities
Anticipated Cost	Moderate
Timeline/Schedule	Medium term
Responsible Agency	Albia City Council, Lovilia City Council, Melrose Mayor, & critical facility property owners, Albia Fire Department
Mitigation Category	Emergency services, Prevention, Property Protection
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 2.5, 3.1, 3.3, 3.4
Related Hazard(s)	Flash Flood, Thunderstorm/Lightning, Communication failure, Severe winter storm, Energy Failure, Rail Transportation incident, Windstorm/High Wind Events/High Wind events, River flooding, Tornado, Hailstorm, Extreme heat, Human disease incident, drought
Related Jurisdiction(s)	Albia, Melrose, Lovilia

Staplee Rating	9
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<b>New Storm Shelter/ cooling or heating shelter</b>	
Program/Project Description	Construction of comprehensive storm shelter to Tornado Safe Room standards to serve as a temporary shelter for multiple hazards as often a Church, Community Center, Legion Hall, City Hall, and School are currently utilized as needed
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	Albia City Council
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.3
Related Hazard(s)	Flash flood, thunderstorm / lightning, structural failure, severe winter storm, transportation of hazardous materials, Energy Failure, Windstorm/High Wind Event / high wind event, tornado, hailstorm, sink hole, earthquake
Related Jurisdiction(s)	Albia
Staplee Rating	3

Note: new storm shelter should be located outside of hazard areas to maximize potential as a safe location and should include hazardous materials protection measures, independent power source (generator, solar system with battery storage, multiple sources, etc.), accessible to disabled people, and located close to where most people may be clustered to reduce time and distance residents would need to travel for safety.

<b>Continuity of Operations Planning</b>	
Program/Project Description	City and City Departments work to develop procedures of what do when hazards occur including who has keys to shelters, contact list for city and emergency response personnel, priorities for what facilities to restore following disasters, how to direct Monore County residents to minimize injuries, as well as (off-site) backups of important City documents and files
Anticipated Cost	Minimal
Timeline/Schedule	Medium term
Responsible Agency	ADLM (emergency management) Albia First responders, Lovilia City Council, Melrose City Council
Mitigation Category	Property protection
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.2, 3.4, 3.5
Related Hazard(s)	Flash flood, thunderstorm / lightning, communication failure, structural failure, severe winter storm, transportation of hazardous materials incident, Energy Failure, rail transportation incident, highway transportation incident, structural fire,

	Windstorm/High Wind Event / high wind event, fixed hazardous materials incident, river flooding, tornado, hailstorm, air transportation incident, dam failure, sink hole, human disease incident, earthquake,
Related Jurisdiction(s)	Albia, Melrose, Lovilia,
Staplee Rating	<b>15</b>

<b>Acquisition or relocation of buildings</b>	
Program/Project Description	Utilize disaster recovery funds or pre-disaster mitigation funds to acquire properties in floodplains or relocation of buildings outside of floodplains
Anticipated Cost	Moderate to high
Timeline/Schedule	Ongoing
Responsible Agency	Albia city Council, Monroe BOS
Mitigation Category	Prevention, property protection
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4
Related Hazard(s)	Flash flood, river flood
Related Jurisdiction(s)	Albia, Unincorporated County
Staplee Rating	<b>2</b>

<b>Safe Rooms</b>	
Program/Project Description	Risk to lives can be improved through construction and use of concrete safe rooms in homes and shelter areas of mobile home parks, fairgrounds, shopping malls, & other vulnerable public areas.
Anticipated Cost	Moderate to high – grant dependent
Timeline/Schedule	Long term
Responsible Agency	Albia Community School Board
Mitigation Category	Structural project
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.3
Related Hazard(s)	Flash flood, thunderstorm / lightning, structural failure, severe winter storm, transportation of hazardous materials, Energy Failure, Windstorm/High Wind Event / high wind event, tornado, hailstorm, sink hole, earthquake
Related Jurisdiction(s)	Albia Community School
Staplee Rating	<b>6</b>

<b>Public Education and Outreach</b>	
Description	Develop hazard education and outreach program to help Monroe county residents understand meaning of hazard warnings and self-protection measures
Estimated Cost	Minimal
Timeline/Schedule	Medium Term

Responsible Entity	ADLM (emergency management), Albia First Responders, Lovilia Fire Department, Melrose Fire Department
Hazards Addressed	All
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Related Jurisdiction(s)	Albia, Lovilia, Melrose, Albia Community School
STAPLEE Rating	<b>14</b>

<b>Community Emergency Response Team</b>	
Description	Encourage and support development of volunteer community emergency response team of residents who have access to equipment and training to respond if emergency services are unable to meet all of the immediate needs following disasters as well as checking in on elderly or disabled residents to ensure their safety
Estimated Cost	Volunteer
Timeline/Schedule	Short Term
Responsible Entity	ADLM- emergency management, Albia First Responders, Lovilia Fire department, Melrose Fire Dept
Hazards Addressed	Flash flood, thunderstorm / lightning, communication failure, structural failure, severe winter storm, transportation of hazardous materials incident, Energy Failure, rail transportation incident, highway transportation incident, structural fire, Windstorm/High Wind Event / high wind event, grass / wildfire, fixed hazardous materials incident, river flooding, tornado, hailstorm, air transportation incident, dam failure, sink hole, extreme heat, human disease incident, earthquake, drought
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.4, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia, Melrose
STAPLEE Rating	<b>16</b>

<b>Storm Warning System</b>	
Description	Acquisition and installation of community early warning system to compliment system at fire station
Estimated Cost	Moderate to high
Timeline/Schedule	Long Term
Responsible Entity	Albia City Council, Lovilia City Council
Hazards Addressed	Flash flood, thunderstorm / lightning, severe winter storm, Windstorm/High Wind Event / high wind event, river flooding, tornado, hailstorm, may address other hazards as well

Mitigation Category	Structural Project
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 3.2
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Unincorporated County to include LA-Z-DAZ ranch & estates, Green Acres of seasonal residents, Albia, Lovilia
STAPLEE Rating	<b>10</b>

<b>Address Vacant Structures/collapsed buildings</b>	
Description	Leverage funds for property owners or cities that are unable to afford to remove/repair/demolish dilapidated structures.
Estimated Cost	Moderate-high
Timeline/Schedule	Ongoing
Responsible Entity	Albia City Council, Lovilia City Council, Property Owners
Hazards Addressed	Thunderstorm / Lightning,, Structural Failure, Structural Fire, Windstorm/High Wind Event / High Wind Events, Fixed Hazardous Materials (especially lead paint), Tornado, Hailstorm, Human Disease Incident (especially mold related), Earthquake, Radon/Lead
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5,
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia
STAPLEE Rating	<b>8</b>

<b>Weather Radios</b>	
Description	Encouragement of residents and businesses to obtain NOAA weather radios
Estimated Cost	Voluntary program; approximately \$30 per radio
Timeline/Schedule	Short Term
Responsible Entity	residents
Hazards Addressed	Flash flood, thunderstorm / lightning, severe winter storm, Windstorm/High Wind Event / high wind event, river flooding, tornado, hailstorm, extreme heat, may address other hazards as well
Mitigation Category	Prevention and Public Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 3.1, 3.2, 3.3, 3.4
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia, Melrose, Unincorporated County
STAPLEE Rating	<b>18</b>

<b>Local Hazardous Materials Capabilities</b>	
Description	Encourage establishment of local hazardous materials team and / or support training for local first responders
Estimated Cost	Moderate to high
Timeline/Schedule	Medium to Long Term
Responsible Entity	ADLM emergency management, Albia fire department (in partnership with ADLM and / or County)
Hazards Addressed	Transportation of hazardous materials, rail transportation incident, structural fire, fixed hazardous materials, air transportation incident, human disease incident
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, county
STAPLEE Rating	<b>9</b>

<b>Hazardous Materials Protection for storm shelters</b>	
Description	Develop Hama policies (shutting off air conditioning, closing windows, etc.), prepare kits for sealing off rooms including duct tape and plastic sheeting (see FEMA guidance; <a href="http://www.fema.gov/hazard/hazmat/hz_during.shtm">http://www.fema.gov/hazard/hazmat/hz_during.shtm</a> )
Estimated Cost	Minimal or Voluntary
Timeline/Schedule	Short Term
Responsible Entity	Property Owners
Hazards Addressed	Transportation of hazardous materials, rail transportation incident, highway transportation incident
Mitigation Category	Public Education and Awareness, Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 3.3, 3.4
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia, Melrose, unincorporated county
STAPLEE Rating	<b>11</b>

<b>Review Floodplain Management and Enforcement for Effectiveness</b>	
Description	Review city/county policies and procedures for enforcing floodplain ordinance and methods, if any, to ensure flooding is primarily limited to floodplains
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	Albia City Council, County BOS
Hazards Addressed	Flash flood, river flood
Mitigation Category	Property Protection, Prevention
Related Goals/Objectives	1.1, 1.2, 2.1, 2.3

Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, unincorporated county
STAPLEE Rating	-1

<b>Consider CRS Participation</b>	
Description	Explore feasibility of City participating in Community Rating System for enhanced flood protection
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	Albia City Council, County BOS
Hazards Addressed	Flash flood, river flood
Mitigation Category	Property Protection, Prevention
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, unincorporated
STAPLEE Rating	4

<b>Flood proofing (wet or dry)</b>	
Description	Encourage property owner use of flood proofing techniques to reduce potential flood-related damages such as water-proofing basement walls, structural modifications allowing flood waters to pass through or around structures without causing damage (as part of remodeling or disaster related repairs), use of water- / mold-resistant paints, etc.
Estimated Cost	Minimal to high depending on structure and techniques
Timeline/Schedule	Short Term
Responsible Entity	Abila, Melrose, & Lovilia City councils (encouragement) and Property Owners (execution)
Hazards Addressed	Flash Flood, River Flooding
Mitigation Category	Public Education and Awareness, Structural Projects, Prevention
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4,
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	-1

<b>Storm water Management</b>	
Description	Develop a storm water management ordinance to minimize impacts on storm water system and to minimize flash flooding impacts; may include artificial erosion control, creek bank stabilization, erosion resistant planting on steep slopes (deep root plants) to slow and help infiltrate storm water, terracing

	hillsides, grading techniques
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	Albia City Council, County BOS
Hazards Addressed	Flash Flood, Thunderstorm / Lightning, Severe Winter Storm, River Flooding, Sink Holes
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Unincorporated county
STAPLEE Rating	<b>8</b>

<b>Flood Insurance</b>	
Description	Encourage property owner purchase of flood insurance
Estimated Cost	Volunteer
Timeline/Schedule	Ongoing
Responsible Entity	City and Property Owners
Hazards Addressed	Flash Flood, River Flooding
Mitigation Category	Property Protection
Related Goals/Objectives	1.1, 2.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	All Cities
STAPLEE Rating	<b>19</b>

<b>Surge Protection / Lightning Protection</b>	
Description	Encourage property owners to use surge protectors to protect computers and other sensitive electrical appliances from lightning strikes and power surges; purchase, use, and maintenance of surge protectors for City facilities as needed
Estimated Cost	Minimal , Voluntary
Timeline/Schedule	Ongoing / Short Term
Responsible Entity	City
Hazards Addressed	Thunderstorm / Lightning, Communications Failure, Energy Failure
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	All Cities
STAPLEE Rating	<b>18</b>



<b>Burying Power Lines</b>	
Description	Encourage burying of power lines to new construction and upon significant maintenance or upgrades of existing power supply
Estimated Cost	Minimal (for City), Moderate to High (for power companies)
Timeline/Schedule	Long Term
Responsible Entity	City, Power Companies
Hazards Addressed	Thunderstorm / Lightning, Communications Failure, Transportation of Hazardous Materials, Energy Failure, Rail Transportation Incident, Highway Transportation Incident
Mitigation Category	Property Protection, Structural Projects
Related Goals/Objectives	1.1, 1.3, 2.3
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	County
STAPLEE Rating	<b>7</b>

<b>Temporary Debris Disposal Plan</b>	
Description	Develop policy for temporary debris disposal for city and private property owners for post-disaster clean-up
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	City
Hazards Addressed	Flash Flood, Thunderstorm / Lightning, Structural Failure, Severe Winter Storm, Transportation of Hazardous Materials, Rail Transportation Incident, Highway Transportation Incident, Structural Fire, Windstorm/High Wind Event / High Windstorm/High Wind Event Events, Fixed Hazardous Materials Incident, River Flooding, Tornado, Air Transportation Incident, Dam Failure, Sink Holes, Earthquake, Landslide
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 2.2, 2.3, 2.4, 3.1, 3.6
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	County
STAPLEE Rating	<b>1</b>

<b>Snow Fences / Barriers</b>	
Description	Encourage development of snow fences or barriers to block drifting snow from blocking critical access routes or from building entrances ranging from artificial to vegetative barriers
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	Property Owners
Hazards Addressed	Severe Winter Storms, Windstorm/High Wind Event / High Wind

	Events,
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	County and possibly Cities
STAPLEE Rating	<b>19</b>

<b>Maintenance of Older Buildings</b>	
Description	Encourage property maintenance and help leverage funds for property owners unable to afford more significant structural maintenance
Estimated Cost	Minimal to moderate
Timeline/Schedule	Ongoing
Responsible Entity	Albia City council, Lovilia City Council, Property Owners, County BOS, Melrose City Council
Hazards Addressed	Thunderstorm / Lightning, Communication Failure, Structural Failure, Severe Winter Storm, Energy Failure, Structural Fire, Windstorm/High Wind Event / High Wind Events, Fixed Hazardous Materials (especially lead paint), Tornado, Hailstorm, Sink Holes, Human Disease Incident (especially mold related), Earthquake, Radon/Lead
Mitigation Category	Property Protection, Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Unincorporated County
STAPLEE Rating	<b>8</b>

<b>Expanded Hazard Area Mapping and Mine Evaluation</b>	
Description	Record areas where hazards occur to aid in hazard mapping, encourage detailed evaluation of the structural integrity of mines under each community, encourage detailed floodplain mapping, seek funds to develop more detailed multi-hazard area maps
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term (hazard recording) to Long Term (mine evaluation)
Responsible Entity	Albia City Council, Lovilia City council, County BOS and Albia First Responders
Hazards Addressed	Flash Flood, Transportation of Hazardous Materials Incident, Rail Transportation Incident, Highway Transportation Incident, Grass / Wildfires, Fixed Hazardous Materials Incident, River Flooding, Dam Failure, Sink Holes
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.1, 3.6

Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia, Unincorporated county
STAPLEE Rating	<b>7</b>

<b>Water Storage or Saving Plans</b>	
Description	Develop plan for water storage for back-up and to supplement Rathbun Rural Water, develop policy or program for helping residents reduce water demand using measures such as low-flow toilets and showerheads and landscaping
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	Albia First Repsonders, ADLM emergency management,
Hazards Addressed	Structural Fire, Drought
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.5, 3.1, 3.3, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	County & all Cities
STAPLEE Rating	<b>7</b>

<b>Evaluate/maintain/repair area dams</b>	
Description	Establish an inspection, maintenance & enforcement program to help continue structural integrity of Monroe County Dams and levees. Plan would also include emergency plans to develop access roads, pumping, etc.
Estimated Cost	Moderate to High
Timeline/Schedule	Medium Term
Responsible Entity	Board of Supervisor's
Hazards Addressed	Flash Flood, Structural Failure, River Flooding, Dam Failure
Mitigation Category	Prevention, Natural Resource Protection, Structural Project
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 2.5, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Unincorporated County
STAPLEE Rating	<b>3</b>

<b>Burning Restrictions</b>	
Description	Develop, implement, and enforce burning restrictions for trash and yard waste within each city's boundaries
Estimated Cost	Minimal
Timeline/Schedule	Medium Term
Responsible Entity	Albia City Council, Melrose City Council, Lovilia City Council,

	County BOS
Hazards Addressed	Energy Failure, Structural Fire, Fixed Hazardous Materials
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Unincorporated County, Albia, Lovilia, Melrose
STAPLEE Rating	<b>1</b>

Note: Burning restrictions should address controlled burning for prairie maintenance as fire is an integral part of prairie ecosystems, this does not mean that burning restrictions must permit such controlled burns. For example, burning permits may be required as well as potentially the presence of trained burning professionals. Prairie stands in incorporated areas may be maintained through mowing as a second best maintenance strategy.

<b>Smoke / Fire / Carbon Monoxide Detector and Sprinkler Systems</b>	
Description	Encourage use and maintenance of smoke / fire / carbon monoxide detectors and fire suppression (aka sprinkler) systems in private buildings; use and maintain smoke / fire / carbon monoxide detectors in City-owned buildings and install sprinkler systems as funds are available and as needed
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	Property Owners, Albia Maintenance Dept
Hazards Addressed	Structural Failure, Structural Fire
Mitigation Category	Prevention, Property Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Unincorporated county,
STAPLEE Rating	<b>16</b>

<b>Evacuation Plans</b>	
Description	Develop evacuation plans for school, community buildings, and for town
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	ADLM-Emergency Management, Albia Fire department, Albia community Schools,
Hazards Addressed	Flash Flood, Communications Failure, Structural Failure, Transportation Hazardous Materials Incident, Energy Failure, Rail Transportation Incident, Structural Fire, River Flooding, Fixed Hazardous Materials, Air Transportation Incident, Dam Failure, Sink Holes
Mitigation Category	Prevention, Emergency Services
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6

Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Albia Community Schools
STAPLEE Rating	<b>5</b>

<b>Maintenance of Heating / Cooling Systems</b>	
Description	Encourage property owner maintenance of heating and cooling systems and maintenance of heating and cooling systems in community buildings
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term
Responsible Entity	Property Owners, Albia city Maintenance Dept
Hazards Addressed	Severe Winter Storm, Energy Failure, Extreme Heat
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.3, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia, Melrose, Unincorporated County
STAPLEE Rating	<b>16</b>

<b>Fireplace Maintenance</b>	
Description	Encourage property owners with fireplaces to keep chimneys clean and in good structural repair
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	Property Owners, Albia Fire Department
Hazards Addressed	Structural Failure, Structural Fire, Windstorm/High Wind Event / High Wind Events, Tornado, Earthquake
Mitigation Category	Property Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 2.1, 2.2, 2.3, 2.4, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Unincorporated County
STAPLEE Rating	<b>16</b>

<b>Hazardous Material Disposal</b>	
Description	Develop hazardous materials disposal program incorporating public education, community clean-up days, and household hazardous waste exchange
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	ADLM emergency management, Albia Maintenance Dept.
Hazards Addressed	Transportation of Hazardous Materials Incident, Fixed Hazardous

	Materials Incident, Structural Fire, Fixed Hazardous Materials Incident, Human Disease Incident
Mitigation Category	Prevention, Natural Resource Protection, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4 2.5, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia
STAPLEE Rating	<b>11</b>

<b>Search and Rescue Training for First Responders</b>	
Description	Training Firefighters and other local emergency responders best practices in search and rescue operations
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Albia Fire Department& First responders, Lovilia Fire Dept, Melrose Fire Dept
Hazards Addressed	Flash Flood, Structural Failure, Severe Winter Storm, Transportation of Hazardous Materials Incident, Rail Transportation Incident, Structural Fire, Fixed Hazardous Materials Incident, River Flooding, Tornado, Windstorm/High Wind Event / High Wind Events, Air Transportation Incident, Dam Failure, Sink Holes, Earthquake, Landslide
Mitigation Category	Emergency Services
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 2.3, 3.1, 3.4, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	<b>6</b>

<b>Mass Casualty Preparation</b>	
Description	Develop plan for how to handle mass casualties resulting from hazard events in and near each jurisdiction
Estimated Cost	Minimal to moderate
Timeline/Schedule	Medium Term
Responsible Entity	Albia First Responders, ADLM-Emergency Management
Hazards Addressed	Flash Flood, Structural Failure, Severe Winter Storm, Transportation of Hazardous Materials Incident, Rail Transportation Incident, Structural Fire, Fixed Hazardous Materials Incident, River Flooding, Tornado, Human Disease Incident, Air Transportation Incident, Dam Failure, Sink Holes, Earthquake
Mitigation Category	Emergency Services

Related Goals/Objectives	1.1, 1.2, 2.2, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	<b>3</b>

<b>Immunization</b>	
Description	Encourage periodic immunizations, especially for children and elderly residents, review mass immunization plan with school for emergency immunizations
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	County Public Health Department
Hazards Addressed	Human Disease Incident
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.2, 2.3, 2.6, 3.1, 3.5
Addresses High Risk Hazards?	No
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Albia Community Schools, Unincorporated county
STAPLEE Rating	<b>5</b>

<b>Waste Disposal Enforcement</b>	
Description	Develop or update waste disposal policies and enforce, review for effectiveness
Estimated Cost	Minimal
Timeline/Schedule	Short to Medium Term
Responsible Entity	Albia City Council, Melrose City council, Lovilia City Council
Hazards Addressed	Windstorm/High Wind Event / High Wind Events, Fixed Hazardous Materials Incident, Tornado, Human Disease Incident
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	<b>-3</b>

<b>Pest Management</b>	
Description	Review policies for effectiveness governing mowing and maintaining properties to discourage infestations by pests within each city limit, consider or update as needed other polices to control pests
Estimated Cost	Minimal

Timeline/Schedule	Short Term
Responsible Entity	Melrose city council, Lovilia City Council, Albia City Council
Hazards Addressed	Human Disease Incident
Mitigation Category	Prevention, Natural Resource Protection
Related Goals/Objectives	1.1, 1.3, 2.1, 2.4, 3.1, 3.5
Addresses High Risk Hazards?	No
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	-2

<b>Radon/Lead Mitigation</b>	
Description	Encourage property owner Radon/Lead testing and mitigation, explore feasibility of Cities leveraging funds to help property owners test and / or mitigation unsafe Radon/Lead levels
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	Property Owners, ADLM-Environmental Management, County Health Department
Hazards Addressed	Human Disease Incident, Radon/Lead
Mitigation Category	Public Education and Awareness, Prevention
Related Goals/Objectives	1.1, 1.3, 2.6, 3.5
Addresses High Risk Hazards?	No
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Unincorporated County
STAPLEE Rating	15

<b>Hazard Occurrence Data Collection</b>	
Description	Record occurrences of hazards, loss estimates, populations impacted, amount of area impacted, and other relevant information for updates to this plan and for improved emergency response information
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	ADLM Emergency Management, County Public Health Department,
Hazards Addressed	All
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4, 2.5, 3.1, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	12



<b>Collection &amp; Protection of Vital Records</b>	
Description	Encourage property owners to inventory and protect critical information for improved disaster recovery and minimize disruptions to lives following disaster events; critical information includes titles to property, bank information, insurance documents, wills, copies of prescription medications, family contact information, social security cards, passports, marriage licenses, birth certificates, and other forms of information that may be difficult to replace or needed to document eligibility for disaster aid
Estimated Cost	Voluntary
Timeline/Schedule	Short Term
Responsible Entity	Residents
Hazards Addressed	Flash Flood, Thunderstorm / Lightning, Communications Failure, Structural Failure, Severe Winter Storm, Transportation of Hazardous Materials Incident, Energy Failure, Rail Transportation Incident, Highway Transportation Incident, Structural Fire, Windstorm/High Wind Event / High Wind events, Fixed Hazardous Materials Incident, River Flooding, Tornado, Hailstorm, Air Transportation Incident, Dam Failure, Sink Hole, Extreme Heat, Human Disease Incident, Earthquake, Landslide
Mitigation Category	Public Education and Awareness
Related Goals/Objectives	1.1, 3.1, 3.5, 3.6
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Unincorporated county
STAPLEE Rating	<b>17</b>

<b>Digging hotline/pipeline safety regulations of pipelines</b>	
Description	Communities must insure that they are in compliance with industry safety regulations and standards. One component that is to be well advertised is the digging hotline for residents to call before digging on their property.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	County BOS, ADLM emergency management, private pipeline owners
Hazards Addressed	Flash flood, tornado, sinkholes, pipeline,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 2.1, 2.2, 2.4, 3.4
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	County, Albia, Lovila, Unincorporated county
STAPLEE Rating	<b>12</b>

<b>Tree Management/Trimming</b>	
Description	Encourage private home owners, businesses, and jurisdictions to regularly perform tree trimming and maintenance to prevent limb breakage and for safeguarding nearby utility lines.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	City of Albia maintenance dept, property home owners, utility companies, County Roads Dept
Hazards Addressed	Communications Failure, Severe winter storm, Energy Failure, Windstorm/High Wind Event/high wind events, structural failure,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.1, 2.3, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia, Unincorporated county
STAPLEE Rating	<b>12</b>

<b>Manufactured Home Tie-Downs</b>	
Description	Encourage incorporated and rural manufactured homes to be secured by tie-downs to the ground. This anchoring can prevent damage and injuries.
Estimated Cost	Minimal
Timeline/Schedule	Short Term
Responsible Entity	Albia City council, Melrose City Council, Lovilia city council, property owners, County BOS
Hazards Addressed	Communications failure, river flooding, tornado, Windstorm/High Wind Events/high wind events,
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	11, 1.3, 2.1, 2.4, 3.1
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia, Melrose & Unincorporated County
STAPLEE Rating	<b>12</b>

<b>Critical Infrastructure Protection (CIP) from terrorism</b>	
Description	Critical Infrastructure Protection will be a prominent part of a community risk assessment & threat assessment. It will identify vulnerabilities and possible targets for terroristic actions. The CIP insures that critical services such as water, electricity, telephones, roads, bridges, etc. in the event of an act of terrorism.
Estimated Cost	Moderate
Timeline/Schedule	Long Term
Responsible Entity	Albia First Responders, ADLM emergency management

Hazards Addressed	Cyber terrorism, Agro-terrorism, Biological terrorism, Chemical terrorism, Conventional terrorism, Radiological terrorism
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 1.2, 1.3, 2.2, 3.1, 3.2, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia
STAPLEE Rating	<b>12</b>

<b>Assessment Risk for Terrorism</b>	
Description	Local jurisdictions will develop a through risk and threat assessment that identifies potential vulnerabilities and potential targets for a terroristic attack.
Estimated Cost	Moderate
Timeline/Schedule	Long Term
Responsible Entity	Albia First Responders, ADLM emergency management
Hazards Addressed	Cyber terrorism, Agro-terrorism, Biological terrorism, Chemical terrorism, Conventional terrorism, Radiological terrorism
Mitigation Category	Prevention, Public Education and Awareness
Related Goals/Objectives	1.1, 2.2, 2.3, 3.1, 3.4, 3.5
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Lovilia
STAPLEE Rating	<b>12</b>

<b>Building Code Enforcement</b>	
Description	Encourage all local governments to adopt and enforce updated building codes to reduce the risk of collapse, failure or injury in the event of a disaster.
Estimated Cost	Moderate
Timeline/Schedule	ongoing
Responsible Entity	Albia City Council, Melrose City Council, Lovilia City Council,
Hazards Addressed	Severe winter storm, structural failure, structural fire, Human disease pandemic, Human disease incident, earthquake,
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 1.3, 2.1, 2.4, 2.6, 3.4
Addresses High Risk Hazards?	Yes
Related Jurisdiction (s)	Albia, Melrose, Lovilia
STAPLEE Rating	<b>12</b>

<b>NFIP Participation</b>	
Program/Project Description	Communities will consider or continue participating with the

	National Flood Insurance Program (NFIP).
Estimated Cost	Minimal
Timeline/Schedule	Ongoing
Responsible Entity	Albia City Council, Lovilia City Council, Melrose City Council
Hazards Addressed	Flash flooding, Thunderstorm/Lighting, Severe Winter Storm, River Flooding
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.3, 2.2, 2.3, 2.4,
Addresses High Risk Hazards?	Yes
Jurisdiction(s) Priority	Albia, Melrose, Lovilia
STAPLEE Rating	<b>13</b>

<b>Expanded Hazard Area Mapping and Mine Evaluation</b>	
Program/Project Description	Record areas where hazards occur to aid in hazard mapping, encourage detailed evaluation of the structural integrity of mines under communities, encourage detailed floodplain mapping, seek funds to develop more detailed multi-hazard area maps
Estimated Cost	Minimal to moderate
Timeline/Schedule	Short Term (hazard recording) to Long Term (mine evaluation)
Responsible Entity	Emergency Management, Albia Fire Department & First Responders
Hazards Addressed	Flash Flood, Transportation of Hazardous Materials Incident, Rail Transportation Incident, Highway Transportation Incident, Grass / Wildfires, Fixed Hazardous Materials Incident, River Flooding, Dam Failure, Sink Holes, Expansive Soils
Mitigation Category	Prevention
Related Goals/Objectives	1.1, 1.2, 2.2, 2.3, 2.4, 3.1, 3.6
Addresses High Risk Hazards?	Yes
Jurisdiction(s) Priority	Unincorporated County; Albia, Melrose, Lovilia
STAPLEE Rating	<b>7</b>

## 8. Plan Maintenance & Updates

This plan is, as all plans are, intended to be a living document to be used in decision making and in new projects within the community. This first draft cannot anticipate all things that might happen eventually and so it will be necessary for the plan to be updated periodically. Updates to this plan shall be made no fewer than once every five years as is required by FEMA.

Much of the background data for the jurisdictions in Monroe County is from the 2000 Decennial Census and thus is out of date. Upon release of 2010 Decennial Census data, the newer data shall replace what is in this plan, then in the respective community profile within that document. This may take place at the full update point or be integrated by amendment at review points.

### A. Update and Review Cycle

In the suggested timeline below, the start and end times are given in number of months after the adoption date of this document. Annual reviews should include a narrative covering the tasks listed in Evaluating Mitigation Actions and Goals and any disasters that have occurred in the past year. If no action has progressed or there have been no disasters during this time, the narrative should still describe how the review took place and the fact that there have been no notable events or actions completed. The purpose of this is to maintain a record to aid in future updates and to aid in updating and revising the plan as needed.

Since it may not be reasonable to assume that the planning team will remain the same from year to year, it should consist of at least one city representative (mayor, elected official, or city clerk), at least one emergency responder, at least one representative of the school district, and anyone else that is interested in participating. ADLM Emergency Management, Monroe County coordinator, will be responsible for reconvening the planning team for each required review.

Suggested monitoring timeline;

	Start	End	Action
Annual Review #1	11 months	12 months	Addendum added to Plan
Annual Review #2	23 months	24 months	Addendum added to Plan
Annual Review #3	35 months	36 months	Addendum added to Plan
Annual Review #4	47 months	48 months	Addendum added to Plan
Plan Update	52 months	57 months	Submit updated plan to State and FEMA for approval and Adopt plan as revised (adoption must take place by the end of the 60 <sup>th</sup> month to remain in compliance)

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## **B. Plan Monitoring and Evaluation**

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For updates to this plan, the following tasks will need to be addressed by ADLM Emergency Management, Monroe County coordinator, charged with implementing actions in conjunction with the planning team;

### Procedures and Techniques

*Task A. Evaluate the effectiveness of the planning process.*

1. Reconvene the Planning Team.
2. Review your Planning Process.  
Items to Discuss:
  - a. Building the Planning Team
  - b. Engaging the Public
  - c. Data Gathering and Analysis
  - d. Coordinating with other Agencies

*Task B. Evaluate the effectiveness of your actions.*

1. What were the results of the implemented action? Did the results achieve the goals/objectives outlined in the plan? Did the actions have the intended results?
2. Were the actions cost-effective? Did (or would) the project result in the reduction of potential losses?
3. Document actions which were slow to get started or not implemented.

*Task C. Determine why the actions worked (or did not work).*

1. Lack of available resources
2. The political or popular support for or against the action.
3. The availability of funds
4. The workloads of the responsible parties
5. The actual time necessary to implement the actions.

## 9. Incorporation into Existing and Future Planning Mechanisms

The hazard mitigation planning team was created to develop the mitigation plan and guide the plan preparer in its writing. The planning team should not formally end with the approval of the plan. The planning team can evolve into one of a watch dog over the practices of land developers and public officials. Members can help remind public officials of that particular year’s mitigation strategy and possible funding options and can volunteer in the implementation process for certain actions. The team and local governments may participate in the process and engage regional organizations, state agencies, state universities, schools and church via memorandums of agreement.

Finally, the planning team is partly responsible to ensure that the public officials are incorporating mitigation actions into relevant plans and planning mechanisms, such as zoning, annexation plans, and bonding proposals. Communities should also include mitigation initiatives as regular line items in community capital or operational budgets to ensure ongoing funding for hazard mitigation initiatives. The following matrix shows the types of planning mechanisms available and how the plan should be incorporated into them.

Current Mechanisms	Planning	Jurisdictions Currently in Place	Method of Incorporation	Who Responsible or Lead
Comprehensive Land Use plan		Albia, rural county	Review Each, develop in other jurisdictions	Zoning Commissions & staff, BOS
Capital improvement plan		None	Modernize each, develop plans if they are outdated	City councils
Economic Development plan		Albia, Regional plan	Add a mitigation section to annual regional plan	CVPD, city of Albia, Albia Economic Dev
Open space/ conservation plan		Rural County	Incorporate mitigation projects affecting open spaces into plans	Conservation board/staff, city parks
Watershed Protection plan		Limited at best	Address mitigation actions in watershed areas	Emergency management Coordinator
Zoning Ordinance		Albia	Review zoning code concerning applicable hazards	Zoning commissions & staff, BOS
Building Codes		Limited	Update building codes for fire & wind standards	City councils, BOS
Tree Maintenance Codes		Limited in all areas	Consult with utilities	City of Albia Utilities Dept, County Maintenance Dept
Soil erosion/ water control ordinance		Limited in all areas	Consult with RRWA	Emergency management coordinator
Solid/hazardous waste regulations		Limited	Review regulations as to what can be landfilled, add hazard maps	Landfill owner, Emergency Management Coordinator
Public Health Regulations		All of county is covered through Public Health Dept	Collaborate with PH agencies to incorporate new protocols	Emergency Management Coordinator, Public Health Board, & staff
Historic District Programs		Albia	Provide data to assist in protecting properties	Development of groups with state IDED assistance
Long-Range Transportation Plan		Regional plan for entire county	Incorporate hazard maps & transportation improvement ideas	County engineer, CVTPA, IDOT, BOS
Water source plan		All county through inter-	Include mitigation actions	RRWA

	government agreement	related to relevant hazards	
Storm water Management program	Albia	Include mitigation actions related to flash flooding	City Councils, Emergency Management coord,
Housing & Special Needs plan	Albia & Lovila but limited in each	Consider mitigation recommendations in housing plans & funding requests for improvements	City Councils, CVPD, hospitals, Emergency Management Coord
Administrative Operations processes- departments & boards	All jurisdictions	Convene meetings where possible, realignment of tasks, new or improved tasks & processes, & board goals are updated.	Emergency Management Coord, elected officials, clerks & board chairs

At this time, it is not recommended that any jurisdiction adopt a formal policy that requires each jurisdiction to include relevant parts of the plan in each planning mechanism. However, it is strongly recommended that staff and elected/appointed officials become aware of the mitigation strategy’s practical applications. An annual review of the local planning mechanisms is warranted, simply to give the local leaders the opportunity to think about how mitigation actions affect the local planning mechanisms and to ensure local plans are current.

### 10. Continued Public Involvement

Obtaining public participation for planning can be difficult in both rural areas and in larger urban areas, sometimes there is significant interest, but this is not always the case. Public participation for planning exercises is particularly difficult when the public is not interested in the plan or is not clear on what the plan means to them. An advantage in small communities though, is the capacity for word-of-mouth and informal discussion, especially with the community’s elected officials. We are hopeful that Monroe County will have a standing mitigation committee (comprised primarily of LEPC members) to answer community questions, reach out to the community, or to review proposed projects. The public shall be presented the opportunity to take part in plan reviews and updates.

The opportunity for the public to take part in updates and reviews of this plan will comply with Iowa’s Open Meeting Law (Iowa Code, Chapter 21). For each plan update (the five year period), the plan will be presented to the public for a 30 day comment and review period prior to being submitted to the State and FEMA. For each annual review, public notices should be announced as all city council meetings are in order to permit members of the public to attend planning team meetings. This document shall be available through City Halls and/or Chamber of Commerce offices to any party who requests to see it where and when practicable. However, portions intended for internal use may be withheld for confidentiality purposes (such as where private individual information is disclosed) or where legitimate safety concerns are present (such as the exact location and contents of sensitive facilities, hazardous chemical storage and composition, or mine entrances are identified).



# 11. Appendices

## Appendix A: Resolutions Adopting Monroe County Multi-Jurisdictional Hazard Mitigation Plan

RESOLUTION # \_\_\_\_\_

**Purpose:** A Resolution to approve and adopt the Monroe County Multi-Jurisdictional Hazard Mitigation Plan.


**WHEREAS,** Monroe County Multi-Jurisdictional Hazard Mitigation Plan was presented to the Monroe County Board of Supervisor's on May 24, 2011; and

**WHEREAS,** Monroe County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division; and

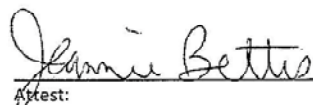
**WHEREAS,** Monroe County Multi-Jurisdictional Hazard Mitigation Plan identifies the county and all jurisdiction's potential hazards; and

**WHEREAS,** Monroe County Multi-Jurisdictional Hazard Mitigation Plan includes a profile of hazard events, vulnerability assessment, evaluation of mitigation goals and a plan maintenance process.

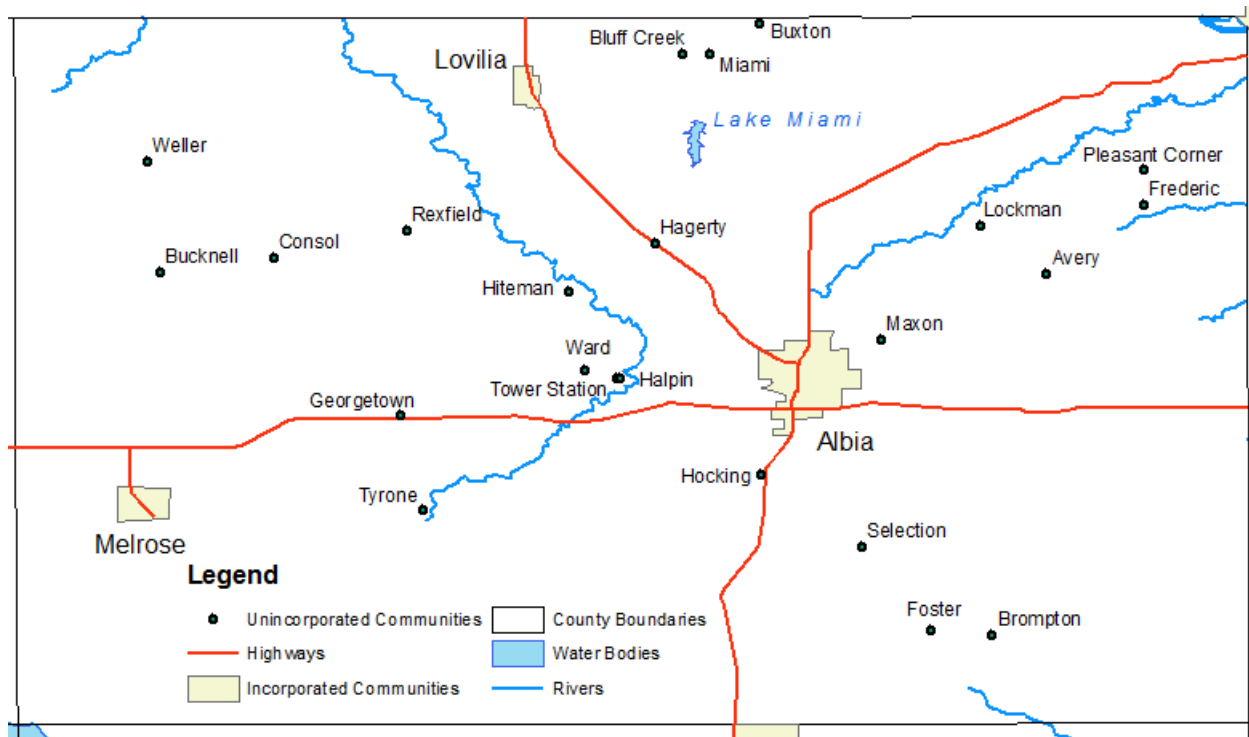
**NOW THEREFORE BE IT RESOLVED** that Monroe County does hereby approve and adopt the Monroe County Multi-Jurisdictional Hazard Mitigation Plan this 24 day of May, 2011.

  
\_\_\_\_\_  
Contact name, Monroe County Board of Supervisor's

5-24-11  
\_\_\_\_\_  
Date of Signature

  
Attest:  
5-24-11  
\_\_\_\_\_  
Date of Signature

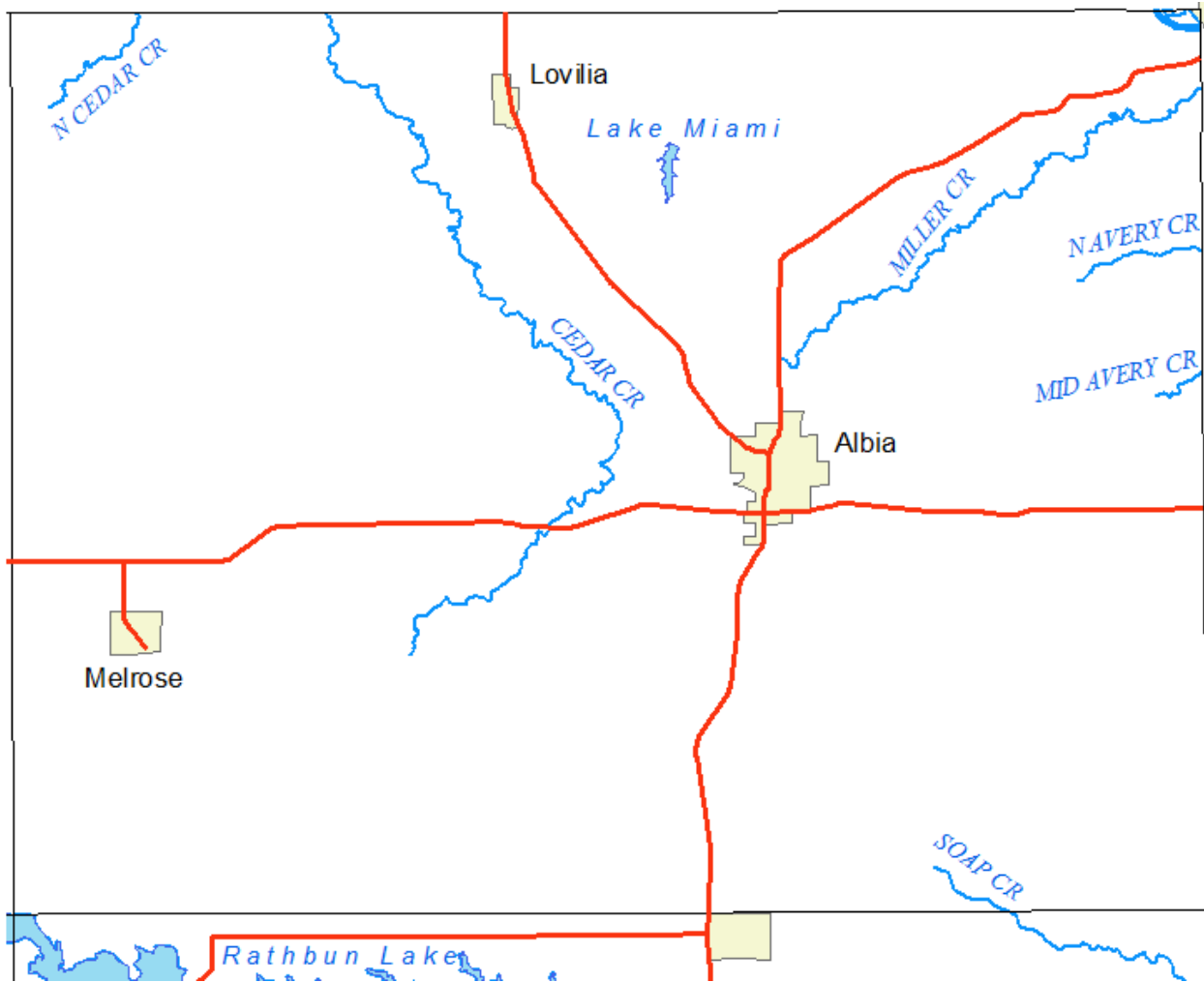
## Appendix B: Communities of Monroe County



There are twenty-three unincorporated communities and four incorporated cities in Monroe County. One of the incorporated communities, Eddyville, is also in Wapello and Mahaska Counties and is not considered in this plan. These communities reflect the entire body of Census-recognized named places in the county, though there may be others that are locally recognized such as named subdivisions in the unincorporated county.

Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

### Appendix C: Waterbodies in Monroe County



Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

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## Appendix D: Hillshade Image of Monroe County

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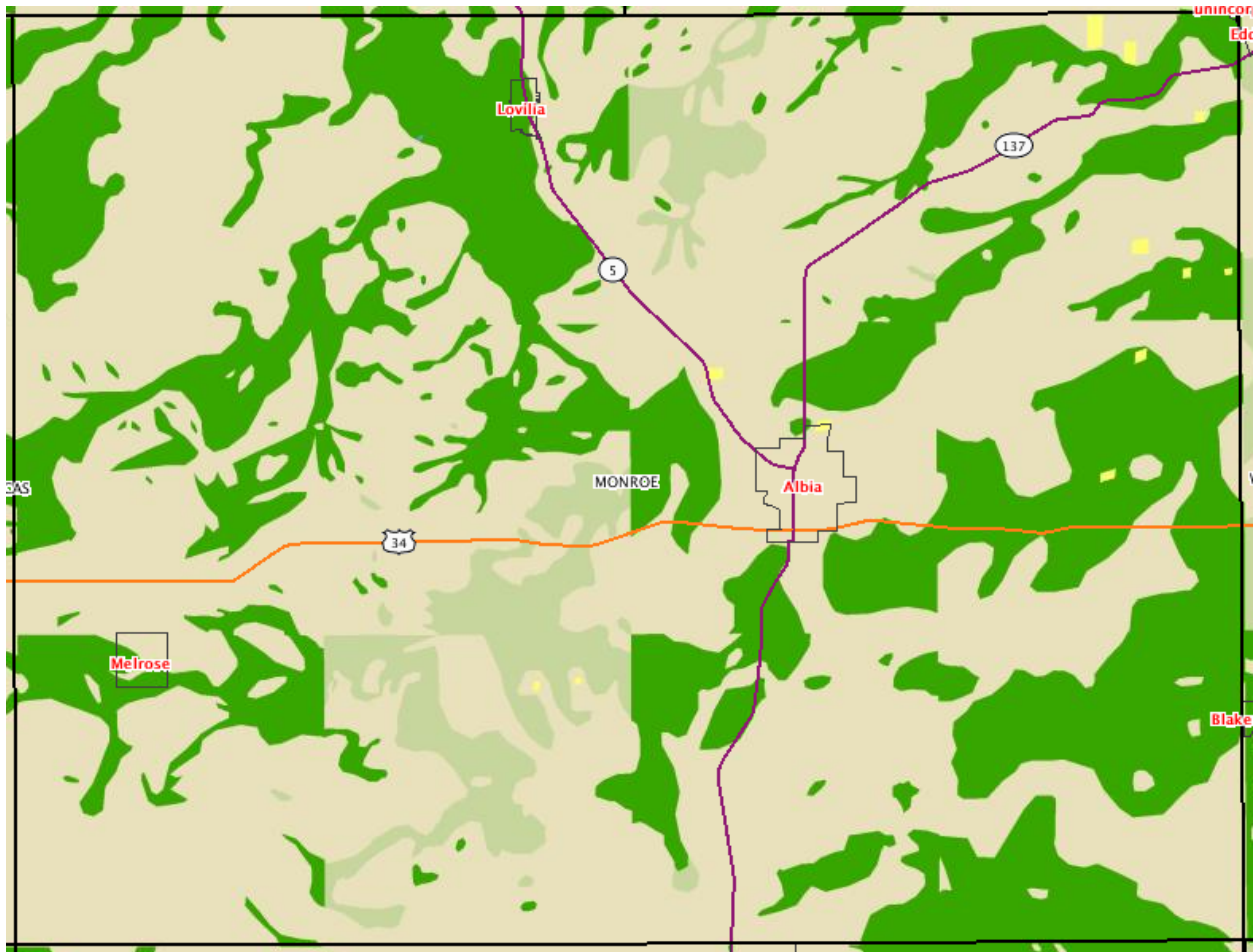


This image shows a representation of the topography in Monroe County. The western portion of the county has more steep slopes than the eastern portion except for the extreme southwest corner of the county. Albia and Lovilia are all located on relatively flat terrain while Melrose sits largely on down slopes with a portion of town extending to the opposite side of a valley.

The interactive mapping site where this image can be generated and manipulated can be found on the ISU GIS Facility Iowa Geographic Map Server website; <http://ortho.gis.iastate.edu/map.html> (30-meter DEM).






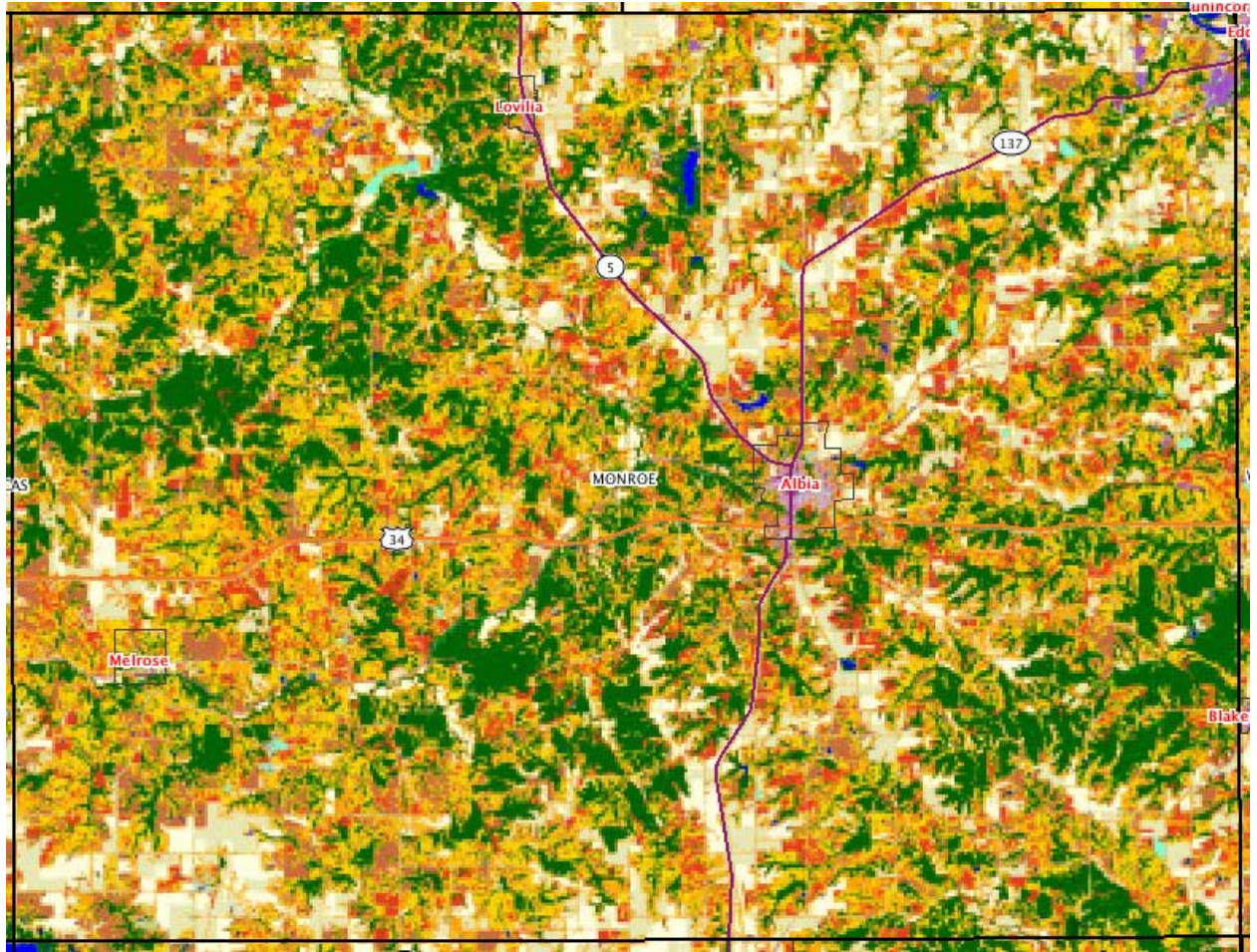
## Appendix E: Change in Vegetative Cover



**Historic Vegetation of Iowa 1832-1859  
from General Land Office Plat Maps**  
Source: Iowa State University, Iowa DNR

**Legend**

-  City/Village
-  Field
-  Forest
-  Prairie
-  Scattered Trees
-  Water/Wetland





These two comparison maps show some dramatic changes have occurred in Monroe County since the county was formed. Initially the county was predominantly forest and prairie land with some scattered fields mostly in the northeast quadrant of the county. This land cover has been transformed into various cropland uses over the last one hundred and fifty years. Substantial stands of deciduous forest remained despite the vast changes, more-so than may be found elsewhere in Iowa. The interactive mapping site where this image can be generated and manipulated can be found on the ISU GIS Facility Iowa Geographic Map Server website; <http://ortho.gis.iastate.edu/map.html> (1800s Historic Vegetation and 2002 Landcover).

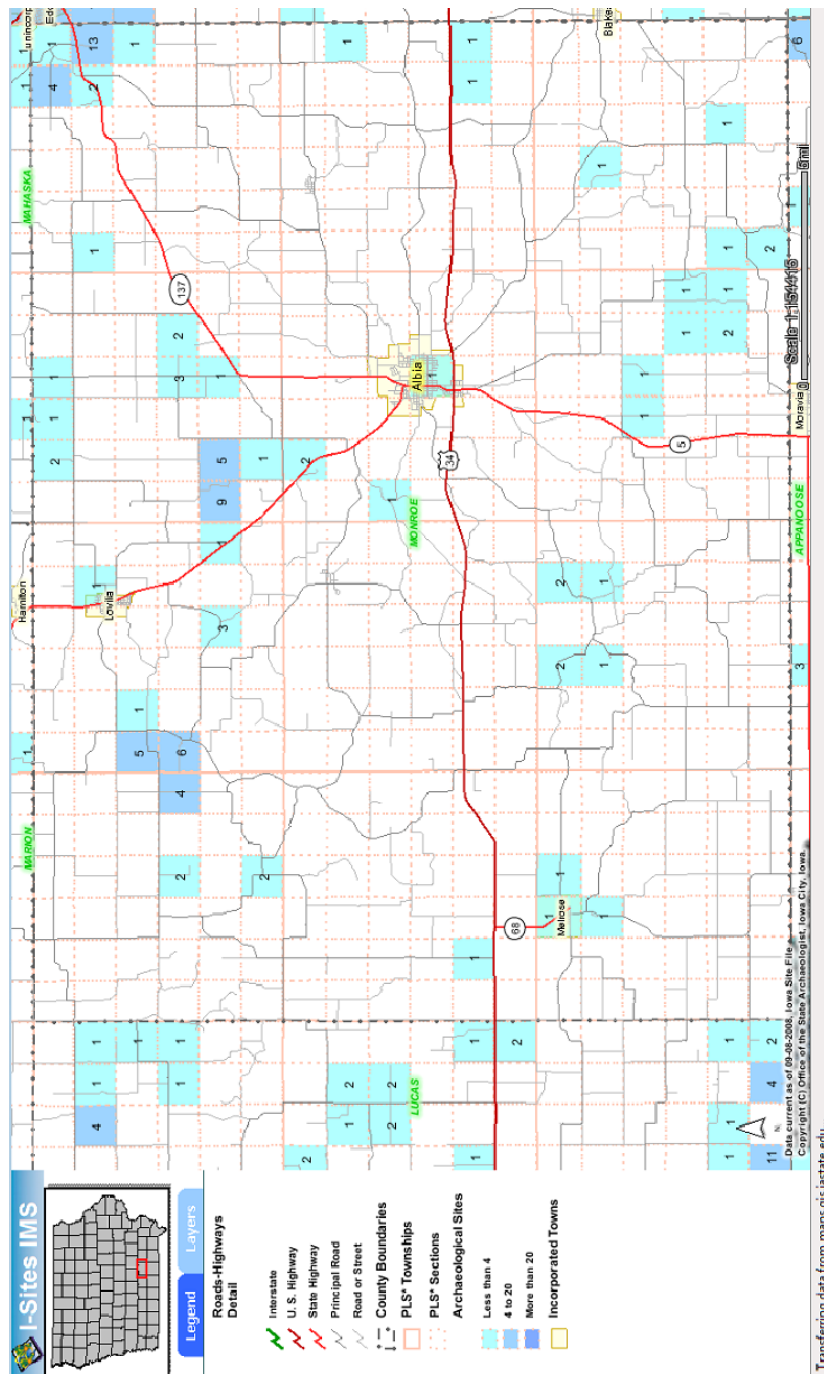
Appendix F: Waste Water Permits

Facility Name	Facility Type	Owner Name	River Basin	Nearest City	Type of Treatment	Design PE	Design BOD	Design ADW Flow (MGD)	Design AWW Flow (MGD)	Operator Certification Facility Type	Operator Certification Facility Grade
ALBIA CITY OF STP (NORTH)	MUNICIPAL	CITY OF ALBIA	DES MOINES RIVER BELOW WHITEBREAST CREEK	ALBIA	AERATED LAGOON	4,353.00	727.00	0.35	0.82	WL	I
ALBIA CITY OF STP (WEST)	MUNICIPAL	CITY OF ALBIA	DES MOINES RIVER BELOW WHITEBREAST CREEK	ALBIA	AERATED LAGOON	1,246.00	208.00	0.15	0.27	WL	I
HALLEY'S MHP STP	SEMI-PUBLIC	HALLEY'S MOBILE HOMES, INC.	DES MOINES RIVER BELOW WHITEBREAST CREEK	ALBIA	WASTE STABILIZATION LAGOON	54.00	9.00	0.00	0.00		
AVERY CITY OF STP (RATHBUN RWA)	MUNICIPAL	RATHBUN REGIONAL WATER ASSOCIATION	DES MOINES RIVER BELOW WHITEBREAST CREEK	CENTERVILLE	WASTE STABILIZATION LAGOON	126.00	21.00	0.00	0.01	WL	I
LOVILLA CITY OF STP	MUNICIPAL	CITY OF LOVILLA	DES MOINES RIVER BELOW WHITEBREAST CREEK	LOVILLA	AERATED LAGOON	653.00	109.00	0.06	0.18	WL	I
MELROSE CITY OF STP (RATHBUN REGIONAL WATER ASSN.)	MUNICIPAL	RATHBUN REGIONAL WATER ASSOCIATION	DES MOINES RIVER BELOW WHITEBREAST CREEK	MELROSE	WASTE STABILIZATION LAGOON	155.00	26.00	0.01	0.02	WL	I

Source: Iowa DNR

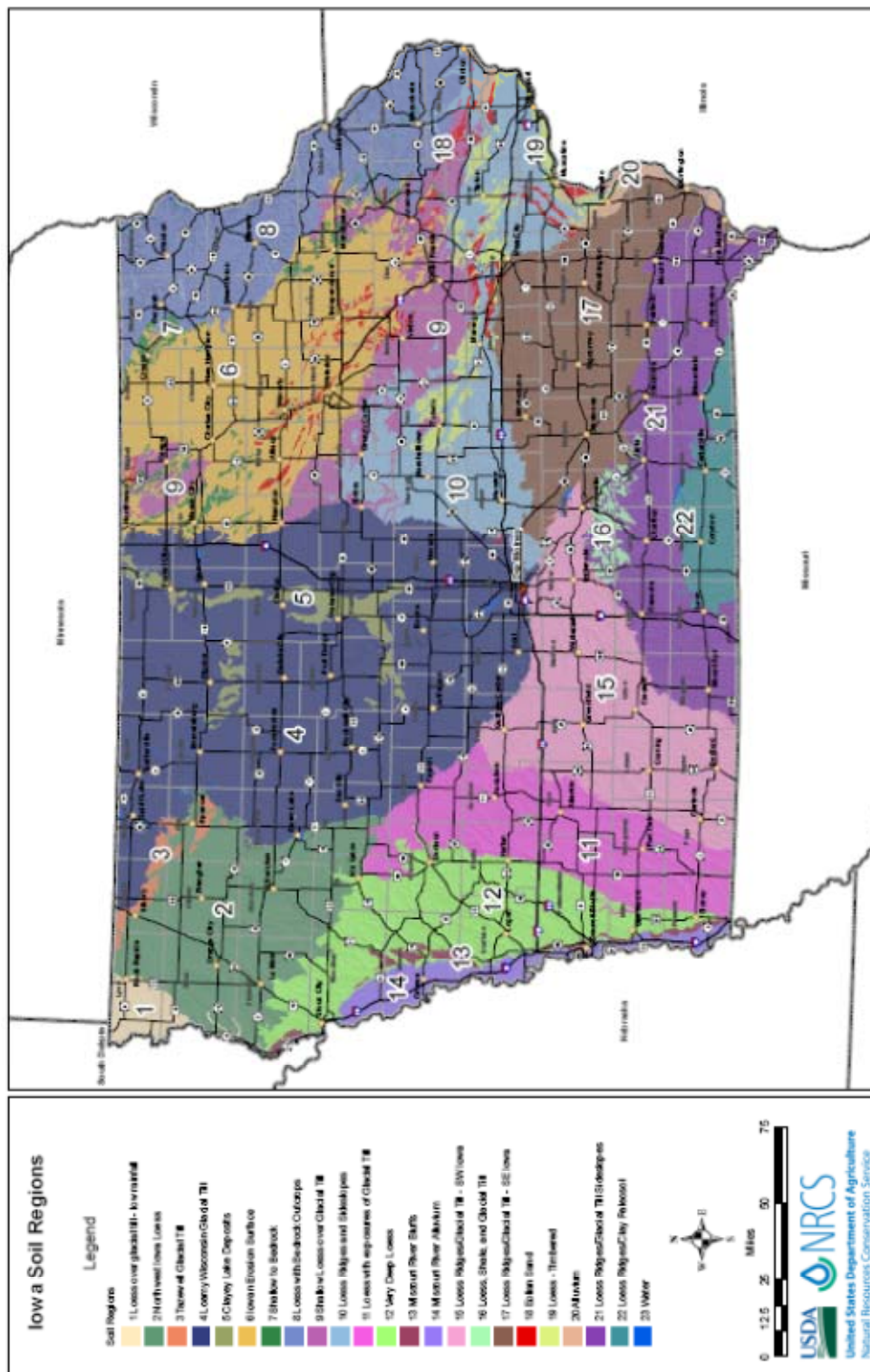


## Appendix G: Historic Sites in Monroe County



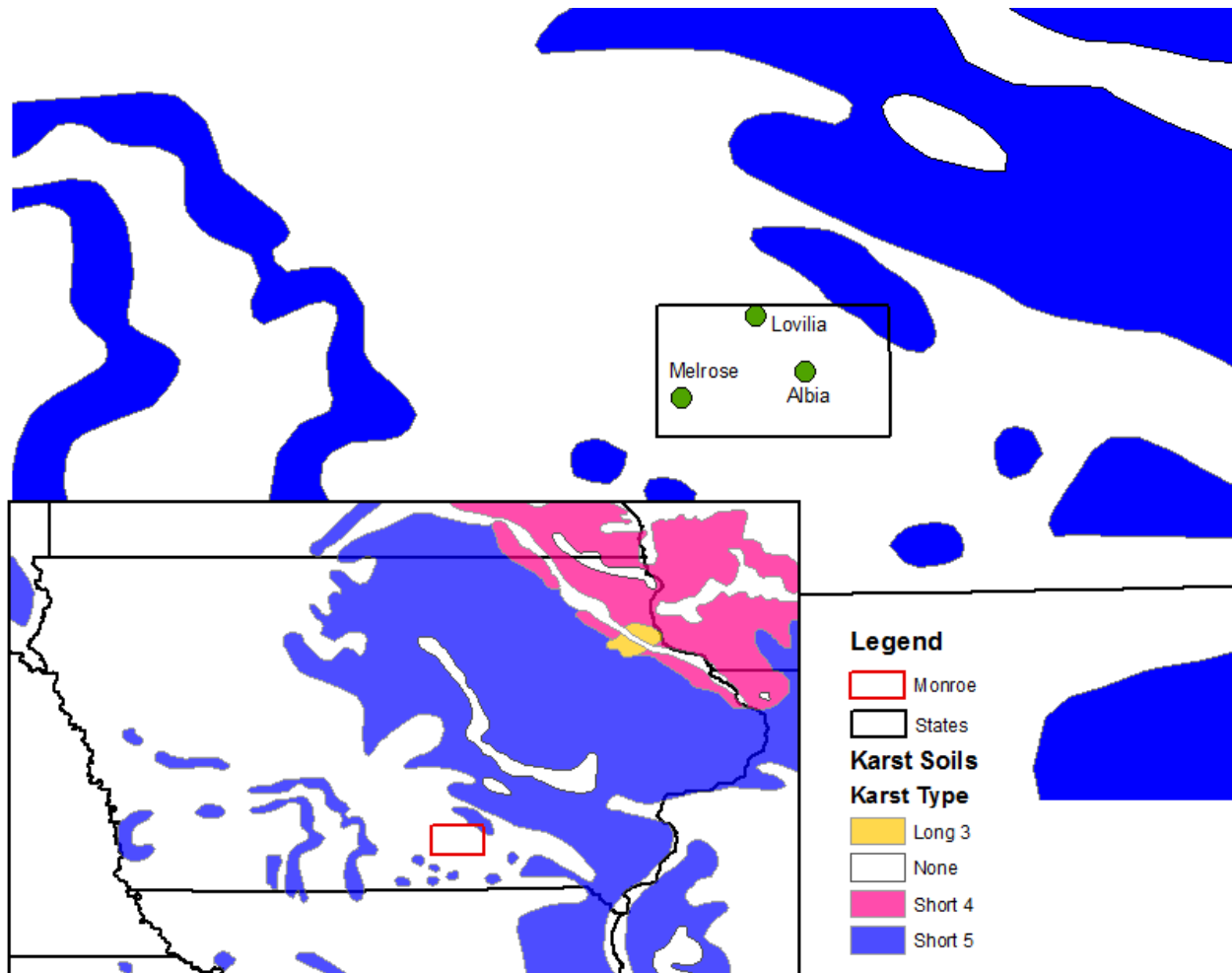
This map from the State Archeologist at the University of Iowa shows the number of historic sites per Public Land Survey section in Monroe County. The online interactive mapping tool can be found at the following website; <http://www2.uiowa.edu/i-sites/public.htm>.

Appendix H: NRCS Iowa Soil Regions map



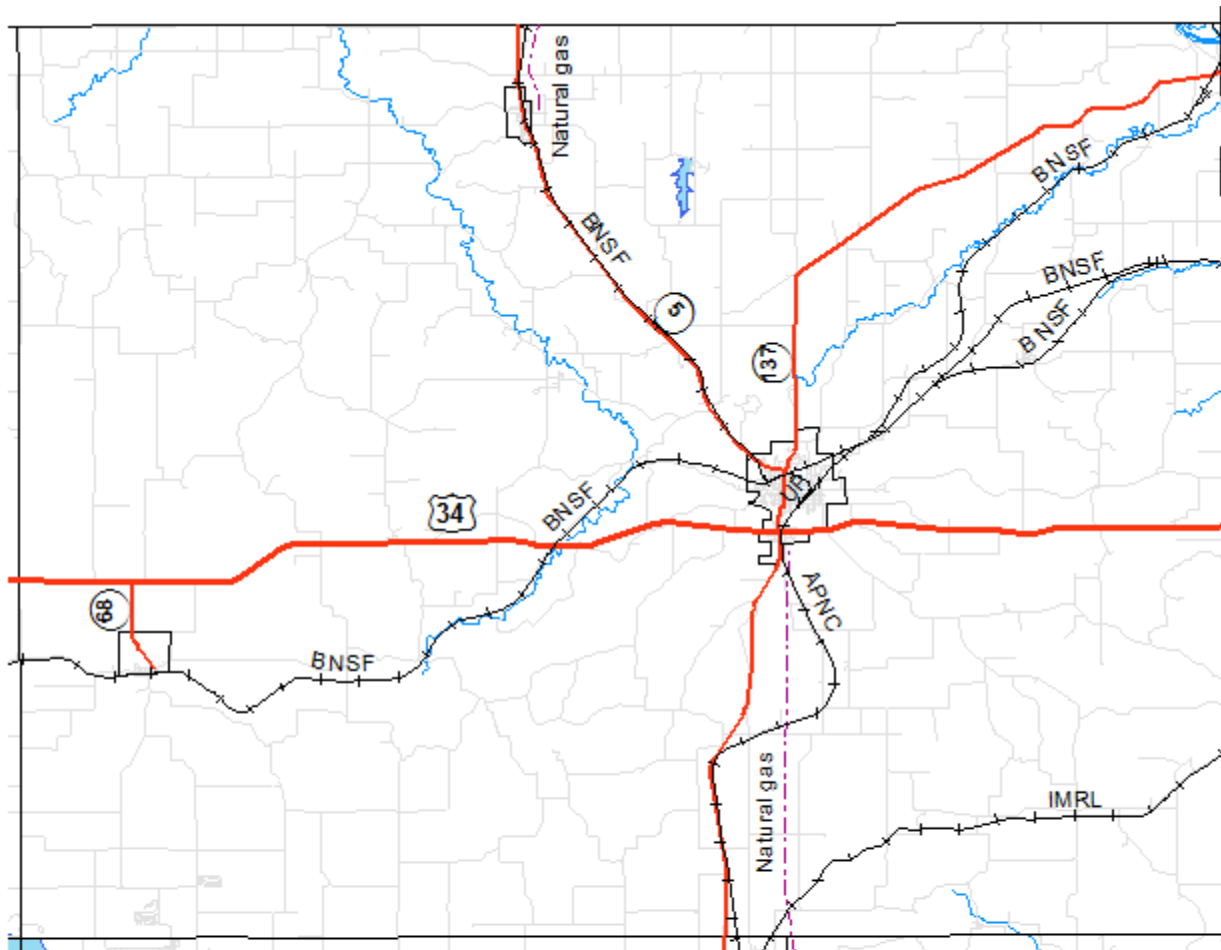
Source: NRCS, <ftp://ftp-fc.sc.egov.usda.gov/IA/technical/soilregionsmap.pdf>

## Appendix I: Karst Soils in Relation to Monroe County



Source: National Atlas GIS data compiled by Chariton Valley Planning and Development

**Appendix J: Transportation Routes in Monroe County**

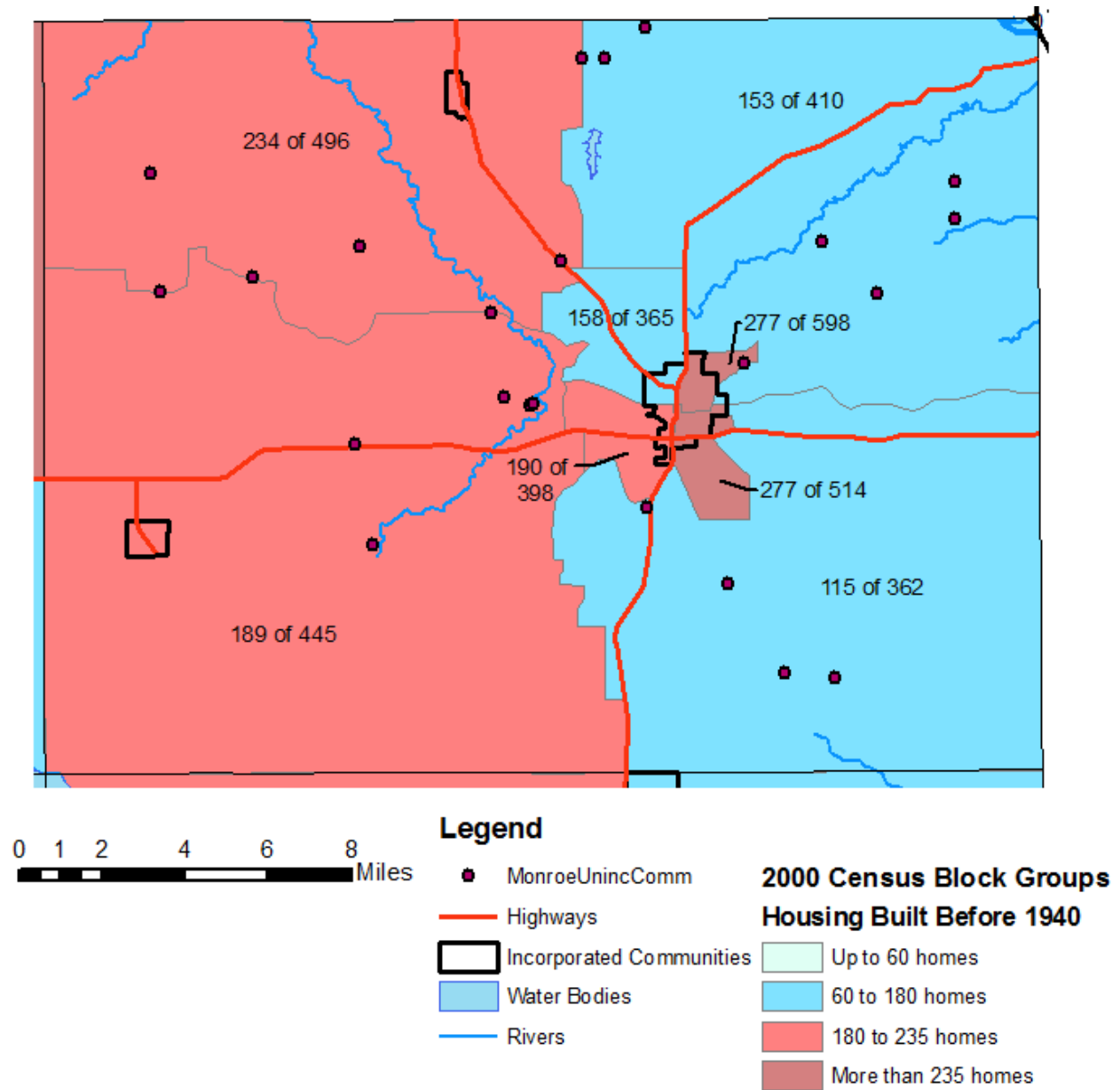


**Legend**

- +— Railroad
- Pipeline
- US Hwy
- State Hwy
- Inc. Community
- Roads
- Water Body
- River / Creek

Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

**Appendix K: Housing Built Before 1940 by Block Group**

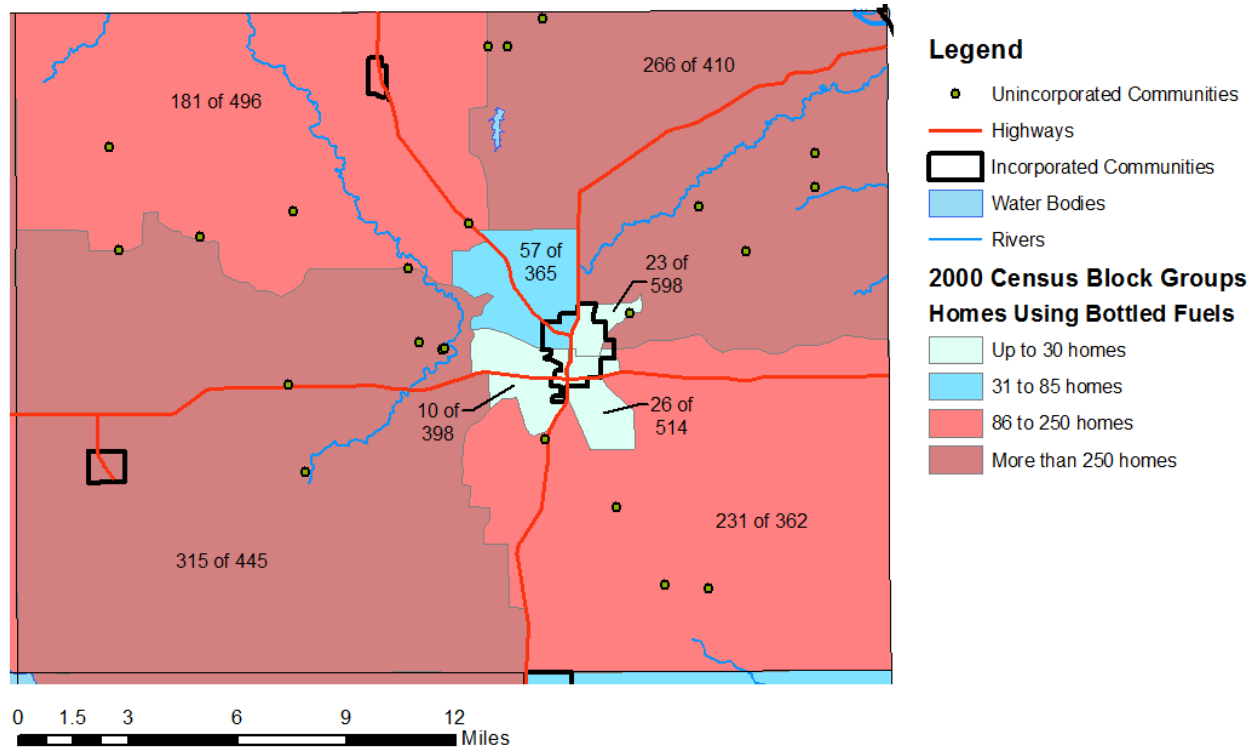


**Note:** The US Census breaks down data, such as the years houses were built, by Census Tract, Block, and Block Group (the smallest Census designation based on population) or by incorporated area. Each incorporated community in this plan has similar information provided; however an accurate estimate of how many homes in a block group containing a community were built before 1940 and in the community itself may be difficult to determine for some areas. For example: Melrose and Lovilia are each the only incorporated community in their respective block group. For these communities, estimating the number of homes built before 1940 is simply a matter of subtracting the number of homes for one of the communities from the number for its block group

to find the number of homes in the unincorporated portion of the block group. Several block groups extend from the unincorporated county into Albia, so estimating the number of homes built before 1940 between the incorporated and unincorporated portions of these block groups would be very difficult to do accurately.

Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

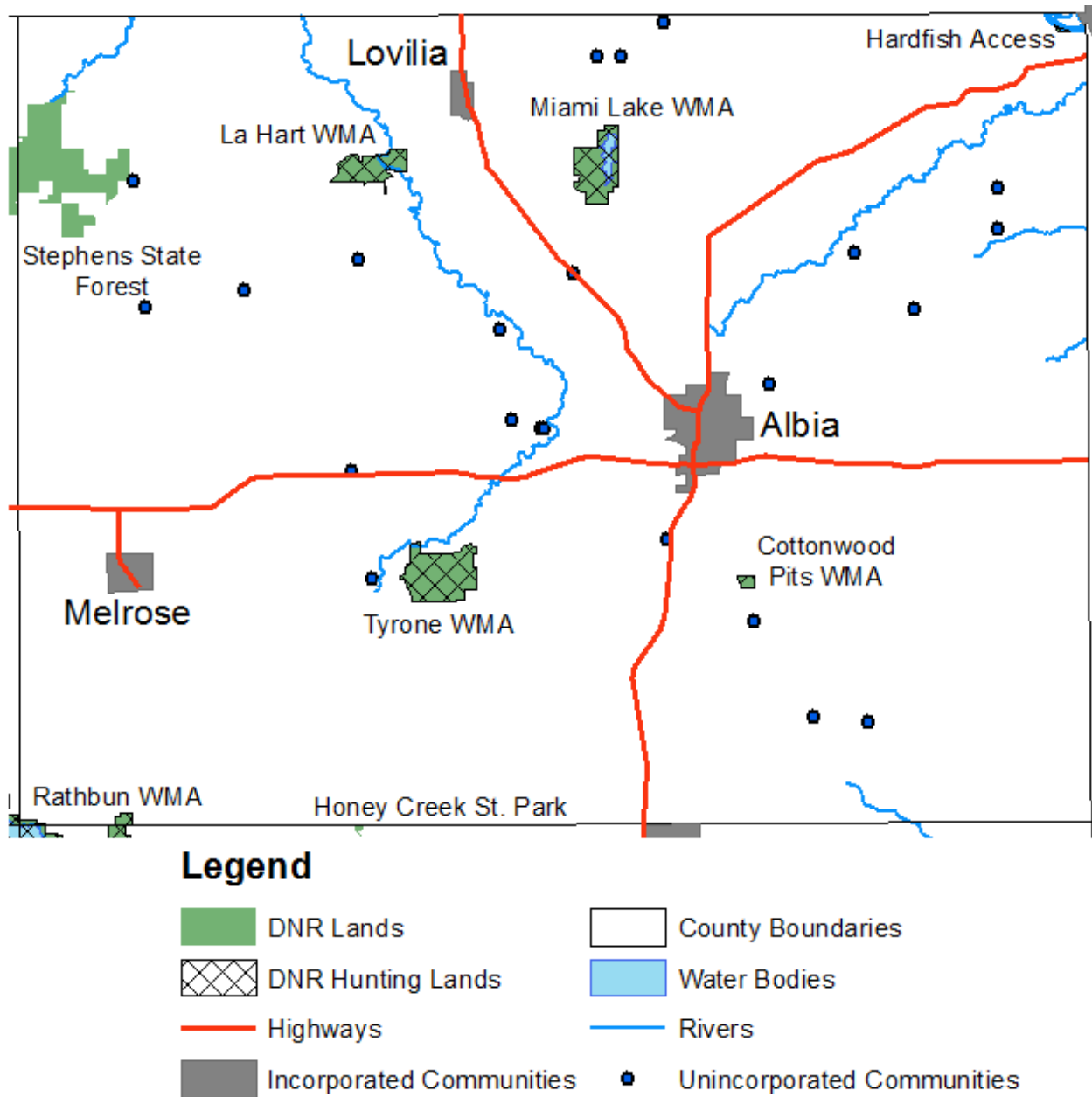
**Appendix L: Homes Heated with Bottled Fuel by Block Group**



Not surprisingly, most homes using bottled fuels are outside of the Census Block Groups that overlap with incorporated Albia. The majority of homes using bottled fuels are located in roughly the northeast and southwest quadrants of the county.

Source: IA DNR GIS data compiled by Chariton Valley Planning and Development

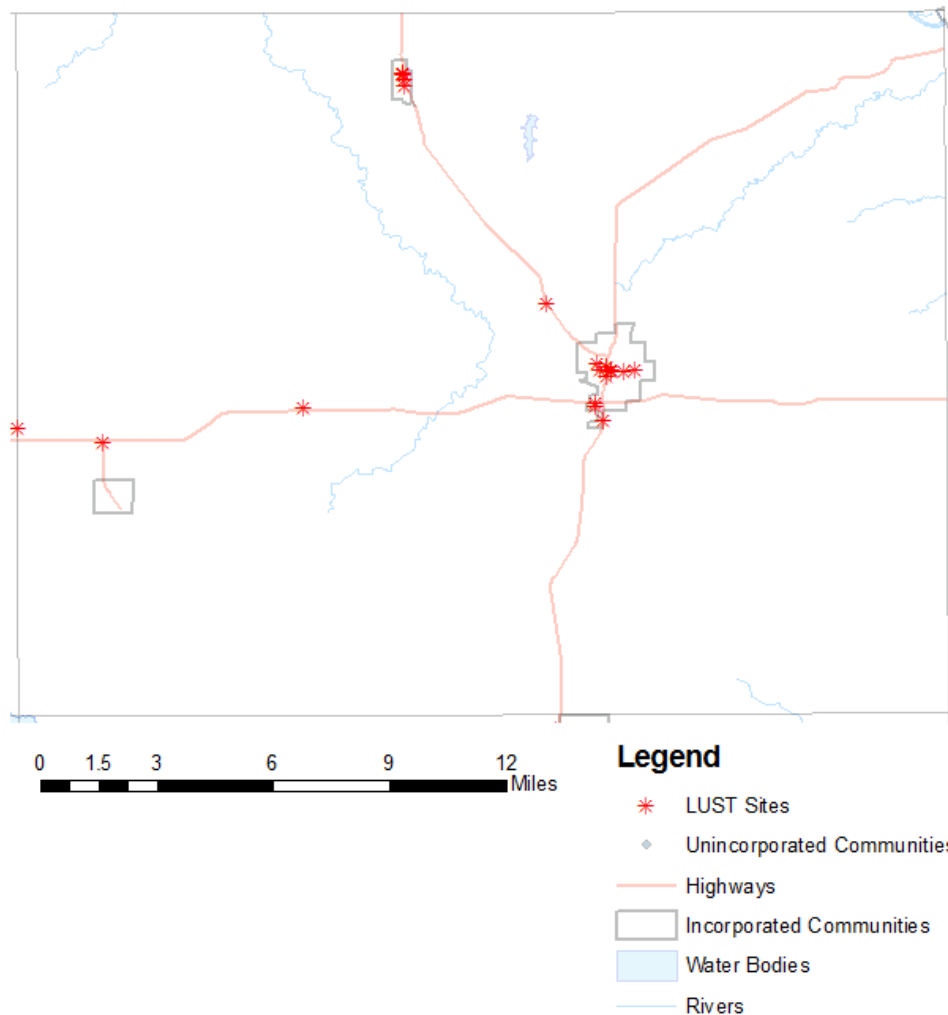
**Appendix M: Public Lands in Monroe County**



Source: IA DNR GIS data compiled by Chariton Valley Planning and Development



## Appendix N: Leaking Underground Storage Tank (LUST) Sites in Monroe County



The Iowa Department of Natural Resources keeps track of leaking underground storage tanks (LUST) which often include underground gasoline storage. Not all of the sites that the DNR maps are currently leaking but have been known to leak in the past or are at risk for potentially leaking. LUST sites pose a potential threat to drinking water resources and may be hazardous to people digging or otherwise in contact with soil that may be contaminated by plumes of leaking substances from the tanks.

There are two clusters of current or former LUST sites in Monroe County, in Albia and in Lovilia. The most of such sites are located in Albia. There are no known LUST sites in Melrose and four known sites along highways 34 and 5 west and north of Albia in the unincorporated county.

Source: Iowa Department of Natural Resources GIS data maintained at the University of Iowa, [ftp://ftp.igsb.uiowa.edu/gis\\_library/ia\\_state/Environmental\\_Regulation/LUST\\_sites.html](ftp://ftp.igsb.uiowa.edu/gis_library/ia_state/Environmental_Regulation/LUST_sites.html)

LEAK NUMBER	FACILITY NAME	FACILITY ADDRESS	FACILITY CITY	CURRENT STATUS	COMMENT
8LTL98	Lucas Monroe Landfill		Chariton	No Action Required	Former tank pit NW of maintenance bldg./office
8LTC97	Parenza Svc	US HWY 3Y	Melrose	No Action Required	UST area approx 60' SE of site bldg
7LTA60	Albia Maintenance Shed	HIGHWAY 5 SOUTH	Albia	No Action Required	UST N of E side of maint. bldg
9LTG57	Frank Gnrl Store			No Action Required	Former USTs
7LTL26	Idot	15TH ST AND C AVENUE WEST	Albia	No Action Required	0
7LTP13	Albia Stop & Shop	300 HWY 34 W	Albia	High Risk	4 USTs located E of Texaco bldg.
7LTK51	Kum & Go #651	204 S MAIN	Albia	No Action Required	USTs W of N side of Kum & Go
7LTH08	Sch Bus Garage	805 WASHINGTON AVENUE EAST	Albia	No Action Required	UST area E of NE side of site bldg
7LTA74	R&r Oil Db a C-Mart	222 BENTON AVE E	Albia	Low Risk	2 USTs E of Coastal bldg. 1 UST SE of bldg
7LTM36	Kraber Elec	221 EAST BENTON	Albia	High Risk	0
7LTM35	First Iowa State Bnk	E BENTON AVE & S 3RD ST	Albia	Not Classified	Former UST site NW of island near 3rd St.
9LTA73	Jehovahs Witnesses	1305 EAST BENTON	Albia	No Action Required	UST area W of site bldg
7LTS97	Vitko Sinclair	113 BENTON AVENUE W	Albia	No Action Required	UST area W of site bldg
7LTX90	Albia Bp	107 N MAIN	Albia	No Action Required	3 USTs E of station bldg
7LTX84	Caseys Gnrl Store	122 NORTH MAIN ST	Albia	No Action Required	UST area N of Casey's site bldg
8LTM98	Goode Seed & Feed Co Inc	117 E WASHINGTON	Albia	No Action Required	UST LOCATED E OF SCALE
7LTL40	Cntry Mill Inc	RTE 5	Albia	No Action Required	UST LOCATED SE OF SE CORNER OF BLDG
7LTP12	Gas & Go	1604 S. HWY 5	Lovilia	No Action Required	UST area approx 60' N of site bldg
7LTD73	Lovilia Bait & Tire	1905 N HWY. 5	Lovilia	High Risk	Former diesel tank, Test hole #4
8LTV05	Trust Trucking Inc	HIGHWAY 5	Lovilia	High Risk	Site E of bldg
7LTY73	Lovilia Tire Svc	1905 HWY 5 N	Lovilia	No Action Required	3,000-gal. Gasoline UST
8LTU62	Lovilia Tire Svc	1905 HWY 5 N	Lovilia	No Action Required	Former diesel tank

**Appendix O: Monroe County NCDC Storm Events**

**6 DROUGHT** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

*Click on **Location or County** to display Details.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

**Iowa**

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">All Of Iowa</a>	08/01/1995	0000	Drought	N/A	0	0	0	0.5B
2 <a href="#">IAZ057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	07/20/1999	12:00 PM	Drought	N/A	0	0	0	109.9M
3 <a href="#">IAZ033 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	08/14/2000	12:00 AM	Drought	N/A	0	0	0	150.1M
4 <a href="#">IAZ033 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	09/01/2000	12:00 AM	Drought	N/A	0	0	0	161.0M
5 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	08/01/2001	12:00 AM	Drought	N/A	0	0	0	578.9M
6 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	08/01/2003	12:00 AM	Drought	N/A	0	0	645.2M	0
TOTALS:					0	0	645.150M	1.500B

**61 FLOOD** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

Click on **Location or County** to display *Details*.

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

**Iowa**

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">IAZ026&gt;030 - 035&gt;042 - 045&gt;054 - 056&gt;064 - 070&gt;079 - 080&gt;099</a>	03/02/1993	1200	Flooding	N/A	0	0	50K	0
2 <a href="#">IAZ002&gt;011 - 013&gt;054 - 056&gt;064 - 070&gt;079 - 080&gt;099</a>	03/22/1993	0600	Major Flood	N/A	0	0	50.0M	0
3 <a href="#">IAZ002&gt;011 - 013&gt;054 - 056&gt;064 - 070&gt;079 - 080&gt;099</a>	04/01/1993	0000	Major Flood	N/A	0	0	50.0M	0
4 <a href="#">IAZ002&gt;011 - 013&gt;054 - 058&gt;064 - 071&gt;078 - 083&gt;089 - 093&gt;099</a>	04/20/1993	0600	Major Flood	N/A	0	0	5.0M	0
5 <a href="#">IAZ002&gt;005 - 013&gt;015 - 022&gt;026 - 033&gt;037 - 045&gt;050 - 058&gt;064 - 071&gt;078 - 083&gt;088 - 095&gt;099</a>	08/16/1993	0600	Flood	N/A	0	0	5.0M	5.0M
6 <a href="#">IAZ002&gt;011 - 013&gt;054 - 056&gt;064 - 070&gt;078 - 080&gt;099</a>	08/29/1993	0300	Flood	N/A	0	0	5.0M	5.0M
7 <a href="#">All Of Iowa</a>	09/01/1993	0000	Flood	N/A	0	0	500K	500K
8 <a href="#">Southern Iowa</a>	09/06/1993	0600	Flood	N/A	0	0	500K	500K
9 <a href="#">IAZ034&gt;040 - 046&gt;052 - 058&gt;064 - 072&gt;078 - 083&gt;089 - 095&gt;099</a>	09/14/1993	0600	Flood	N/A	0	0	500K	500K

<a href="#">10 IAZ028=030 - 040&gt;054 - 056&gt;064 - 070&gt;078 - 080&gt;099</a>	09/25/1993	1400	Flood	N/A	0	0	5.0M	500K
<a href="#">11 Central And</a>	10/01/1993	0000	Flooding	N/A	0	0	50K	50K
<a href="#">12 Much Of Iowa</a>	02/19/1994	0600	Flooding	N/A	0	0	500K	0
<a href="#">13 IAZ001=099</a>	06/22/1994	2330	Flooding	N/A	0	0	500K	500K
<a href="#">14 IAZ004=006 - 015 - 048&gt;050 - 061&gt;064 - 074&gt;078 - 082&gt;089 - 094&gt;099</a>	04/10/1995	0900	Flooding	N/A	0	0	10K	0
<a href="#">15 IAZ004=006 - 015 - 035&gt;037 - 048&gt;052 - 061&gt;064 - 074&gt;078 - 085&gt;089 - 097&gt;099</a>	04/26/1995	1500	Flooding	N/A	0	0	25K	0
<a href="#">16 IAZ033 - 034 - 045&gt;052 - 057&gt;068 - 070&gt;078 - 081&gt;089 - 092&gt;099</a>	05/07/1995	1200	Flooding	N/A	0	0	200K	10K
<a href="#">17 IAZ004=011 - 015&gt;019 - 023&gt;030 - 035&gt;042 - 047&gt;054 - 060&gt;068 - 074&gt;078 - 084&gt;089 - 095&gt;099</a>	06/06/1995	2300	Flood	N/A	0	0	50K	100K
<a href="#">18 IAZ017=019 - 026&gt;029 - 038&gt;042 - 051&gt;053 - 082&gt;085 - 092&gt;096</a>	06/28/1995	0600	Flood	N/A	0	0	25K	30K
<a href="#">19 Central Into South</a>	07/04/1995	2100	Flood	N/A	0	0	25K	10K
<a href="#">20 IAZ060=062 - 072&gt;075 - 081&gt;086 - 092&gt;097</a>	05/09/1996	06:00 AM	Flood	N/A	0	0	100K	50K
<a href="#">21 IAZ057=062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	05/23/1996	03:00 PM	Flood	N/A	0	0	250K	75K
<a href="#">22 IAZ057=062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	05/26/1996	12:00 PM	Flood	N/A	0	0	400K	100K
<a href="#">23 IAZ034=039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	02/18/1997	06:00 PM	Flood	N/A	0	0	750K	0
<a href="#">24 IAZ073=075 - 083&gt;086</a>	05/07/1997	06:00 PM	Flood	N/A	0	0	10K	0

<a href="#">25 IAZ075 - 083&gt;086 - 094&gt;097</a>	03/30/1998	06:00 PM	Flood	N/A	0	0	90K	0
<a href="#">26 Albia</a>	06/14/1998	04:00 PM	Urban/sml Stream Fld	N/A	0	0	50K	30K
<a href="#">27 IAZ034 - 037&gt;038 - 045&gt;046 - 049 - 058&gt;062 - 073&gt;075 - 084&gt;086 - 095</a>	07/06/1998	03:00 AM	Flood	N/A	0	0	900K	1.8M
<a href="#">28 IAZ074&gt;075 - 085</a>	10/05/1998	06:00 AM	Flood	N/A	0	0	75K	15K
<a href="#">29 IAZ027 - 074&gt;075 - 083&gt;085 - 095&gt;096</a>	10/17/1998	06:00 AM	Flood	N/A	0	0	560K	80K
<a href="#">30 IAZ004&gt;006 - 016 - 023 - 025&gt;027 - 033&gt;037 - 045&gt;046 - 048&gt;049 - 058&gt;061 - 071&gt;073 - 075 - 083&gt;086 - 095</a>	04/06/1999	06:00 PM	Flood	N/A	0	0	210K	0
<a href="#">31 IAZ004&gt;007 - 015&gt;017 - 023&gt;027 - 033&gt;037 - 045&gt;046 - 048&gt;049 - 058&gt;061 - 071&gt;072 - 075 - 083&gt;086 - 095</a>	04/22/1999	06:00 AM	Flood	N/A	0	0	370K	0
<a href="#">32 IAZ004&gt;006 - 016&gt;017 - 023&gt;028 - 035&gt;039 - 045&gt;046 - 048&gt;049 - 058&gt;061 - 072&gt;075 - 083&gt;085 - 095</a>	05/16/1999	09:00 PM	Flood	N/A	0	0	7.6M	875K
<a href="#">33 Albia</a>	06/23/2000	04:45 PM	Flash Flood	N/A	0	0	100K	50K
<a href="#">34 IAZ026&gt;027 - 038 - 061 - 074&gt;075 - 083&gt;086 - 094&gt;095 - 097</a>	06/24/2000	03:00 AM	Flood	N/A	0	0	650K	975K
<a href="#">35 Countywide</a>	06/25/2000	07:00 PM	Flash Flood	N/A	0	0	200K	50K
<a href="#">36 IAZ046&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	03/15/2001	03:00 PM	Flood	N/A	0	0	260K	0
<a href="#">37 IAZ085&gt;086</a>	03/15/2001	09:00 AM	Flood	N/A	0	0	75K	0
<a href="#">38 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 -</a>	03/23/2001	06:00 PM	Flood	N/A	0	0	383K	0

<a href="#">033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>								
<a href="#">39 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;037 - 039 - 045&gt;046 - 048&gt;049 - 074&gt;075 - 083&gt;086 - 094&gt;095</a>	04/07/2001	09:00 PM	Flood	N/A	0	0	4.7M	0
<a href="#">40 Countywide</a>	05/10/2001	08:30 PM	Flash Flood	N/A	0	0	150K	0
<a href="#">41 IAZ074&gt;075 - 083&gt;086 - 094&gt;095</a>	05/11/2001	06:00 AM	Flood	N/A	0	0	200K	0
<a href="#">42 IAZ004&gt;007 - 015&gt;017 - 023&gt;026 - 033&gt;038 - 045&gt;046 - 048&gt;049 - 059&gt;061 - 073&gt;075 - 083&gt;086 - 094&gt;095</a>	06/12/2001	03:00 PM	Flood	N/A	0	0	825K	1.7M
<a href="#">43 South Portion</a>	08/03/2001	06:00 AM	Flash Flood	N/A	0	0	15K	15K
<a href="#">44 IAZ083&gt;085 - 095&gt;096</a>	10/23/2001	03:00 AM	Flood	N/A	0	0	25K	0
<a href="#">45 IAZ004&gt;006 - 015&gt;016 - 023&gt;025 - 033&gt;036 - 045&gt;049 - 058&gt;062 - 071&gt;075 - 083&gt;086</a>	05/04/2003	12:00 PM	Flood	N/A	0	0	200K	0
<a href="#">46 IAZ004&gt;006 - 015&gt;016 - 023&gt;025 - 033&gt;036 - 045&gt;049 - 058&gt;062 - 071&gt;075 - 083&gt;086</a>	05/09/2003	06:00 AM	Flood	N/A	0	0	155K	0
<a href="#">47 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	05/22/2004	06:00 PM	Flood	N/A	0	0	5.1M	15.2M
<a href="#">48 IAZ004&gt;006 - 015&gt;016 - 023&gt;025 - 033&gt;036 - 044&gt;047 - 057&gt;061 - 071&gt;075 - 083&gt;086 - 096&gt;097</a>	05/13/2005	02:00 AM	Flood	N/A	0	0	960K	0
<a href="#">49 Albia</a>	04/26/2007	06:00 AM	Flood	N/A	0	0	250K	0K

50 <a href="#">Avery</a>	06/13/2008	00:04 AM	Flash Flood	N/A	0	0	25K	0K
51 <a href="#">Albia Muni Arpt</a>	06/26/2008	13:00 PM	Flash Flood	N/A	0	0	25K	0K
52 <a href="#">Melrose</a>	06/26/2008	13:00 PM	Flash Flood	N/A	0	0	10K	0K
53 <a href="#">Tyrone</a>	06/26/2008	13:00 PM	Flash Flood	N/A	0	0	5K	0K
54 <a href="#">Albia</a>	07/08/2008	00:00 AM	Flash Flood	N/A	0	0	10K	0K
55 <a href="#">Melrose</a>	07/08/2008	00:20 AM	Flash Flood	N/A	0	0	30K	0K
56 <a href="#">Avery</a>	07/08/2008	01:00 AM	Flash Flood	N/A	0	0	25K	0K
57 <a href="#">Selection</a>	07/08/2008	02:00 AM	Flash Flood	N/A	0	0	50K	0K
58 <a href="#">Albia</a>	07/27/2008	23:20 PM	Flash Flood	N/A	0	0	25K	0K
59 <a href="#">Hiteman</a>	07/28/2008	00:00 AM	Flash Flood	N/A	0	0	10K	5K
60 <a href="#">Lovilia</a>	07/28/2008	00:00 AM	Flash Flood	N/A	0	0	5K	5K
61 <a href="#">Melrose</a>	07/28/2008	06:38 AM	Flood	N/A	0	0	25K	0K
TOTALS:					0	0	148.693M	33.675M

**2 FUNNEL CLOUD** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

*Click on [Location](#) or [County](#) to display Details.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

**Iowa**

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">Melrose</a>	04/10/2008	16:16 PM	Funnel Cloud	N/A	0	0	0K	0K
2 <a href="#">Avery</a>	04/10/2008	16:38 PM	Funnel Cloud	N/A	0	0	0K	0K
TOTALS:					0	0	0	0

**34 HAIL** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

*Click on [Location](#) or [County](#) to display Details.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage



Iowa

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">MONROE</a>	08/21/1979	1530	Hail	1.75 in.	0	0	0	0
2 <a href="#">MONROE</a>	03/27/1985	2059	Hail	0.75 in.	0	0	0	0
3 <a href="#">MONROE</a>	05/11/1985	1603	Hail	1.75 in.	0	0	0	0
4 <a href="#">MONROE</a>	05/31/1987	1726	Hail	0.75 in.	0	0	0	0
5 <a href="#">MONROE</a>	10/24/1991	0249	Hail	1.00 in.	0	0	0	0
6 <a href="#">Moravia</a>	07/22/1995	2024	Hail	1.75 in.	0	0	5K	10K
7 <a href="#">Albia</a>	04/18/1996	02:00 PM	Hail	0.75 in.	0	0	5K	0
8 <a href="#">Melrose</a>	05/09/1996	12:27 PM	Hail	0.88 in.	0	0	5K	0
9 <a href="#">Albia</a>	05/14/1996	03:38 PM	Hail	1.00 in.	0	0	5K	0
10 <a href="#">Albia</a>	03/30/1998	04:53 PM	Hail	0.75 in.	0	0	0	0
11 <a href="#">Avery</a>	03/30/1998	05:06 PM	Hail	0.75 in.	0	0	0	0
12 <a href="#">Hiteman</a>	05/20/1998	10:05 AM	Hail	3.25 in.	0	0	100K	25K
13 <a href="#">Albia</a>	05/23/1998	06:26 PM	Hail	1.00 in.	0	0	1K	3K
14 <a href="#">Hiteman</a>	10/22/2001	03:25 PM	Hail	0.88 in.	0	0	3K	5K
15 <a href="#">Hiteman</a>	10/22/2001	03:26 PM	Hail	1.75 in.	0	0	20K	10K
16 <a href="#">Albia</a>	10/22/2001	03:33 PM	Hail	1.00 in.	0	0	5K	5K
17 <a href="#">Albia</a>	10/22/2001	03:35 PM	Hail	1.00 in.	0	0	30K	5K
18 <a href="#">Albia</a>	10/22/2001	04:37 PM	Hail	1.00 in.	0	0	5K	3K
19 <a href="#">Albia</a>	12/22/2001	01:52 PM	Hail	0.88 in.	0	0	0	0
20 <a href="#">Albia</a>	06/13/2002	12:22 AM	Hail	0.75 in.	0	0	0	5K
21 <a href="#">Albia</a>	06/13/2002	12:30 AM	Hail	0.75 in.	0	0	0	5K
22 <a href="#">Albia</a>	09/18/2002	07:41 PM	Hail	0.88 in.	0	0	3K	0
23 <a href="#">Albia</a>	04/30/2003	05:16 PM	Hail	1.75 in.	0	0	10K	0
24 <a href="#">Avery</a>	04/30/2003	05:25 PM	Hail	2.75 in.	0	0	50K	0
25 <a href="#">Albia</a>	04/30/2003	05:30 PM	Hail	2.50 in.	0	0	50K	0
26 <a href="#">Melrose</a>	05/08/2003	06:00 PM	Hail	1.75 in.	0	0	10K	0
27 <a href="#">Lovilia</a>	05/08/2003	06:20 PM	Hail	1.75 in.	0	0	10K	0
28 <a href="#">Albia Muni Arpt</a>	08/31/2005	06:24 PM	Hail	0.75 in.	0	0	0	5K
29 <a href="#">Albia Muni Arpt</a>	08/31/2005	06:35 PM	Hail	0.75 in.	0	0	0	5K
30 <a href="#">Avery</a>	05/25/2008	22:02 PM	Hail	1.25 in.	0	0	3K	0K
31 <a href="#">Albia</a>	06/12/2008	16:00 PM	Hail	1.75 in.	0	0	75K	5K
32 <a href="#">Avery</a>	06/12/2008	16:10 PM	Hail	1.75 in.	0	0	25K	5K
33 <a href="#">Weller</a>	06/20/2008	16:01 PM	Hail	0.88 in.	0	0	1K	5K
34 <a href="#">Melrose</a>	07/27/2008	19:00 PM	Hail	1.75 in.	0	0	10K	10K
TOTALS:					0	0	431K	111K

**0 LIGHTNING** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

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**48 SNOW & ICE** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

*Click on **Location or County** to display **Details**.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

## Iowa

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
<a href="#">1 IAZ053 - 054 - 063 - 064 - 074 &gt; 078 - 084 &gt; 089 - 092 &gt;</a>	01/11/1993	1800	Freezing Rain	N/A	0	0	50K	0
<a href="#">2 IAZ002 &gt; 011 - 013 &gt; 054 - 056 &gt; 064 - 070 &gt; 078 - 080 &gt; 099</a>	01/20/1993	0430	Ice Storm	N/A	0	0	50K	0
<a href="#">3 IAZ002 &gt; 011 - 013 &gt; 054 - 056 &gt; 064 - 070 &gt; 076 - 080 &gt; 086 - 090 &gt; 096</a>	02/08/1993	2230	Freezing Rain	N/A	0	0	1K	0
<a href="#">4 IAZ002 &gt; 011 - 013 &gt; 054 - 056 &gt; 064 - 070 &gt; 078 - 080 &gt; 099</a>	02/10/1993	2100	Freezing Rain	N/A	1	0	50K	0
<a href="#">5 IAZ056 &gt; 064 - 070 &gt; 078 - 080 &gt; 099 -</a>	02/20/1993	1400	Freezing Rain	N/A	0	0	5K	0
<a href="#">6 IAZ043 &gt; 049 - 056 &gt; 064 - 070 &gt; 078 - 080 &gt; 099 -</a>	02/25/1993	0500	Snow	N/A	0	0	1K	0
<a href="#">7 IAZ041 - 042 - 051 &gt; 054 - 061 &gt; 099</a>	01/26/1994	1300	Freezing Rain	N/A	0	0	500K	0
<a href="#">8 Southeast Third Of Io</a>	02/22/1994	1000	Snow	N/A	0	0	5K	0
<a href="#">9 IAZ001 &gt; 004 - 012 &gt; 015 - 020 &gt; 028 - 031 &gt; 099</a>	01/26/1995	2300	Freezing Rain	N/A	0	0	100K	0
<a href="#">10 Southern Iowa</a>	11/10/1995	1200	Snow	N/A	0	0	10K	0
<a href="#">11 Much Of Iowa</a>	11/27/1995	0500	Snow	N/A	0	0	50K	0
<a href="#">12 IAZ004 &gt; 011 - 015 &gt; 019 - 023 &gt; 030 - 033 &gt; 039 - 044 &gt; 050 &gt; 057 - 062 - 070 &gt; 075 - 081 &gt; 086 - 092 &gt; 097</a>	12/08/1995	0200	Snow	N/A	0	0	20K	0
<a href="#">13 IAZ007 &gt; 011 - 016 &gt; 019 - 024 &gt; 029 - 033 &gt; 039 - 044 &gt; 050 - 057 &gt; 062 - 070 &gt; 075 - 081 &gt; 086 - 092 &gt; 097</a>	01/26/1996	12:00 AM	Heavy Snow	N/A	2	0	600K	0
<a href="#">14 IAZ004 &gt; 007 - 015 &gt; 017 - 023 &gt; 028 - 033 &gt; 036 - 038 &gt; 039 - 044 &gt; 050 - 057 &gt; 060 - 062 - 070 &gt; 075 - 081 &gt; 086 - 092 &gt; 097</a>	11/14/1996	04:00 PM	Ice Storm	N/A	0	0	150K	0
<a href="#">15 IAZ074 &gt; 075 - 083 &gt; 086 - 092 &gt; 097</a>	04/10/1997	05:00 AM	Heavy Snow	N/A	0	0	1.6M	0

<a href="#">16 IAZ047&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;095</a>	10/26/1997	03:00 AM	Heavy Snow	N/A	0	0	25.0M	65.0M
<a href="#">17 IAZ084&gt;085 - 095&gt;096</a>	12/04/1997	07:00 AM	Heavy Snow	N/A	0	0	10K	0
<a href="#">18 IAZ023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	12/21/1997	02:00 PM	Ice Storm	N/A	0	0	88K	0
<a href="#">19 IAZ074&gt;075 - 084&gt;086 - 093&gt;097</a>	12/24/1997	09:00 AM	Heavy Snow	N/A	0	0	56K	0
<a href="#">20 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/04/1998	06:30 AM	Ice Storm	N/A	0	0	1.0M	0
<a href="#">21 IAZ070&gt;072 - 081&gt;086 - 092&gt;097</a>	01/14/1998	01:30 AM	Ice Storm	N/A	0	0	30K	0
<a href="#">22 IAZ024&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;085 - 092&gt;096</a>	03/07/1998	09:00 PM	Heavy Snow	N/A	1	0	2.0M	0
<a href="#">23 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	03/17/1998	02:00 AM	Ice Storm	N/A	0	0	300K	0
<a href="#">24 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 045&gt;050 - 058&gt;062 - 070&gt;075 - 082&gt;086 - 096&gt;097</a>	01/01/1999	03:00 PM	Winter Storm	N/A	2	0	440K	0
<a href="#">25 IAZ005 - 015&gt;017 - 023&gt;024 - 033&gt;037 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	03/08/1999	12:00 AM	Winter Storm	N/A	0	0	450K	0
<a href="#">26 IAZ082&gt;086 - 092&gt;097</a>	02/17/2000	08:00 PM	Ice Storm	N/A	0	0	550K	0
<a href="#">27 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	12/10/2000	09:00 PM	Winter Storm	N/A	0	0	1.3M	0

<a href="#">28 IAZ026&gt;028 - 036&gt;039 - 046&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	02/08/2001	04:00 PM	Ice Storm	N/A	0	0	2.7M	0
<a href="#">29 IAZ026&gt;028 - 036&gt;039 - 046&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	02/08/2001	11:00 PM	Winter Storm	N/A	0	0	1.8M	0
<a href="#">30 IAZ059&gt;062 - 071&gt;075 - 081&gt;086 - 092&gt;097</a>	03/15/2001	03:00 PM	Heavy Snow	N/A	0	0	650K	0
<a href="#">31 IAZ075 - 083&gt;086 - 093&gt;097</a>	01/30/2002	06:00 AM	Heavy Snow	N/A	0	0	500K	0
<a href="#">32 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086</a>	01/28/2003	05:00 AM	Freezing Rain	N/A	0	0	0	0
<a href="#">33 IAZ023 - 033&gt;035 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 093&gt;097</a>	02/14/2003	11:00 AM	Winter Storm	N/A	0	0	170K	0
<a href="#">34 IAZ025&gt;028 - 034&gt;039 - 044&gt;048 - 062 - 074&gt;075 - 085&gt;086</a>	03/04/2003	10:00 AM	Heavy Snow	N/A	0	0	20K	0
<a href="#">35 IAZ059&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/04/2004	05:00 AM	Heavy Snow	N/A	0	0	110K	0
<a href="#">36 IAZ033 - 044&gt;046 - 057&gt;061 - 070&gt;074 - 081&gt;085 - 092&gt;097</a>	02/05/2004	02:00 PM	Heavy Snow	N/A	0	0	0	0
<a href="#">37 IAZ044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	03/15/2004	07:00 AM	Heavy Snow	N/A	0	0	310K	0
<a href="#">38 IAZ075 - 082&gt;086 - 092&gt;097</a>	01/03/2005	01:00 AM	Ice Storm	N/A	0	0	300K	0
<a href="#">39 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/04/2005	05:00 PM	Heavy Snow	N/A	0	0	510K	0
<a href="#">40 IAZ085 - 095</a>	11/29/2006	15:00 PM	Ice Storm	N/A	0	0	5K	0K

<a href="#">41 IAZ060&gt;062 - 072&gt;075 - 082&gt;086 - 093</a>	02/12/2007	22:30 PM	Winter Storm	N/A	0	0	0K	0K
<a href="#">42 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;082 - 085&gt;086 - 092 - 096</a>	02/24/2007	03:00 AM	Winter Storm	N/A	0	0	250K	0K
<a href="#">43 IAZ044 - 057&gt;062 - 070&gt;074 - 082&gt;086 - 095</a>	12/01/2007	06:00 AM	Ice Storm	N/A	0	0	50K	0K
<a href="#">44 IAZ046 - 059&gt;061 - 073&gt;075 - 085&gt;086 - 096</a>	12/11/2007	00:00 AM	Ice Storm	N/A	0	0	150K	0K
<a href="#">45 IAZ083&gt;085 - 092</a>	12/14/2007	23:00 PM	Heavy Snow	N/A	0	0	0K	0K
<a href="#">46 IAZ073 - 084&gt;086 - 094</a>	12/22/2007	12:00 PM	Winter Storm	N/A	0	0	0K	0K
<a href="#">47 IAZ074 - 083&gt;085 - 094</a>	02/03/2008	11:00 AM	Heavy Snow	N/A	0	0	0K	0K
<a href="#">48 IAZ059&gt;061 - 073&gt;075 - 084&gt;086 - 096</a>	02/05/2008	11:00 AM	Winter Storm	N/A	0	0	10K	0K
TOTALS:					6	0	41.940M	65.000M

**13 TEMPERATURE EXTREMES** event(s) were reported in Monroe County, Iowa between 01/01/1950 and 10/31/2008.

*Click on Location or County to display Details.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Iowa

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">All Of Iowa</a>	01/14/1994	0300	Extreme Cold	N/A	1	0	500K	0
2 <a href="#">All Of Iowa</a>	01/17/1994	0600	Extreme Cold	N/A	0	0	500K	0
3 <a href="#">All Of Iowa</a>	02/10/1995	2200	Extreme Wind Chill	N/A	0	0	50K	0
4 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;030 - 033&gt;042 - 044&gt;054 - 057&gt;068 - 070&gt;078 - 081&gt;089 - 092&gt;099</a>	05/01/1995	0000	Cold And Wet Conditions	N/A	0	0	0	66.0M
5 <a href="#">All Of Iowa</a>	07/12/1995	1100	Heat Wave	N/A	3	0	3.8M	0
6 <a href="#">Much Of Iowa</a>	09/21/1995	2300	Freeze	N/A	0	0	0	0.2B
7 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;030 - 033&gt;039 - 044&gt;050&gt;057 - 062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	12/08/1995	1300	Extreme Wind Chill	N/A	0	0	0	0
8 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;096</a>	01/18/1996	02:00 AM	Extreme Windchill	N/A	0	0	0	0
9 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	02/01/1996	04:00 PM	Extreme Windchill	N/A	0	0	0	0
10 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/09/1997	09:00 PM	Extreme Windchill	N/A	0	0	0	0
11 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/15/1997	09:00 PM	Extreme Windchill	N/A	0	0	750K	0
12 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 -</a>	09/21/1999	01:00 AM	Extreme Cold	N/A	0	0	0	15.0M

<a href="#">081&gt;086 - 092&gt;097</a>								
13 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	08/05/2001	10:00 AM	Excessive Heat	N/A	1	0	0	0
TOTALS:					5	0	5.600M	281.000M

73 THUNDERSTORM & HIGH WIND event(s) were reported in Monroe County, Iowa between 01/01/1950 and 10/31/2008.

*Click on Location or County to display Details.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage



## Iowa

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">MONROE</a>	06/19/1956	1645	Tstm Wind	60 kts.	0	0	0	0
2 <a href="#">MONROE</a>	09/20/1965	1845	Tstm Wind	0 kts.	0	0	0	0
3 <a href="#">MONROE</a>	06/28/1969	1500	Tstm Wind	0 kts.	0	0	0	0
4 <a href="#">MONROE</a>	07/26/1969	1800	Tstm Wind	0 kts.	0	0	0	0
5 <a href="#">MONROE</a>	05/13/1970	1900	Tstm Wind	0 kts.	0	0	0	0
6 <a href="#">MONROE</a>	07/02/1973	0040	Tstm Wind	0 kts.	0	0	0	0
7 <a href="#">MONROE</a>	06/18/1975	0730	Tstm Wind	0 kts.	0	0	0	0
8 <a href="#">MONROE</a>	08/20/1980	1500	Tstm Wind	55 kts.	0	0	0	0
9 <a href="#">MONROE</a>	04/03/1981	2000	Tstm Wind	0 kts.	0	0	0	0
10 <a href="#">MONROE</a>	04/03/1981	2000	Tstm Wind	0 kts.	0	0	0	0
11 <a href="#">MONROE</a>	08/03/1983	2120	Tstm Wind	0 kts.	0	0	0	0
12 <a href="#">MONROE</a>	06/10/1986	2100	Tstm Wind	52 kts.	0	0	0	0
13 <a href="#">MONROE</a>	06/28/1986	1215	Tstm Wind	52 kts.	0	0	0	0
14 <a href="#">MONROE</a>	07/28/1986	2240	Tstm Wind	52 kts.	0	0	0	0
15 <a href="#">MONROE</a>	08/04/1988	1415	Tstm Wind	50 kts.	0	0	0	0
16 <a href="#">MONROE</a>	06/28/1990	0600	Tstm Wind	52 kts.	0	0	0	0
17 <a href="#">IAZ002&gt;009 - 013&gt;019 - 022&gt;028 - 031&gt;039 - 043&gt;051 - 056&gt;063 - 070&gt;076 - 081&gt;087 - 093&gt;099 -</a>	03/09/1993	2230	High Winds	0 kts.	0	0	500K	0
18 <a href="#">IAZ001 - 012 - 020 - 021 - 031 - 032 - 043&gt;046 - 055&gt;060 -</a>	12/05/1993	1500	High Winds	0 kts.	0	0	500K	0

<a href="#">069&gt;075 - 079&gt;086 - 090&gt;098</a>									
19 <a href="#">All Of Iowa</a>	04/14/1994	2200	High Winds	0 kts.	0	0	500K	0	
20 <a href="#">Most Of Iowa</a>	04/26/1994	0900	High Winds	0 kts.	0	3	5.0M	0	
21 <a href="#">IAZ001&gt;068 - 070&gt;078 - 083&gt;089</a>	11/18/1994	0230	High Winds	0 kts.	0	0	200K	0	
22 <a href="#">All Of Iowa</a>	02/10/1995	0000	High Winds	0 kts.	0	0	100K	0	
23 <a href="#">All Of Iowa</a>	02/10/1995	2200	Extreme Wind Chill	N/A	0	0	50K	0	
24 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;030 - 033&gt;042 - 044&gt;054 - 057&gt;068 - 070&gt;078 - 081&gt;089 - 092&gt;099</a>	04/03/1995	1300	High Winds	0 kts.	0	0	125K	0	
25 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;030 - 033&gt;042 - 044&gt;054 - 057&gt;068 - 070&gt;078 - 081&gt;089 - 092&gt;099</a>	04/18/1995	0700	High Winds	0 kts.	0	0	500K	0	
26 <a href="#">Much Of Iowa</a>	10/23/1995	1300	High Winds	0 kts.	0	0	100K	0	
27 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;030 - 033&gt;039 - 044&gt;050&gt;057 - 062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	12/08/1995	1300	Extreme Wind Chill	N/A	0	0	0	0	
28 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/17/1996	09:00 PM	High Wind	55 kts.	0	0	250K	0	
29 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;096</a>	01/18/1996	02:00 AM	Extreme Windchill	N/A	0	0	0	0	
30 <a href="#">IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 -</a>	02/01/1996	04:00 PM	Extreme Windchill	N/A	0	0	0	0	

<a href="#">081&gt;086 - 092&gt;097</a>								
<a href="#">31 IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	02/10/1996	12:00 PM	High Wind	56 kts.	0	0	350K	0
<a href="#">32 IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	03/24/1996	05:00 PM	High Wind	54 kts.	0	0	300K	0
<a href="#">33 IAZ004&gt;011 - 015&gt;019 - 023&gt;029 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	04/25/1996	09:30 AM	High Wind	59 kts.	0	0	750K	0
<a href="#">34 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	10/29/1996	11:00 AM	High Wind	57 kts.	0	0	500K	100K
<a href="#">35 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/09/1997	09:00 PM	Extreme Windchill	N/A	0	0	0	0
<a href="#">36 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/15/1997	09:00 PM	Extreme Windchill	N/A	0	0	750K	0
<a href="#">37 IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	04/06/1997	09:00 AM	High Wind	55 kts.	0	0	1.8M	0
<a href="#">38 IAZ049&gt;050 - 061&gt;062 - 074&gt;075 - 084&gt;086 - 095&gt;097</a>	04/30/1997	12:00 PM	High Wind	52 kts.	0	0	100K	0
<a href="#">39 Avery</a>	06/21/1997	02:00 AM	Tstm Wind	60 kts.	0	0	25K	5K
<a href="#">40 Albia</a>	06/21/1997	02:48 AM	Tstm Wind	50 kts.	0	0	5K	0

41 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	04/12/1998	08:00 AM	High Wind	54 kts.	0	0	2.6M	0
42 <a href="#">Hiteman</a>	06/18/1998	02:17 PM	Tstm Wind	56 kts.	0	0	8K	1K
43 <a href="#">Albia</a>	06/29/1998	02:00 PM	Tstm Wind	52 kts.	0	0	3K	0
44 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	11/10/1998	02:00 AM	High Wind	61 kts.	1	0	17.3M	260K
45 <a href="#">Melrose</a>	06/04/1999	12:35 PM	Tstm Wind	52 kts.	0	0	2K	0
46 <a href="#">Lovilia</a>	02/25/2000	07:50 PM	Tstm Wind	61 kts.	0	0	40K	0
47 <a href="#">IAZ028 - 038&gt;039 - 049&gt;050 - 061&gt;062 - 072&gt;075 - 081&gt;086 - 092&gt;097</a>	03/08/2000	11:00 AM	High Wind	52 kts.	0	0	230K	0
48 <a href="#">Georgetown</a>	06/23/2000	12:00 PM	Tstm Wind	52 kts.	0	0	3K	0
49 <a href="#">Albia</a>	06/25/2000	06:20 PM	Tstm Wind	56 kts.	0	0	3K	0
50 <a href="#">Albia</a>	07/05/2000	11:40 AM	Tstm Wind	56 kts.	0	0	5K	1K
51 <a href="#">Albia</a>	08/06/2000	02:20 PM	Tstm Wind	52 kts.	0	0	10K	2K
52 <a href="#">Melrose</a>	08/06/2000	02:20 PM	Tstm Wind	52 kts.	0	0	2K	1K
53 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	04/07/2001	04:00 AM	High Wind	72 kts.	0	4	3.2M	0
54 <a href="#">Albia</a>	06/14/2001	03:01 PM	Tstm Wind	56 kts.	0	0	10K	0
55 <a href="#">Albia</a>	06/14/2001	03:05 PM	Tstm Wind	52 kts.	0	0	5K	0

56 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	03/09/2002	06:00 AM	High Wind	54 kts.	0	0	2.6M	0
57 <a href="#">Albia</a>	04/24/2002	09:51 AM	Tstm Wind	52 kts.	0	0	3K	0
58 <a href="#">Albia</a>	04/24/2002	10:05 AM	Tstm Wind	52 kts.	0	0	3K	0
59 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086</a>	11/12/2003	09:00 AM	High Wind	55 kts.	0	2	2.6M	0
60 <a href="#">IAZ005&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;085 - 092&gt;095</a>	04/27/2004	12:30 PM	High Wind	56 kts.	0	0	3.5M	0
61 <a href="#">Albia</a>	05/17/2004	08:25 PM	Tstm Wind	65 kts.	0	0	10K	5K
62 <a href="#">Albia</a>	08/25/2004	01:08 PM	Tstm Wind	50 kts.	0	0	2K	0
63 <a href="#">Melrose</a>	08/26/2004	09:20 PM	Tstm Wind	52 kts.	0	0	5K	0
64 <a href="#">Albia</a>	08/26/2004	10:20 PM	Tstm Wind	52 kts.	0	0	5K	0
65 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 084&gt;086 - 096&gt;097</a>	01/22/2005	12:15 AM	High Wind	56 kts.	0	0	440K	0
66 <a href="#">IAZ027&gt;028 - 038&gt;039 - 049&gt;050 - 061&gt;062 - 074&gt;075 - 085&gt;086</a>	06/08/2005	09:00 AM	High Wind	50 kts.	0	0	240K	0
67 <a href="#">Lovilia</a>	09/08/2005	01:15 PM	Tstm Wind	52 kts.	0	0	3K	0
68 <a href="#">IAZ004&gt;007 - 015&gt;017 - 023&gt;028 - 033&gt;039 - 044&gt;050 - 057&gt;062 - 070&gt;075 - 081&gt;086 - 092&gt;097</a>	01/24/2006	09:30 AM	High Wind	60 kts.	0	2	550K	0

69 <a href="#">Avery</a>	04/10/2008	16:34 PM	Thunderstorm Wind	52 kts.	0	0	20K	0K
70 <a href="#">Avery</a>	04/10/2008	16:35 PM	Thunderstorm Wind	57 kts.	0	0	75K	0K
71 <a href="#">Albia</a>	07/27/2008	16:35 PM	Thunderstorm Wind	69 kts.	0	0	100K	10K
72 <a href="#">Hiteman</a>	07/27/2008	16:53 PM	Thunderstorm Wind	61 kts.	0	0	3K	0K
73 <a href="#">Hocking</a>	07/27/2008	17:00 PM	Thunderstorm Wind	69 kts.	0	0	35K	25K
TOTALS:					1	11	45.950M	410K

**9 TORNADO(s)** were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

*Click on Location or County to display Details.*

**Mag:** Magnitude  
**Dth:** Deaths  
**Inj:** Injuries  
**PrD:** Property Damage  
**CrD:** Crop Damage

Iowa

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 <a href="#">MONROE</a>	06/22/1964	2045	Tornado	F1	0	0	250K	0
2 <a href="#">MONROE</a>	06/07/1984	1930	Tornado	F4	0	0	25.0M	0
3 <a href="#">MONROE</a>	10/14/1984	1615	Tornado	F1	0	2	250K	0
4 <a href="#">MONROE</a>	05/08/1986	1450	Tornado	F0	0	0	25K	0
5 <a href="#">MONROE</a>	11/15/1988	1629	Tornado	F2	0	4	250K	0
6 <a href="#">Albia</a>	05/09/1996	02:47 AM	Tornado	F0	0	0	5K	0
7 <a href="#">Avery</a>	05/09/1996	11:36 PM	Tornado	F1	0	2	380K	0
8 <a href="#">Avery</a>	04/30/2003	05:30 PM	Tornado	F0	0	0	0	0
9 <a href="#">Albia</a>	11/12/2005	06:40 PM	Tornado	F1	0	0	50K	0
TOTALS:					0	8	26.210M	0

**0 WILD & FOREST FIRE** event(s) were reported in **Monroe County, Iowa** between **01/01/1950** and **10/31/2008**.

Source: National Climatic Data Center Storm Event online database, <http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms>

## Appendix P: Hazard Mitigation Planning Meeting Summaries

This appendix contains summaries of the planning meetings, sign-in sheets from the meetings are kept with the original copies of this plan submitted to FEMA, Iowa Department of Homeland Security and Emergency Management, the Monroe County, and Chariton Valley Planning and Development. The sign-in sheets are not available in the public copies of this plan to protect personal information pertaining to meeting attendees.

### Orientation Meeting

February 17, 2009 7:00 PM to 8:30 PM

Name	Organization / Agency
Dien Judge	ADLM Emergency Management
Dan Johnson	Monroe County Sherriff
Ray Vitko	Albia Fire Department
Dennis Ryan	Monroe County Supervisor
John Goode	Monroe County Engineer
Stephanie Young	Homeland Security
Danette Kobolt	FEMA
Cathy Mallard	FEMA
Tracy Daugherty	Chariton Valley Planning and Development
John Dawson	Chariton Valley Planning and Development

This meeting started off disadvantaged as there was an apparent delay in getting the public meeting notice published in the local newspaper. However, letters and emails had been sent out to key stakeholders that Dawson wanted to ensure knew about the meeting. Ryan advised that future public notices be directed to Brian Chambers, the editor of the Albia newspaper after speaking with him about the delay. The proof of publication indicates that the meeting notice was published on February 10<sup>th</sup> however and a meeting announcement showed up in the paper the day of this meeting.

Dawson proceeded through a short presentation intended to help attendees understand roughly what the process is and why Monroe County is engaging in the planning process. Included was an example of the phases of mapping one hazard, flooding and some of the research involved in the process. Following the presentation, Dawson opened the meeting to more discussion and asked for directed feedback. Dawson asked for brainstorming on four key items; Critical Facilities, Hazards to be addressed, Mitigation Strategies and Considerations, Others to involve.

Critical Facilities named:

Communications including the Law Center, Courthouse, ADLM (Moravia, Appanoose County), Iowa Telecom facilities in each incorporated community; Secondary Roads facilities, food distributors (grocery stores), hospital, schools, nursing home(s), fire stations, Public Health facilities, police department, REC, City Halls, Churches (Trinity in Albia as a primary shelter),

fuel supply (for example, during the ice storm recently when electricity was out, gas pumps did not work), critical roads (HWYs 34 & 5), Coal Mine historical museum, Cargill and the industrial park in northeastern portion of the county.

**Hazards named:**

Railroad (Amtrack on BNSF line, about 18 trains per day), Fires, Plane Crash, Chemical Spills (including Semi accidents), Natural Gas lines, Communicable Disease and Animal Disease, Agro-terrorism, Severe Winter Storms, Impassible roads (muddy gravel roads, bridges), Elderly access to doctors and medication (including transportation for them), Coal Mines, Power Failure.

**Mitigation Strategies and other Considerations:**

Zoning, Safe Rooms (for mobile homes, schools), not much strong opposition to policies in general, newspaper records at the Albia Newspaper for historic hazard events for more information, Lake Miami has camping facilities, RD Keep can provide information on past functional exercises (public health), Monroe County is a hub for medications dispensation from Des Moines for the region, Kathy Welsh is knowledgeable person on this.

**Others to Involve:**

NRCS, Denny Amos on the school board, Dustin Sample (insurance rep, Dien Judge will provide contact info), there is no Monroe County Red Cross representative, Helping Hands (Denny Ryan is the contact), Ministry Association (Linda Carlson with the Christian Church), Community Action out of Leon (South Central Iowa Area Partnership), Southern Iowa Behavioral Health, Chamber of Commerce (Debra Morgen), Red Rock Lake (watershed includes much of Monroe County), and check with Robin Reece (preparing a debris removal plan for area, Dien Judge has contact information).

Below are pictures of the brainstorming sheets.



### Critical Facilities

- Communications
  - law center
  - courthouse
  - ADLM
    - ↳ Centerville
  - Tax telecom in each incorporated com.
- Secondary Roads: facility
  - Churches
    - ↳ Trinity: primary shelter
  - fuel supply
    - ↳ ice storage: if electricity is out, pump does work
  - Critical Road in Albion
    - ↳ 34 + 5
  - Red Rock North of Eddyville
    - ↳ city evacuated, shut down in Ches in 1993
    - ↳ Rock Island Engineers
  - Corvill/Industrial Park
- food distribution
- hospitals
- schools
- nursing homes
- fire station
- Public Health
- police departments
- REC
- city Halls

### Hazards

- Railroad → Amtrak BU
  - ↳ 18 trains/day
- Fires
- plane crash
- chemical spills
  - ↳ semi accidents
- Nat. Gas
- Communicable disease
  - ↳ animal disease
- agro-terrorism
- severe winter storms
- impassible roads - muddy roads
  - ↳ bridges

Elderly access to dialysis  
↳ transport access  
↳ medication

Coal mines  
↳ w/ historical museum  
↳ Critical Facility

- Power failure  
↳ cascading event

### Mit. Strategies

- zoning
- not much vehement opposition
- safe rooms
  - ↳ mobile homes

go to newspaper → historical disaster units

Lake Miami → campers

Ched w/ RD keep far results from functional exerciser

Monroe County is a hub for medications dispensing (multi-county)  
↳ Kathy Walsh  
↳ dispensing from Des Moines

*This Friday ADLM 1100 @ ADL in office - Budget Meeting*

### Others to involve

- MRCS
  - ↳ Robin Reece  
↳ John's rental plus  
↳ w/ Diem
- Denny Amos: School Board
- Dustin Sample: insurance
  - ↳ Diem
- Monroe County Red Cross rep.
- Helping Hands - Denny Ryan
- Ministry Association → Linda Gulan  
Christian Church
- Community Action → Leon (city)
  - ↳ SciCap
- Southern Iowa Behavioral Health
- Chamber of Commerce
  - ↳ Debra Morgan

CHARITON VALLEY PLANNING AND DEVELOPMENT COUNCIL  
ATTENDANCE ROSTER

Date: 2/17/09 Time: 7:00 pm Location: Monroe Co. Courthouse Meeting: Public Orientation

	NAME	SIGNATURE	ADDRESS	PHONE	E-MAIL
1	Dien Judop	<i>William J. Fox</i>	1420 715 <sup>th</sup> Ave. Albion	641-932-7098	dienjudop@willbluer.net
2	Dan Johnson	<i>Dan Johnson</i>	1033rd Ave West Albion	641-932-7078	monroecounty@emissionline.com leiter681@hotmail.com
3	RAY VITKO	<i>Ray Vitko</i>	215 S. A ALBION	641-932-2961	AFD 14 @ Fire-Plan.net
4	DENNIS J. RYAN	<i>DJR</i>	COURTHOUSE 10 BENTON AVE E	641-932-7706	SUPERVISOR@MONROE.CO.IA.US
5	JOHN GOODE	<i>John Goode</i>	COURTHOUSE 10 BENTON AVE E	641-932-7123	joode@monroecol.gov
6	Tracy Daugherty	<i>Tracy Daugherty</i>	205 N. 13 <sup>th</sup> St.	641-845-8811	daughertytracy@hotmail.com
7	Stephanie Lang	<i>Stephanie Lang</i>	4149 120th St. Urbandale IA		Stephanie.Lang@ihs.gov
8	DARRELL KOBALT	<i>Darrell Kobalt</i>	4149 120 <sup>th</sup> ST Urbandale IA		MONROE.KOBALT@FEMA.GOV
9	Carthy Mallard	<i>Carthy Mallard</i>	4449 120 <sup>th</sup> St Urbandale		Carthy.mallard@fema.gov
10					
11					
12					
13					
14					





# Monroe County Hazard Mitigation Planning Committee Meeting

Date: April 9, 2009

Time: 3 PM

Location: Albia City Council Chambers

Primary Purpose:

To discuss the role of the committee and process of developing the hazard mitigation plan.

This is an open public meeting.

Displayed at : CVPD office in Centerville, Monroe Courthouse, & Albia Chamber.



*Meeting and Managing Change*

205 1/2 N 13th Street  
Centerville IA 52544

Phone: 641-437-4359

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E-mail:

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**CHARITON VALLEY PLANNING AND DEVELOPMENT**

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MONROE COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING #1

AGENDA - AMENDED

APRIL 9, 2009 | 3 PM | ALBIA CITY COUNCIL CHAMBERS

**1. Sign-in**

2. Call to Order and Introductions (1-2 min.)
  - a. Work completed to-date (planner)
3. Briefly Review the purpose of the Hazard Mitigation Plan (> 1 min.)
  - a. This is a FEMA funded, locally developed plan to help reduce the cost of recovery from disasters by actively mitigating risk associated with hazards, this saves tax dollars, improves the resiliency of communities, and protects citizens
  - b. Questions
4. **Appoint Chair and Vice Chair of Sub-committees** (5-10 min.)
  - a. Policy Sub-Committee (PS): to act on recommendations by Technical Advisory Sub-Committee, to approve drafts of the plan, and to represent the plan when presented to communities for adoption and to provide updates to your respective jurisdictions
  - b. Technical Advisory Sub-Committee (TAS): to review research by planner, supplement information collection, and make recommendations based on the data to the Policy Sub-Committee
5. Consider and **Approve Committee Mission and Vision Statements** (5-10 min.)
6. Ground Rules (5-15 min.)
  - a. Frequency of Meetings, how meetings will be called and by whom
  - b. Rescheduling protocol and method of communicating
  - c. Public Participation and process (cities and schools will be asked to post meeting announcements)
  - d. "Homework" and in-kind match satisfaction
7. Preliminary Selection of Hazards to Address in the Plan (30 min.)
  - a. All natural hazards must be addressed, ones that are not applicable simply need to be explained as such (FEMA requirement)
  - b. Human and Combination Hazards are addressed by State Plan, though they should be considered
  - c. It is better to be inclusive at this point and then remove hazards at next meeting
8. **Approve "Next Steps"** (1-2 min.)
9. Adjourn (> 1 min.)

Anticipated Meeting Length: about 1 hour

*Next steps: Planner will distribute Community Demographics and Preliminary Hazard Research to Committee members for review, please review in advance of next meeting. Planner will draft and distribute minutes to all Committee members and send to newspaper. Planner will distribute PAR worksheet to all Committee members. Planner will distribute hazard selection sheets to cities for consideration in council meetings and provide sample recommendations from other plans.*

Specific questions can be addressed following the meeting in order to keep meeting length down for those that have other obligations.

#### Mission Statement

To make Monroe County citizens, communities, and businesses less vulnerable to the effects of natural and human-created hazards through the effective administration of hazard mitigation grant programs, a coordinated approach to mitigation policy through regional and local planning activities, and public education and participation.

#### Vision Statement

Institutionalize a County-wide hazard mitigation commitment through leadership, professionalism, and excellence, leading the way to a safe and sustainable Monroe County.



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## CHARITON VALLEY PLANNING AND DEVELOPMENT

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### MONROE COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING #1

#### MINUTES

APRIL 9, 2009 | 3 PM | ALBIA CITY COUNCIL CHAMBERS

Dawson called the first Monroe County Hazard Mitigation Planning Committee meeting to order at 3:00 PM on April 9, 2009. Present were; Linda Heller, Richard Clarke, Justin Kamerick, Kevin Crall, Dennis Ryan, Dustin Sample, Deborah Morgen, Daniel Johnson's representative, John Goode, Brad Leedom, Kathy Welsh, Daniel Tometich, John Miles, Bryon Stilley, Dien Judge (ADLM), John Dawson (Chariton Valley Planning and Development).

Dawson started with a brief summary of work completed to date then continued to a brief overview of this plan and this process for any attendees that have not had a chance to hear previous overviews. There were no questions regarding current progress.

As a locally driven plan, chairs and vice-chairs of each committee were needed. Dawson briefly explained the rationale for the two sub-committee structure modeled on the regional transportation planning group.

Crall was appointed chair of the Policy Sub-Committee and Heller was appointed vice-chair motioned by Welsh and seconded by Leedom. Tometich was appointed chair of the Technical Advisory Sub-committee motioned by Clarke and Seconded by Sample. The group missed appointing a vice-chair of the Technical Advisory Sub-committee.

Dawson presented a draft mission and a draft vision statement for the committee for consideration modeled on samples from other hazard mitigation plans. The Mission Statement was adopted as presented and a comma was removed and an 'and' was placed before 'sustainable' in the Vision Statement. Krall motioned, Heller seconded the mission statement and Ryan motioned and Tometich seconded the vision statement.

Ground rules were discussed; Dawson will be responsible for setting the meetings and publishing notices in the local paper. Chairs of each sub-committee may reschedule meetings if there is a conflict or other considerations. Approximately 6 committee meetings are anticipated over the next 12 to 18 months; the absolute deadline for this plan to be approved and adopted is April, 2011. City, county, and school representatives will be responsible for posting flyers advertising each meeting that Dawson will prepare and distribute. "Homework" will be employed to keep the process moving and to help keep meetings concise and productive. This work will be detailed on each agenda distributed in advance of each meeting in the "Next Steps" section at the bottom of the page.

Preliminary hazard selection for county-wide consideration was addressed next; Dawson explained that hazards be selected on what can happen or originate in Monroe County. Hazards selected in this meeting will determine which hazards will be detailed after which time; they can be ranked according to relative concern. Dawson verified with FEMA that hazards may be stratified into 'high risk', 'moderate risk', and 'acceptable risk' categories with recommendations developed for the high risk hazards. A hazard worksheet was distributed to help guide the discussion; the sheet contained the hazards addressed in the State plan with several proposed additions.

Attendees chose to address thirteen of the natural hazards including the proposed addition of Radon. Similar to the Appanoose County hazard selection meeting, attendees agreed to include lead with radon as environmental human health hazards. Not selected include levee failure (due to the perception that there are either no or so few levees in the county that it is not of concern), grass or wildfire (firefighters present thought that while they may happen, the threat is sufficiently low to exclude from this plan), landslides, and expansive soils (the onset is over such a long time, that attendees determined that this is a low-risk hazard).

Attendees chose to address eighteen of the twenty six presented human-caused or combination hazards in the plan. Waterway incidents, public disorder, and economic disruption / decline were excluded with little discussion. The group excluded climate change after some discussion based on 1) disagreement over its existence and 2) the appropriateness of addressing it as a "hazard" rather than something else. The terrorism hazards elicited the most discussion; one attendee pointed out that he was involved in identifying potential terrorism targets while serving in the military and felt, along with some other attendees, that there is the potential for terrorist acts in Monroe County. The group selected some but not all of the terrorism hazards listed.

Dawson moved on to the Next Steps and proposed adding to it that the hazard selection sheet will be distributed to each of the cities for them to consider at their next city council meeting. One attendee who has worked on hazard mitigation plans elsewhere asked for some sample recommendations from other plans for the committee as examples. Krall moved to approve the Next Steps as amended and Ryan seconded.

Ryan asked when the next meeting will be. The attendees present decided on 9 AM on May 14<sup>th</sup> to be located at the Albia City Council Chambers again.

The meeting adjourned at 4:00 PM though some people remained to share anecdotes and discuss other matters.

**Hazards to be Addressed**

Hazard	Yes	No	If "no", why
<b>Natural Hazards</b>			
Flash Flood	X		
Tornado	X		
Windstorm / High Wind Event	X		
River Flooding	X		
Severe Winter Storm	X		
Hailstorm	X		
Thunderstorm / Lightning	X		
Sink Hole / Mine Collapse	X		(sinkholes unlikely, but mines are of concern)
Dam Failure	X		(Red Rock, Lake Miami)
Levee Failure		X	
Grass / Wildfire		X	
Extreme Heat	X		
Drought	X		
Landslide		X	
Earthquake	X		
Expansive Soils		X	
Radon / Lead	X		(lead is an environmental human health risk similar to Radon)
<b>Human Caused and Combination Hazards</b>			
Climate Change		X	Even if consensus of this as a "hazard" committee felt that this plan is not an appropriate way to address this
Structural Failure	X		
Structural Fire	X		
Energy Failure	X		
Communications Failure	X		
Highway Transport Incident	X		
Transport Haz. Materials	X		
Air Transport Incident	X		
Rail Transport Incident	X		
Pipeline Incident	X		
Transport Radiological Mat.	X		
Waterway Incident		X	there are no navigatable waterways in Monroe Co.
Human Disease Pandemic	X		
Human Disease Incident	X		
Animal / Plant / Crop Disease	X		
Agro-Terrorism	X		
Biological Terrorism	X		
Chemical Terrorism	X		
Conventional Terrorism		X	Committee felt that these forms of terrorism were unlikely to be targeted in Monroe County based on relative attractiveness of targets
Cyber Terrorism		X	
Radiological Terrorism		X	
Enemy Attack		X	
Fixed Radiological Incident	X		
Fixed Hazardous Materials	X		
Public Disorder		X	likelihood of riots considered extremely low
Economic Disruption / Decline		X	Committee felt that this was not an appropriate venue for considering this as a "hazard"





# Monroe County Hazard Mitigation Planning Committee Meeting

Date: May 14, 2009

Time: 9 AM

Location: Albia City Council Chambers

Primary Purpose:

The Committee will review community profiles, local capabilities, and important buildings, services, and infrastructure.

This is an open public meeting and all are welcome!



**Chariton Valley**  
PLANNING & DEVELOPMENT  
*Meeting and Managing Change*

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CHARITON VALLEY PLANNING AND DEVELOPMENT

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MONROE COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING #2

AGENDA

MAY 14, 2009 | 9AM | ALBIA CITY COUNCIL CHAMBERS

1. Sign-in
2. Call to Order (up to 5 min.)
  - a. Recent progress (planner)
    - i. Delays from changing State guidance
    - ii. Need to adjust number of anticipated meetings
3. **Approve minutes** (1-2 min.)
4. Discuss Community Profiles (30 min.)
  - a. Demographics limitations
    - i. Other information that should be included?
  - b. Capabilities Assessment (review/update of survey results)
  - c. Fire Insurance Rating and NFIP information
  - d. Discuss "Critical Facilities" (FEMA requirement)
5. **Approve/Finalize Hazard Selection** (5-15 min.)
  - a. Second look at preliminary selection from last meeting
  - b. Sample recommendations from other plans as requested
6. Discussion or other Business (up to 10 min.)
7. **Approve "Next Steps"** (up to 5 min.)
  - a. Please note the last two lines of Next Steps
8. Schedule next meeting / Adjourn (1-2 min.): late July

Anticipated Meeting Length: about 1 hour

*Next steps: Planner will complete hazard profiles and related research for committee review prior to next meeting. Planner will draft and distribute minutes to all Committee members and send to newspaper.*

*TAS will provide supplementary research on Critical Facilities (addresses, contact people, and other information as relevant).*

*PS will provide update on planning process to respective city councils, Board of Supervisors, or governing boards and take any potential questions from those bodies. Please have attendees sign in and send sign-in sheet with minutes and agenda to Dawson for in-kind match satisfaction. Sign-in sheet, agenda, and minutes need to show date, location, start time, and end time.*

*All members (TAS, PB, and Planner) will review hazard profiles prior to next meeting. Familiarity with this material will help move the next meeting along efficiently.*

POTENTIAL GOALS DERIVED FROM FEMA AND OTHER HAZARD PLAN SAMPLES

Goal 1: Protect existing properties and infrastructure

Objective 1.1: Use the most effective approaches to protect buildings from flooding

Objective 1.2: Enact and enforce regulatory measures to ensure that new structures do not increase threats to existing properties

Goal 2: Protect the health, safety, and quality of life for (County) County residents

Objective 2.1: Ensure that property-owners can maintain and improve their properties

Objective 2.2: Ensure that disaster recovery can proceed promptly following a disaster

Objective 2.3: Prioritize mitigation projects, policies, and programs starting with those that address the greatest threats to health, safety, and properties

Goal 3: Ensure that public funds are used efficiently

Objective 3.1: Use public funds to protect critical facilities and public services

Objective 3.2: Use public funds for projects on private property where the benefits to the public exceed the costs

Objective 3.3: Maximize the use of outside sources of funding such as grant opportunities

Objective 3.4: Maximize owner participation in mitigation efforts to protect their own properties

Objective 3.5: Encourage property-owner self-protection measures



POTENTIAL ACTIONS DERIVED FROM FEMA SAMPLES AND LOCAL CONDITIONS

action for objective 2.2, 3.2, and 3.4 – data collection for prompt applications for recovery projects (HMGP and PDM) – see BCA documentation requirements

action for objective 2.2, 3.1, 3.2, and 3.3 – data collection pertaining to disasters for future plan updates (2010 Census demographics, disaster declarations, occurrences, costs incurred by disasters – can be voluntary data from businesses/home owners, and locations of disasters)

action for objective 1.1 (2.3, 3.1, 3.2, 3.3) – property acquisition grant seeking and relocation program out of floodplain

action for objective 1.1 – flood-proofing or structural flood control projects (must consider impact on downstream properties) to reduce flood damages

action for objective 1.2 – enact zoning or sensitive areas ordinance to limit construction activities in hazard areas (floodplains, landslides)

action for objective 3.5 – real estate disclosures for floodplain properties or other identifiable hazard areas (landslide, mines, flood, etc.)

action for objective 3.4 – education outreach (especially radon, rain gardens for minor flood control or other green infrastructure, wetland protection/restoration for haz mat and water/food supply/human disease/animal/plant/crop disease)

action for objective 2.1 and 1.1 – seek CDBG funds for housing rehab (addresses fire and structural failure and human disease, etc.)

action for objective 3.2 and 3.3 – seek PDM funds for community safe rooms, seek out funds for mobile and/or fixed power generators (or other power source off-grid for communications and power failure hazards, perhaps solar or wind power sources)

Sample of how final actions will be presented in the plan:

JURISDICTION NAME	
PROGRAM/PROJECT DESCRIPTION	VOLUNTARY PROPERTY ACQUISITION
ANTICIPATED COST	TBD
TIMELINE/SCHEDULE	PENDING DISASTER DECLARATIONS AND/OR PRE-DISASTER MITIGATION FUNDING
RESPONSIBLE AGENCY	JURISDICTION NAME
FINANCING	PROGRAM TO BE PAID FOR BY GRANT ONCE OBTAINED
RELATED GOALS/OBJECTIVES	1.1, 2.3, 3.1, 3.2, 3.3
RELATED HAZARD(S)	RIVER FLOODING, FLASH FLOODING

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## CHARITON VALLEY PLANNING AND DEVELOPMENT

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### MONROE COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING #2 MINUTES

MAY 14, 2009 | 9AM | ALBIA CITY COUNCIL CHAMBERS

Dawson called the meeting to order at 9:00 AM. Present were; Linda Heller, John Goode, Kelly Freeman, Kathy Welsh, Bryon Stilley, Dien Judge (ADLM Emergency Management), Renee Powers, Jim Coritman, and John Dawson (CVPD).

Dawson begun with a summary of the work completed since the last meeting which consisted primarily of finishing community profiles and distributing them to committee members. Dawson also explained that he has received conflicting guidance from the State regarding how to document the meetings. As a result, Dawson is advising that the next meeting be postponed until late July or August to allow time for backtracking. Dawson also pointed out that Appanoose County is slightly ahead of Monroe County and that in one of their meetings, the next step appears to take longer than originally anticipated. Therefore, Dawson is advising that the number of anticipated meetings discussed at the last meeting be revised to eight rather than six.

Welsh pointed out that Kevin Crall's name was misspelled in two places on the minutes. Dawson took note. Welsh moved to approve the minutes with the corrections and Heller seconded.

Dawson turned the attendees to the community profiles and asked for input on gaps that remain or corrections that may need to be made. Dawson noted that the demographics are from the 2000 Census and that while some newer information is available, it is not available consistently for all things for all areas. Freeman pointed out that Dan Tometich would be a good contact for a brief history of Albia. Judge mentioned that he knows a person that could provide some history of Melrose and Welsh mentioned a former city clerk for Lovilia's history. Judge offered to get Dawson in touch with his contact for Melrose.

Dawson pointed out that there is a chart for each jurisdiction which contains information from a survey sent out over the winter. Dawson will leave these charts open for discussion throughout the process in case new information is uncovered. These charts are part of Dawson's reporting requirements to the State. Heller pointed out that a Builder Plan was done for Albia and Goode mentioned that he thought ones were done for Melrose and Lovilia.

Judge mentioned that there are two areas in the unincorporated county that he is concerned about and would like noted in the plan; Lazy Dazy Ranch and Green Acres. Judge mentioned that residents of these areas have met with him and there is a desire for storm shelters and storm warning systems.

Judge and Heller noted that they think a housing condition assessment has been done for Albia a few years ago. Heller offered to look into it. Goode added that Dawson should contact Tometich to see if housing assessments have been done for Melrose and Lovilia. Judge advised that Dawson talk to Tometich for the Fire Insurance Ratings for each community as well. Dawson also mentioned that Ray Vitco with Eddyville may be a resource as well.

Dawson pointed out that he will need to make sure that flood plain managers in the county are aware of their role soon. When the committee gets to the point of developing actions, some will need to address NFIP compliance. Goode mentioned that the flood in 1982 pretty much wiped out the properties in the flood plain in Melrose. Goode added that due to staff turnaround, he is not sure if the city knows who their flood plain manager is.

Dawson turned the attendees to Critical Facilities and the accompanying hand-out. A preliminary discussion on important buildings, infrastructure, and services took place at the orientation meeting earlier this year. Dawson noted that identifying these sites is used to begin to prioritize what properties should be protected from disasters. Much more information will be needed to do this, but the goal for today is to just get a rough idea of what and where these sites are. Dawson mentioned that he will continue to take input on facilities and infrastructure that are brought up in city council meetings, by committee members, and by citizens.

Judge noted that the top of his list for sites to be protected are the Albia City Square (also a historic site) and gas stations.

Dawson asked for the attendees to look over the hazard selection from the last meeting. Heller motioned to approve the list as final and Goode seconded. Dawson pointed out that a sample of goals, objectives, and actions was included in the agenda as requested by Stilley at the last meeting. This sample is preliminary and drawn from FEMA guidance documents as well as other hazard mitigation plans.

Dawson asked Stilley for any input he may have from hazard mitigation planning that he has been part of before. Stilley mentioned that this process is moving along in pretty much the standard way and acknowledged the comment by Dawson that the next step is probably the most time consuming.

Dawson pointed out the next steps for the committee to take; city representatives are still asked to provide at least one update before the next meeting to their respective city councils, Dawson will work with individuals noted to illicit additional information on critical facilities, and all members are asked to review hazard research. Dawson will finish and distribute the hazard research as well as prepare guidance for city representatives on how to best document the city council meetings once guidance from the State is clarified. Heller motioned to approve these next steps and Goode seconded.

The date of the next meeting was not set, but the last week of July was recommended. Dawson will contact all meeting attendees to see what would work best for everyone. The meeting adjourned at 9:58 AM.

[These minutes as well as other information may be found on the planning website which is accessible by anyone; <http://sites.google.com/site/monroecountyhmp/>.]

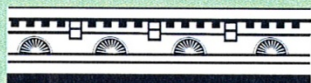
The following list consists of the facilities discussed;

Law Center	Knights of Columbus
Courthouse	KC Hall
ADLM (Appanoose County)	Jim & Charles
Iowa Telecom	HyVee
Secondary Roads facilities	Pamida?
Schools	Dollar General?
Chariton Valley REC	Oakwood (elderly population)
City Halls	Monroe Care Center (elderly population)
Churches (especially Trinity)	Breeze Rest Home
Intersection of HWYs 34 and 5	Monroe County Professional Management
Industrial Park	Library
Relco	Monroe County Historical Museum
County Public Health facilities	School Administration Building
Hospital	Hickory Grove Cemetery
High School (potential med. distribution center)	





# Monroe County Hazard Mitigation Planning Committee Meeting



**Chariton Valley**  
PLANNING & DEVELOPMENT

*Meeting and Managing Change*

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Date: August 10, 2009

Time: 9 AM

Location: Albia City Council Chambers

Primary Purpose:

FEMA will discuss the value & importance of forming a COAD and the role they play in a community in the event of a disaster.

This is an open public meeting and all are welcome!

Displayed at : CVPD office in Centerville, Monroe Courthouse, & Albia Chamber.



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**CHARITON VALLEY PLANNING AND DEVELOPMENT**

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**MONROE COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING #3****AGENDA****AUGUST 10, 2009 | 9AM | ALBIA CITY COUNCIL CHAMBERS**

1. Sign-in
2. Iowa Disaster Human Resource Council presentation: Linda Northouse (45 min.)
3. **Approve minutes** (1-2 min.)
4. Resume regular meetings (10-15 min.)
  - a. Update on progress since last meeting, updated guidance from State
  - b. Discuss outstanding documentation needed for local match
  - c. Preview of upcoming meetings and work
5. Discussion or other Business (up to 10 min.)
6. **Approve "Next Steps"** (1-2 min.)
7. Schedule next meeting / Adjourn (1-2 min.)

Anticipated Meeting Length: up to 1 hour 15 minutes

*Next steps: Planner will complete natural hazard profiles and related research for committee review prior to next meeting (carry-over from last meeting). Planner will draft and distribute minutes to all Committee members and send to newspaper.*

*PS will provide finished city hazard selections and provide to Dawson by next meeting. PS will provide update to relevant jurisdictions on hazard mitigation process.*

*All members (TAS, PS, and Planner) will review natural hazard profiles prior to next meeting. Familiarity with this material will help move the next meeting along efficiently. Keep track of the time you spend reviewing this information and provide letter indicating time spent, date(s), and brief description as match documentation; Dawson has provided guidance on this.*

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## CHARITON VALLEY PLANNING AND DEVELOPMENT

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### MONROE COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING #3 MINUTES

AUGUST 10, 2009 | 9AM | ALBIA CITY COUNCIL CHAMBERS

Dawson called the meeting to order at 9:00 AM. Present were; Linda Heller, Brad Leedom, Daniel Tometich, Deborah Morgan, Gene Rouze, Dien Judge (ADLM Emergency Management), John Dawson (CVPD), Linda Northouse and Jim Woodworth (FEMA).

Dawson began by pointing out a new sign-in sheet intended to meet Iowa Homeland Security's requirements for documenting match contributions. Dawson introduced Linda Northouse and Jim, both local hires with FEMA who had asked to present to the hazard mitigation committee.

Linda presented a video on how communities in the State of Washington have organized volunteer citizen groups trained to respond in disasters. The effort is part of a national collaboration through the National Voluntary Organizations Active in Disasters (NVOAD). Some counties in Iowa have local groups such as this in place and FEMA is encouraging other counties to form them as well. The reason for this is that FEMA is limited in what they are allowed to do under the law. In addition, local groups have the local knowledge and capacities that no outside organization can bring in.

Dawson interjected that the importance of this information is that once the committee reaches the mitigation portion of the plan, this is a potential strategy to evaluate. Dawson continued that the City of Mystic emphasized forming a local volunteer disaster response team in the mitigation section of their plan along with other strategies. Something like this was informally in place during the 2007 flood that inundated Mystic, but was not centrally organized and relied on individuals simply going out and helping one another.

Following the presentation discussion ensued regarding the barriers to receiving funds from FEMA for disaster response and recovery and the various hoops that local groups have to jump through. Judge and Rouze emphasized that while having local response volunteers would be a good thing, the problem in southern Iowa is that there simply is not the population present to form such groups. What happens in practice is that the same individuals that play other roles serve in this capacity as well and eventually become burnt out on the meetings.

Dawson turned the attention to the remaining agenda items by providing a quick update on progress since the last meeting. Dawson pointed out that along with the revised sign-in sheet; he needs letters or emails from meeting attendees approximately on a quarterly basis in order to obtain match credit for their participation. Dawson added that he keeps track of the information needed in these emails or letters and provides that to attendees so that attendees do not have to hunt for the information themselves.

Dawson explained the next steps the committee will undertake and pointed out that the upcoming meetings will be much more content heavy and that they will run more smoothly if attendees are familiar with the information. Dawson will provide this information in advance of the meetings.

Judge moved to approve the Next Steps and Tometich seconded. The meeting adjourned at 10:15 Am though some individuals remained to discuss related and other issues.

## Identified Critical Facilities

Law Center

Courthouse

ADLM (Appanoose County)

Iowa Telecom

Secondary Roads facilities

Schools

Chariton Valley REC

City Halls

Churches (especially Trinity)

Intersection of HWYs 34 and 5

Industrial Park

Relco

County Public Health facilities

Hospital

High School (potential med. distribution center)

Knights of Columbus

KC Hall

Jim &amp; Charles

HyVee

Pamida?

Dollar General?

Oakwood (elderly population)

Monroe Care Center (elderly population)

Breeze Rest Home

Monroe County Professional Management

Library

Monroe County Historical Museum

School Administration Building

Hickory Grove Cemetery



# Monroe County Hazard Mitigation Planning Committee Meeting

Date: January 12, 2010

Time: 11 AM

Location: Albia City Council Chambers

Primary Purpose:

Identify critical county facilities and discussion occurrences of hazards.

This is an open public meeting.

Displayed at : CVPD office in Centerville, Monroe Courthouse, Albia City Hall & Albia Chamber.



*Meeting and Managing Change*

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Historic Courthouse District  
205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707

Meeting and managing change

Monroe County Hazard Mitigation Planning  
January 12, 2010  
11:00-12:00Pm  
Albia City Hall

- I. Introductions
- II. Review minutes & progress made in steps to advance the plan.
  - a. Natural & Human caused hazards have been identified.
  - b. In Kind match contributions
    - i. Previous confusion has been taken care of & new approach to accomplish.
  - c. Critical facilities in Albia partially identified.

\*\*\*\*follow up question from previous minutes-

5/14/09 – There was discussion of a Housing assessment for Albia & possibly Melrose & Lovilia. Haven't found the results of that other than notes stating need to talk to Tometich.

- III. Have a working draft document that is for review if anyone would like to. Please keep in mind that it is a DRAFT & changes daily as work is made on it. Maps have not been updated in this plan so know that as you review. Also, there are many profiles that still need Monroe data entered but the descriptions of the hazards are complete.
- IV. New In Kind approach description. Members have any suggested organizations CVPD can present to in order to collect the required amount?
- V. Look at the Critical facilities list that has been started for Albia. Please make additions to it as you seen appropriate.
  - a. Albia locations
  - b. Melrose facilities
  - c. Lovilia sites
- VI. Local input on the following hazards: Fires and/or Wildfires, Landslides, & Dam Failure
- VII. Adjourn & sheets to review on your own before the next meeting are included. The forms would score identified hazards so that they can be ranked/prioritized.

NEXT MEETING: \_\_\_\_\_

Tasks for next meeting: score/prioritized hazards & review proposed goals/objectives of the plan.

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Historic Courthouse District  
 205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707  
*Meeting and managing change*

Monroe County HMG Planning Meeting  
 1/12/2010  
 Albia City Hall @ 11:00-12:00

Members present: Dien Judge, John Goode, Gene R, Kathy Welsh, Tammy Shroyes, Brad Leedon, Dennis Ryan, Donnie Herteen, Michael Beary, Dan Tometich, Tary Vitko, Kevin Crall, Richard Clark, Linda Heller, Jay Andrews, Dan Johnson, John Hughes and staff members Julie Pribyl & Nichole Moore.

CVPD introduced new staff members that are now working on the Hazard Mitigation plan for Monroe County. Julie Pribyl & Nichole Moore explained the new “team approach” that CVPD is taking with the two of them working with communities to gather information and to continue researching online. Tracy Daugherty is the “Community Planner” in the office that will be assembling and grooming the document before submission.

Julie explained that current status of the In Kind contributions for HMG plans. The staff members are not solely relying on the hours contributed by committee members but rather am making community presentations to local clubs/organizations to gather hours. This will accumulate as In-kind hours and will also educate citizens about HMG, the purpose, the importance and how it applies to them. CVPD staff members would like referrals for meetings that presentations could possibly be made.

A few questions were answered about “loose ends” that had been identified in previous minutes. The Housing assessment for Albia is located at the Albia Industrial corporation office in Albia. There is not a housing assessment for Lovilia or Melrose that any of the members are aware of. Dan will bring the assessment to the next meeting for CVPD to view on 2-9-10.

A list of the critical facilities that were previously identified was given to the committee members. The topic was re-visited so that additional sites could be included on it. Many were added to it-specifically noting City Halls only exist in Albia & Melrose; gas/natural gas sites; medical outreach offices; and there was some uncertainty on childcare facilities throughout the area.

Discussion was held about fires in Monroe County. Tometich noted that there has been multiple small community fires but that very few large critical fires. The only one specifically noted was the recent loss (few months ago) to the fire of the Melrose store that housed the groceries, gas station, etc. The site was a complete loss and no insurance was held.

It was specifically noted that the entire plant of Cargill is located in Monroe County. That will need to be specifically noted and addressed. Dien will invite a representative from the plant to be included in a meeting so that he can provide us with information and guidance.

Next meeting will be at 10:30am on 2/9/10 in the Albia City hall.

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	Name	Representing	Phone, email	adming@iowa telecom.net
	Dion Judge	ADLM-EMA	641-895-1826	
	John Good	Monroe Co	641-932-7123	jgood@monroecoa.gov
NO	Carole Rong	EDDYVILLE	641-929-4870	eddyville@monroecoa.gov
NO	Kathy Welsh	Monroe Co P.A.	641-932-2771	kwelsh@monroecoa.gov
NO	Tommy Shover	Farm Life Ctr	641-799-8565	tommyshover@glia.com
YES	Fred Leedom	MaCo. Ashline	641-932-1676	fleedom@metelli.com
YES	PENNIS J. RYAN	MONROE County Bldg	641-932-7706	supervisors@monroecoa.gov
YES	Donnie Hites	ADLM-Env	641-724351	
Y	Michael A Beary	Monroe Co Supor	641-932-9706	
NO	DAN TOMETICH	AED	641-777-2916	AED@IOWATELECOM.NET
NO	RAY VITKO	D.C.	641-799-8867	
Y	Kevin Crall	Albia Schools	641-799-9234	Kevin.crall@spac.k12
	Julie Prybyl	CVPD	641-437-4359	jp Prybyl@charitonvalleyplanning.com
	Nichole Moore	CVPD	641-437-4359	n.moore@charitonvalleyplanning.com
Y	Richard Eberke	ALBIA Mayor	641-922-2129	albiacity@iowatelecom.net
L	Linda Helle	Albia City Clerk	641-932-3139	albiacityclerk@iowatelecom.net
L	JAY ANDREWS	ALBIA POLICE DEPT.	641-932-7815	jandrews6911@iowatelecom.net
Y	Dan Johnson	Monroe Co. Sheriff Office	641-932-7815	monroecso@sirisonline
Y	John Hugel	Board of Super & Dept	641-932-5837	

MONROE LEPC  
1-12-10

6 Volunteers @ 25<sup>34</sup> = 152<sup>04</sup>





# Monroe County Hazard Mitigation Planning Committee Meeting



**Chariton Valley**  
PLANNING & DEVELOPMENT

*Meeting and Managing Change*

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[jdawson@charitonvalleyplanning.com](mailto:jdawson@charitonvalleyplanning.com)

Date: March 9, 2010

Time: 11 AM

Location: Albia City Council Chambers

Primary Purpose:

Review of hazard profiles for accuracy, content & grammar. We will also score the local hazards.

This is an open public meeting.

Displayed at : CVPD office in Centerville, Monroe Courthouse, Albia City Hall & Albia Chamber.





*Historic Courthouse District*  
205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707  
*Meeting and managing change*

MONROE COUNTY HMG Planning  
Tuesday, March 9, 2010  
11-12pm  
Albia City Hall

- I. Review minutes from meeting on January 12, 2010. Adjustments, additions, changes? Approval.
- II. Hazard profiles are nearly complete. Each has been printed off and needs reviewed for grammar, content and additional input from local residents. Particularly on structure fires, what is downstream if there were a dam failure, etc.
- III. Use the scoring chart you are provided with to evaluate and give a specific ranking to each section of the hazard you have before you.
- IV. CVPD will use this information to complete a chart of Hazard Rankings in your Monroe County HMG Plan.
- V. Adjourn

Next steps: CVPD will create the Hazard Rankings from the estimate scorings members provided. The committee to review scores for consensus or changes. Next meeting or following will need to have a presentation from Staff at Cargill on emergency procedures at their facility.



Historic Courthouse District  
205 1/2 N. 13th Street, Suite A, Centerville, IA 52544-1707  
*Meeting and managing change*

Monroe County HMP  
3/9/10  
Meeting minutes

Members Present: Dennis Ryan, Dien Judge, John Goode, Ken Hollingsworth, Ray ??, Jay Andrews, Joe Pabst, Rowland, Barnesh, Richard Clark, Daniel Tometich, & Chariton Valley Planning staff members Nichole Moore & Julie Pribyl

Member reviewed the notes from the January and had no adjustments.

Much of the meeting time was dedicated to reviewing the narrative and clarifying county specific information. Members also worked on scoring of the hazards that are approved to be in the plan. Members worked in groups and some individually to add specific information to each hazard & give an initial score. Those changes/suggestions to the hazard profiles will be compiled by CVPD, further research may be completed and then incorporated into the plan. CVPD will also use the scores assigned to complete the chart and accompanying rankings to present to the group at the next meeting.

Members were then given the FEMA-R5, "Mitigations Idea" packet that provided them with suggestions for Monroe county to mitigate for each hazard. Pribyl had already highlighted the choices of neighboring counties and noted them to the group. Each person was allowed to review the information and it was consensus of the group to initially accept the same strategies. CVPD will begin to work off that concept and will present those strategies to a larger committee for final approval in upcoming months.

The HMGP committee will meet again on April 20th at 10:30am

04/17/2010 10:14am

ADLMEMA

6417243273

#286

Page 01/02

March 9, 2010

MONROE Co. LEPC

Are you  
seeing past  
?

yes

yes

yes

NO

NO

YES

YES

Name

Representing

Phone - email

Dien J. Lee

ADLM-EMA

641-895-1826

Ray Vitek

mc Assault (Co.)

641-799-8867

JAY ANDREWS

ALBIA P.D.

641-932-7815

Rebecca J. Pifer <sup>Clark</sup>

ALBIA

641 932 2129

DAN TOMETICH

ALBIA F.D.

641-932-7253

DENNIS J. RYAN

MONROE Co B/S

641-932-7706

JOHN GOODE

MONROE Co Sec. RD.

641-932-7123

Ken Hollingsworth  
for Dan Johnson

MONROE Co.  
Sheriff's

641-932-7815

Nichol Moore

CVPD

641-431-4359

Julie Pabyl

CVPD

"

Rouland Barnes

641 799 5471

Joe Burt

641-932-5155

Volunteers

7 x 25% = 175%



# Monroe County Hazard Mitigation Planning Committee Meeting



**Chariton Valley**  
PLANNING & DEVELOPMENT  
*Meeting and Managing Change*

205 1/2 N 13th Street  
Centerville IA 52544  
Phone: 641-437-4359  
Fax: 641-437-1161  
E-mail:  
jdawson@charitonvalleyplanning.com

Date: April 20, 2010

Time: 11 AM

Location: Albia City Council Chambers

Primary Purpose:

Approval of hazard scores & rankings. Preliminary selection of Mitigation Strategies.

This is an open public meeting.

Displayed at : CVPD office in Centerville, Monroe Courthouse, Albia City Hall & Albia Chamber.





Historic Courthouse District  
205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707

*Meeting and managing change*

MONROE COUNTY HMGP Meeting  
4/20/2010 @ 11am  
Albia City Hall

#### AGENDA

1. Review notes from March meeting. Adjustments?
2. Committee review preliminary decisions on following documents:
  - a. Hazard Analysis – summary chart
    - i. Need complete score for “Fixed Radiological Incident”. Scoring criteria attached.
    - ii. Changes to those scores? Final approval.
  - b. Hazard rankings – review to see if committee agrees with how the rankings fell.
  - c. Mitigation strategies – each identified hazard must have a corresponding “action step” or mitigation strategy. The committee made preliminary choices from the FEMA booklet “Mitigation Ideas”. Please review to have entire committee approval.
    - i. Need to have input from School. Any interest in grant funding for a “Safe room”.
      1. We must then profile school & specifically state that intention.
      2. Each city will have to select several mitigation strategies which will be a priority for them to be better prepared for an emergency.
3. STAPLEE process - will help prioritize mitigation strategies for the county. Committee work to complete the chart.

NEXT STEPS: CVPD will supply you with charts/graphs from the decisions you have made today with hazards & mitigation strategies. CVPD will also gather community history.

Community packets have been created to gather info and confirm the accuracy of data already in the document. Active members here can complete or packets will be sent to cities.

Phone: 641.437.4359

Fax: 641.437.1161

Website: [charitonvalleyplanning.com](http://charitonvalleyplanning.com)

**Hazard Analysis Summary**

	Historical	Probability	Vulnerability	Threat	Impact	Onset	Comb.
<b>Natural Hazards</b>							
Flash Flood	4	3	2	2	3	4	18
Tornado	4	4	4	3	3	4	22
Windstorms / High Wind Events	4	4	3	3	3	4	21
Extreme Heat	2	2	2	3	2	2	17
Hailstorm	4	4	2	2	2	4	18
Sink Holes	1	2	1	1	1	4	10
River Flooding	4	4	2	2	2	2	16
Severe Winter Storm	4	4	4	4	3	3	22
Drought	2	2	3	4	3	1	15
Earthquake	1	1	2	4	2	4	14
Dam Failure	1	2	2	2	2	2	11
Thunderstorm / Lightning	4	4	2	2	3	3	18
Radon	4	4	3	3	3	1	18
<b>Human Caused and Combination Hazards</b>							
Air Transport. Incident	1	3	1	1	4	4	14
Pipeline incident	1	2	1	1	3	4	12
Transport Radiological Mat	1	2	2	3	2	1	11
Rail Transport. Incident	2	2	1	1	2	4	12
Highway Transport. Incident	4	4	2	1	3	4	18
Transport. Haz. Materials	2	3	2	2	2	4	15
Human Disease Incident	2	2	2	3	3	1	13
Human Disease Pandemic	2	3	3	3	3	1	15
Animal/plant/Crop Disease	1	2	2	3	3	1	12
Agro Terrorism	1	1	2	2	2	2	10
Biological Terrorism	1	1	2	2	2	2	10
Chemical Terrorism	1	1	2	2	2	2	10
Fixed Hazardous Materials	4	4	2	1	2	4	17
Fixed Radiological Incident	1	1	1	1	2	1	
Energy Failure	2	3	3	3	2	4	17
Communications Failure	1	3	3	3	2	4	16
Structural Failure	1	3	2	2	3	4	15
Structural Fire	1	3	2	2	3	4	15

In making their hazard analysis and risk assessment, the Appanoose County Hazard Mitigation Planning Committee considered the following:

- Historical Occurrence
- Probability
- Vulnerability
- Maximum Threat
- Severity of Impact
- Speed of Onset

The following tables define each factor and the rating scale the Planning Committee used to assess the hazards risk to the community.

**Historical Occurrence:** Number of times that a hazard has occurred in the community in the past.

Rating	Number of Historical Occurrences
1	Fewer than 4 occurrences
2	5 to 7 occurrences
3	8 to 12 occurrences
4	More than 12 occurrences

**Probability:** Likelihood of the hazard occurrence, sometimes without regard to hazard history.

Rating	Likelihood	Frequency of Occurrence
1	Unlikely	Less than 1% probability in the next 100 years
2	Possible	Between 2 and 10% probability in next year, or at least one chance in the next 100 years
3	Likely	Between 11 and 100% probability in next year, or at least one chance in next 10 years
4	Very Likely	Near 100% chance in the next year

**Vulnerability:** Measure of the percentage of people and property that would be affected by the hazard event.

Rating	Magnitude	Percentage of people and property affected
1	Negligible	Less than 10%
2	Limited	11 to 25%
3	Critical	26 to 50%
4	Catastrophic	More than 50%

**Maximum Threat:** Spatial extent of the community that might be impacted.

Rating	Magnitude	Percentage of jurisdiction that can be affected
--------	-----------	---

Mitigation Strategies in Monroe County, Iowa

Public Outreach and Education	58
Community Emergency Response Team	56
Weather Radios	55
Continuity of Operations Planning	52
Hazard Occurrence data collection	52
Collection and protection of vital records	41
Generators	38
Maintenance of Older Buildings	31.5
Safe Rooms???? School interested????	30
Surge protectors/ Lighting protection	30
Snow Fence/ Barriers	30
Storm Warning systems	29.5
Search & Rescue training for first responders	29.5
Flood Insurance	29
Evacuation Plans	28.5
Smoke/Fire/CO Detectors/sprinkler Systems	28
Fireplace maintenance	28
Maintenance of heating/cooling systems	27.5
Manufactured homes tie-downs	26
Address vacant structures/collapsed buildings	25
Expanded hazard area mapping/mine evaluation	23.5
Tree management/trimming	23
Temporary Debris disposal plan	23
Hazardous material disposal	22.5
HazMat protection of storm shelters	22.5
Water storage or saving plans	22
Mass Casualty preparation	21.5
Radon Mitigation	21
Local HazMat Capabilities	20
New Storm Shelter	19.5
Critical Infrastructure protection from terrorism	17
Assessment risk for terrorism	17
Acquisition or relocation of buildings	16.5
Building Code Enforcement	16
Storm water management ordinance	15
Burying power lines	13
Immunizations	13
Dam/Levee Maintenance	12.5
Consider (Community Rating System) CRS participation	12
Burning restrictions	10
Waste disposal enforcement	9.5
Flood proofing (wet or dry)	7
Pest management	7
Review Floodplain ordinances for effectiveness	6



identify and prioritize mitigation actions 2

Table 2-1 suggests some considerations and sources of information for each STAPLEE criterion to use when completing Worksheet #4.

**Table 2-1: Researching STAPLEE Criteria**

Evaluation Category	Considerations	Sources of Information
<b>Social</b>	Community Acceptance	<ul style="list-style-type: none"> <li>▪ Questionnaire (see Appendix E)</li> <li>▪ Interviews with government staff, non-profit organizations, and neighborhood advocacy organizations</li> <li>▪ Community plans</li> <li>▪ Newspaper articles</li> </ul>
	Adversely Affects Segment of Population	<ul style="list-style-type: none"> <li>▪ Maps showing demographics (race, age, income, voting districts, etc.) with locations of proposed mitigation actions</li> </ul>
<b>Technical</b>	Technical Feasibility	<ul style="list-style-type: none"> <li>▪ Judgment of mitigation experts, scientists, and engineers</li> <li>▪ Existing literature/studies on the action</li> </ul>
	Long-term Solution	<ul style="list-style-type: none"> <li>▪ Judgment of mitigation experts</li> <li>▪ Existing literature/studies on the action</li> </ul>
	Secondary Impacts	<ul style="list-style-type: none"> <li>▪ Judgment of mitigation experts</li> <li>▪ Existing literature</li> <li>▪ Maps showing environmentally sensitive resources with locations of proposed mitigation actions</li> <li>▪ Scientific and/or engineering evaluations</li> </ul>
<b>Administrative</b>	Staffing (sufficient number of staff and training)	<ul style="list-style-type: none"> <li>▪ Capability assessment (see Worksheets #2 and #3)</li> <li>▪ Jurisdiction organizational chart</li> <li>▪ Availability of technical assistance from regional or state agencies</li> <li>▪ Interviews with department heads and relevant staff</li> </ul>
	Funding Allocated	<ul style="list-style-type: none"> <li>▪ Capability assessment (see Worksheets #2 and #3)</li> <li>▪ Annual operating budget</li> <li>▪ Capital improvement budget</li> <li>▪ Interviews with department heads and relevant staff</li> </ul>
	Maintenance/Operations	<ul style="list-style-type: none"> <li>▪ Capability assessment (see Worksheets #2 and #3)</li> <li>▪ Existing literature on maintenance costs</li> <li>▪ Interviews with department heads and relevant staff</li> </ul>
<b>Political</b>	Political Support	<ul style="list-style-type: none"> <li>▪ Questionnaire (see Appendix E)</li> <li>▪ Interviews with elected officials</li> <li>▪ Newspaper articles</li> </ul>
	Local Champion or Plan Proponent (respected community member)	<ul style="list-style-type: none"> <li>▪ Questionnaire (see Appendix E)</li> <li>▪ Interviews with elected officials, community leaders, and private sector participants in planning process</li> </ul>
	Public Support (Stakeholders)	<ul style="list-style-type: none"> <li>▪ Questionnaire (see Appendix E)</li> <li>▪ Interviews with government staff, non-profit organizations, and neighborhood advocacy organizations</li> <li>▪ Newspaper articles</li> <li>▪ Public meetings</li> </ul>



06/09/2010 03:02pm

AULMEMA

641/243273

#028

Page 01/01

4-20-10

MONROE LEPC

are you paid

- yes X Dien J. J. J.
- YES X STAY ANDREWS
- NO X Richard E. Clark
- NO X Linda Heller
- NO X Rowland Barnes
- Yes X Kathy Welsh
- Yes X BRAD BLEEDOM
- NO X DAN TOMETICH
- NO X JOHN PABST
- yes X Richard L. Moore
- yes X Julie Pribyl

contact info

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641-437-4359 nmscre@charitonvalleyplanning.com

641-437-4359 jpribyl@charitonvalleyplanning.com

8 Volunteers x 25<sup>00</sup> 202<sup>00</sup>



*Historic Courthouse District*  
205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707  
*Meeting and managing change*

Monroe County HMGP  
4/20/210  
Albia City Hall

Members Present: Dien Judge, Dan Tometich, Jay Andrews, Richard Clark, Linda Heller, Rowland Barnes, Kathy Welsh, Brad Leedom, John Pabst, and CVPD staff members Julie Pribyl & Nichole Moore.

Committee Members reviewed the notes from the March 2010 meeting. There were no changes or adjustments.

The group reviewed the scores previously assigned to the identified hazards and were still agreeing on it. The committee agreed to move forward with those scores. Members corrected the oversight of scoring "Fixed Radiological Incident" with the scores of: 1,1,1,1,2,1.

All members agreed that the Hazard Rankings accurately reflect the county's major concerns of Serve Winter Storm, Tornados, Wind events and Flash flooding. The committee approved all rankings of the identified hazards.

CVPD explained the STAPLEE process and how it will help determine the scores & ranking for the selected mitigation strategies. Committee members were provided with a STAPLEE/mitigation chart to complete with a + or - indicator score for each strategy and how it applies to Monroe County. They were also given with suggested scores that the neighboring counties have chosen. A brief discussion was held about the school's interest in the safe room funding. Julie will speak with the school to confirm their decision. The committee moved forward with their scoring and included the safe room. CVPD will input the data into the chart, assign the corresponding score and will be presented back to the committee in order for them to approve how prioritize strategies.

CVPD will continue working forward on the decisions made today. The next HMGP meeting will be in June 2010.

\*\*\*Kevin Crall later indicated that Albia School District will consider review the requirements for the School Safe Rooms and may possibly apply for those funds in the future.



Historic Courthouse District  
205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707

*Meeting and managing change*

Monroe County Hazard Mitigation Planning  
June 15, 2010 10:30pm  
Albia City Hall, Albia, IA

- I. Review Past minutes & approve.
- II. Re-Visit hazards & possibility of including Grass/Wildfire & Waterway incident
  - a. State plan says that Grass/Wildfire has a 100% chance of occurring – indicating that it probably should be included in plan. Also there is mention of Lake Miami & several different creeks throughout the plan – that opens up the possibility of Waterway incident (chemical release/spills or drowning) and may need to be considered in the plan.
- III. Review of documents – Hazard Scoring & rankings; STAPLEE scores for each Mitigation Strategy selected; Hazards that are address by each mitigation action chart; Mitigation Action Ranking
  - a. Discussions – any questions, concerns or preferred changes?

NEXT STEPS: CVPD will continue to work on the document. Time will be spent gathering community histories, profiling Albia Public Schools to qualify for potential Safe Room funds, creating & inserting maps for hazards, and potential financial impact in the event of a disaster.

Phone: 641.437.4359

Fax: 641.437.1161

Website: [charitonvalleyplanning.com](http://charitonvalleyplanning.com)





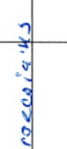

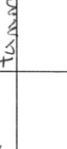
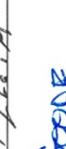

**MONROE COUNTY HAZARD SCORES**

	Historical	Probability	Vulnerability	Threat	Impact	Onset	Comb.
Natural Hazards							
Flash Flood	4	3	2	2	3	4	18
Tornado	4	4	4	4	4	4	24
Windstorms / High Wind Events	4	4	3	3	3	4	21
Extreme Heat	2	2	2	3	2	2	17
Hailstorm	4	4	2	2	2	4	18
Grass/Wildfires	2	2	1	1	2	4	12
Sink Holes	1	2	1	1	1	4	10
River Flooding	4	4	2	2	2	2	16
Severe Winter Storm	4	4	4	4	3	3	22
Drought	2	2	3	4	3	1	15
Earthquake	1	1	2	4	2	4	14
Dam Failure	1	2	2	2	2	2	11
Thunderstorm / Lightning	4	4	2	2	3	3	18
Radon	4	4	3	3	3	1	18
Human Caused and Combination Hazards							
Air Transport. Incident	1	3	1	1	4	4	14
Pipeline incident	1	2	1	1	3	4	12
Transport Radiological Mat	1	2	2	3	2	1	11
Rail Transport. Incident	2	2	1	1	2	4	12
Highway Transport. Incident	4	4	2	1	3	4	18
Transport. Haz. Materials	2	3	2	2	2	4	15
Human Disease Incident	2	2	2	3	3	1	13
Human Disease Pandemic	2	3	3	3	3	1	15
Animal/plant/Crop Disease	1	1	1	2	2	1	8
Agro Terrorism	1	1	2	2	2	2	10
Biological Terrorism	1	1	2	2	2	2	10
Chemical Terrorism	1	1	2	2	2	2	10
Fixed Hazardous Materials	4	4	2	1	2	4	17
Fixed Radiological Incident	1	1	1	1	2	4	10
Waterway Incident	1	2	2	1	1	4	11
Energy Failure	2	3	3	3	2	4	17
Communications Failure	1	3	3	3	2	4	16
Structural Failure	1	3	2	2	3	4	15
Structural Fire	1	3	2	2	3	4	15

County Monroe

# HAZARD MITIGATION PLANNING IN-KIND

DATE 10/15/10 TIME 10:30-11:30 LOCATION Albia, IA

NAME	ADDRESS or EMAIL	Elected officials- Are you being paid to be here?	HRS VOLUNTEERED	SIGNATURE
DAN TOMETICH	ADDT4@LOWATELECOM.NET	NO	1	
<i>Albia Ambulance Crew</i> BRIAN LEBLANC	bleeban@mbalbi.com	<del>NO</del>		
Kathy Kleish	KleishEmanassois.us	YES		
GENE RANZE	eddy4011@tae10wstetelcom.net	NO	1	
TAMMY SHROYER	tammyshroyer@gmail.com	NO	1	
Richard P. Pharis	RICHA.P.PHARIS@TELCO.COM			
JOHN GEORGE	jgoodr@monroecounty.com	YES		

Total hrs \_\_\_\_\_ x \$253.11 = \$ \_\_\_\_\_

County Monroe

**HAZARD MITIGATION PLANNING IN-KIND**

DATE 6/15/10 TIME 10:30-11:30 LOCATION Albion, LA

NAME	ADDRESS or EMAIL	Elected officials- Are you being paid to be here?	HRS VOLUNTEERED	SIGNATURE
Dren Judge	adlmonera@comcast.net	yes	—	W. Dren Judge
Richard Barnes	1015 Bontourville Court		1	

Total hrs 1 x \$25.34 = \$ 25.34





Historic Courthouse District  
205 ½ N. 13th Street, Suite A, Centerville, IA 52544-1707

Meeting and managing change

MONROE COUNTY HMGP MEETING  
June 15, 2010 10:30-11:30AM  
Albia City Hall, Albia, IA

MEMBERS PRESENT: Dan Tometich, Brad Leedom, Kathy Welsh, Gene Rouze, Tammy Shroyer, Richard Clark, John Goode, Dien Judge, Rowland Barnes and CVPD staff members Nichole Moore & Julie Pribyl

Members were given a packet of documents that included: Minutes from the April 2010 meeting, the summary chart of the Hazard scorings, a copy of a presentation handout that displays the rankings of the hazard scores, purposed Mitigation Action rankings, the chart of hazards addressed & Mitigations proposed, chart of Goals/Objectives & Mitigation Actions proposed, and the results of the STAPLEE.

Members approved the minutes as correct.

Pribyl asked members to revisit the hazards to reconsider waterway incident because of the mention of Lake Miami and many rivers/creeks throughout Monroe County. The description of the hazard was reviewed and discussion was held if a single drowning would be considered a “disaster” but was viewed as an emergency situation. Members agreed that it would involve emergency personnel, trained professionals, etc to respond to either a drowning or spill so it could be included in the plan. Another hazard that was revisited was Grass/Wild Fire. Pribyl wanted to clarify that the committee did prefer to leave this out even though the State plan indicated that there was a 100% probability that it could occur. The subsequent conversation indicated that it could occur here but not to the capacity of “wild fires” in California but rather rural fires that could burn several acres. Goode questioned what the 100% probability was based upon? Again the committee believed that emergency personnel would be involved and would need to have appropriate training to handle the situation and perhaps it should be included as a hazard that they could be better prepared to handle. Therefore, it was consensus that waterway incident and grass/wild fire be included in the hazards profiled and scores were issued at this meeting.

CVPD staff asked about how the committee preferred to gather information from Cargill as a fixed hazardous location. Rouze explained that Cargill has very well trained personnel to handle all incidents internally, but that locally emergency personnel are concerned of any type of disaster that may cause contamination/exposure to the surrounding areas. Judge & Rouze both explained that Cargill is extremely guarded with information about the contents of their facility. Judge has begun working with Cargill management with a possible simulated disaster that would involve first responders from the 3 counties that merge at the edge of Cargill’s property. Judge will work to gather some information at that time to possibly include in the HMGP. Pribyl also explained that if it is not possible to get pertinent information that the plan may need we just need to state new goals that the county needs to establish a working relationship with Cargill personnel, identify what training needs to occur.

Committee members were given lots of information in the charts provided today. CVPD quickly explained each of them and suggested members review at their own leisure and notify the office if there are any changes/corrections.

Next meeting will be July 20, 2010 at 10:30AM in the Albia City Hall.

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## Appendix Q: Community Assets & Critical Facilities

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### Museums

Monroe County Historical Museum

Albia, IA 52531

[Redacted]

[Redacted]

[Redacted]

[Redacted]

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### Schools

Albia Community School district

South Main & 6<sup>th</sup> Ave E, Albia, IA 52531

Albia Community School district(Admin office)

120 Benton Ave E, Albia, IA 52531

Albia Pre School & Daycare Ctr

100 N 2<sup>nd</sup> St, Albia, IA 52531

Albia Community School District (middle school)

222 N 2<sup>nd</sup> St, Albia, IA 52531

Albia Community School District (HS)

503 B Ave E, Albia, IA 52531

Albia Community School District

623 Washington Ave E, Albia, IA 52531

Albia Community Schools (Elementary)

520 S Clinton St, Albia, IA 52531

Albia Community Schools (Elementary)

701 Washington Ave E, Albia, IA 52531

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### Libraries

Albia Public Library

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203 Benton Ave, Albia, IA 52531

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**Community Centers/City Hall**

City of Melrose

117 Shamrock St, Melrose, IA 52569

City of Lovilia

1613 S E Ave, Lovilia, IA 50150

City of Albia

120 South A St, Albia, IA 52531

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**Places of Worship**

**#’s**

Albia

3

Melrose

Lovilia

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**Nursing/Retirement homes – Vulnerable populations**

Southern IA Home Health Care, LLC

2533 645<sup>th</sup> Ave, Albia, IA 52531

Monroe County Council on Aging

17 N Clinton, Albia, IA 52531

Brees Rest Home

210 Washington Ave E, Albia, IA 52531

Albia Housing Agency

City Hall 120 S A St, Albia, IA 52531

Monroe Care Center Inc

120 N 13<sup>th</sup> St, Albia, IA 52531

Hospice of Monroe County

6580 165<sup>th</sup> St, Albia, IA 52531

---

**Oakwood Nursing & Rehab Center**200 16<sup>th</sup> Ave E, Albia, IA 52531**Parkview Cottage**645 8<sup>th</sup> St, Albia, IA 52531**Ragtime Industries**116 N 2<sup>nd</sup> St, Albia, IA 52531**Monroe County Professional Management**645 N 8<sup>th</sup> St, Albia, IA 52531**Hospitals & Medical Centers****Monroe County Hospital**6580 165<sup>th</sup> St, Albia, IA 52531**Sarver Chiropractic Clinic PC**

909 S Clinton St, Albia, IA 52531

**Judge Chiropractic Center**

22 Washington Ave, Albia, IA 52531

**Dr John Scieszinski, DDS PC**

26 S Main St, Albia, IA 52531

**Dr Joseph L Bates DDS**

222 Washington Ave E, Albia, IA 52531

**County Medical PC**

Avery Rd, Albia, IA 5231

**Heartland Eye Care**

101 Benton Ave E, Albia, IA 52531

**Ambulance Services****Monroe County Ambulance Service**

Albia, IA 52531

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**Police/Law Enforcement Centers and Fire Stations**

Monroe County Sherriff's office

Albia, IA 52531

City of Albia Police Department

103 2<sup>nd</sup> Ave, Albia, IA 52531

Melrose Fire Station

100 Shamrock St, Melrose, IA 52531

Albia Fire Station

115 2<sup>nd</sup> Ave W, Albia, IA 52531

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**Courthouse**

Monroe County Courthouse

10 Benton Ave E, Albia, IA 52531

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**Grocery Stores**

Melrose Market

115 Erin Street, Melrose, IA 52569

Dollar General

900 Princeton Dr, Albia, IA 52531

Jim & Charlie's AFF Foods

121 N Clinton, Albia, IA 52531

Hy-Vee Food Stores

Hwy 34 W, Albia, IA 52531

Pamida Inc

Hwy 34 West, Albia, IA 52531

Snack Shack

906 S Clinton St, Albia, IA 52531

Preferred Wholesale

201 South Main St, Albia, IA 52531

Vitko's Sinclair

113 Benton Av W, Albia, IA 52531

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### **Communications**

Iowa Telecommunications Svcs, Inc  
202 Washington Ave E, Albia, IA 52531

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### **Gas Stations & other sites with possible hazardous materials**

Quality Ag Service of Iowa, Inc  
502 Erin Ave, Melrose, IA 52569

Corydon Oil Co/Quality Ag service  
6385 196<sup>th</sup> Street, Albia, IA 52531

Casey's General Store  
1117 S Clinton St, Albia, IA 52531

Kum & Go  
204 South Main St, Albia, IA 52531

Gas & Go  
1604 Highway 5, Lovilia, IA 50150

Casey's General Store  
1807 Highway 5, Lovilia, IA 50150

Casey's General Store  
122 N Main St, Albia, IA 52531

Elliott Oil Company  
107 N Main, Albia, IA 52531

Cargill Inc  
Eddyville, IA

Albia Amoco  
21 A Ave E, Albia, IA 52531

Albia Stop & Shop  
300 Hwy 34 W, Albia, IA 52531

Smith Fertilizer & Grain  
805 N Hwy 5, Albia, IA 52531

Ferrellgas  
121 10<sup>th</sup> St, Albia, IA 52531

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**Critical Bridges, overpasses, Transportation**

Relco-Locomotives Inc

1 Relco Ave, Albia, IA 52531

Burlington Northern & Santa Fe Railway

300 A St N, Albia, IA 52531

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

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**Shelters/Food Pantries/other**

[Redacted]

[Redacted]

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**Misc**

Iowa Dept of Transportation

1501 S C St, Albia, IA 52531

Rural Housing Service

1709 S B St, Albia, IA 52531

South Central Iowa Community Action Program

221 S Clinton St, Albia, IA 52531

IA Dept of Human Services

208 South Clinton St, Albia, IA 52531

Albia Municipal waterworks

120 S A Street, Albia, IA 52531

US Post office

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104 Benton Ave, Albia, IA 52531

Albia Chamber of Commerce

18 S Main St, Albia, IA 52531

City of Albia Airport

120 A St S, Albia, IA 52531

ADLM Emergency Management/ Environmental

Moravia, IA

Chariton Valley Electric Coop

2090 Hwy 5 South, Albia, IA 52531

McGee Sanitation

16 Washington Ave, Albia, IA 52531

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Appendix R: Hazard/Mitigation Chart

Hazard Addressed	Mitigation Action																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Flash Flood																												
Thunderstorm / Lightning																												
Communication Failure																												
Severe Winter Storm																												
Energy Failure																												
Over Flooding																												
Fixed Hazardous Materials																												
Highway Transport Incident																												
High Pressure Gasoline/Lead																												
Tornado																												
Extreme Heat																												
Wildfires / High Wind Events																												
Grass / Wildfire																												
Soil Transport Incident																												
Structural Failure																												
Structural Fire																												
Transport Haz. Materials																												
Human Disease Pandemic																												
Human Disease Outbreak																												
Earthquake																												
Air Pollution/ Crop Disease																												
Drought																												
Air Transport Incident																												
Climate Change																												
Dam Failure																												
Sea Level Rise																												
Expansive Soils																												
Transportation of Sed. Materials																												
Explosive																												
Agro-Terrorism																												
Biological Terrorism																												

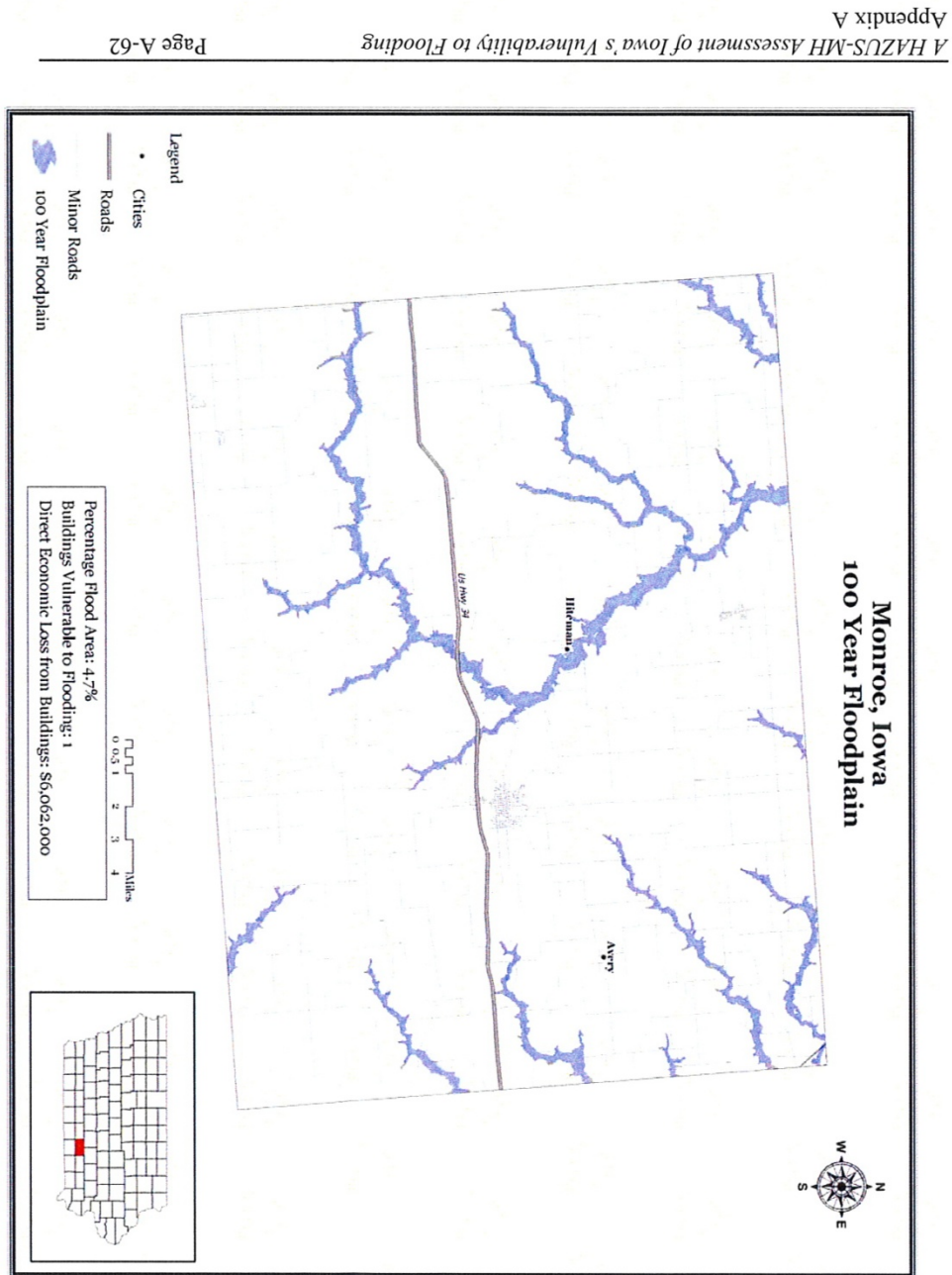
Hazard Addressed by Proposed Mitigation Actions

Appendix S: STAPLEE

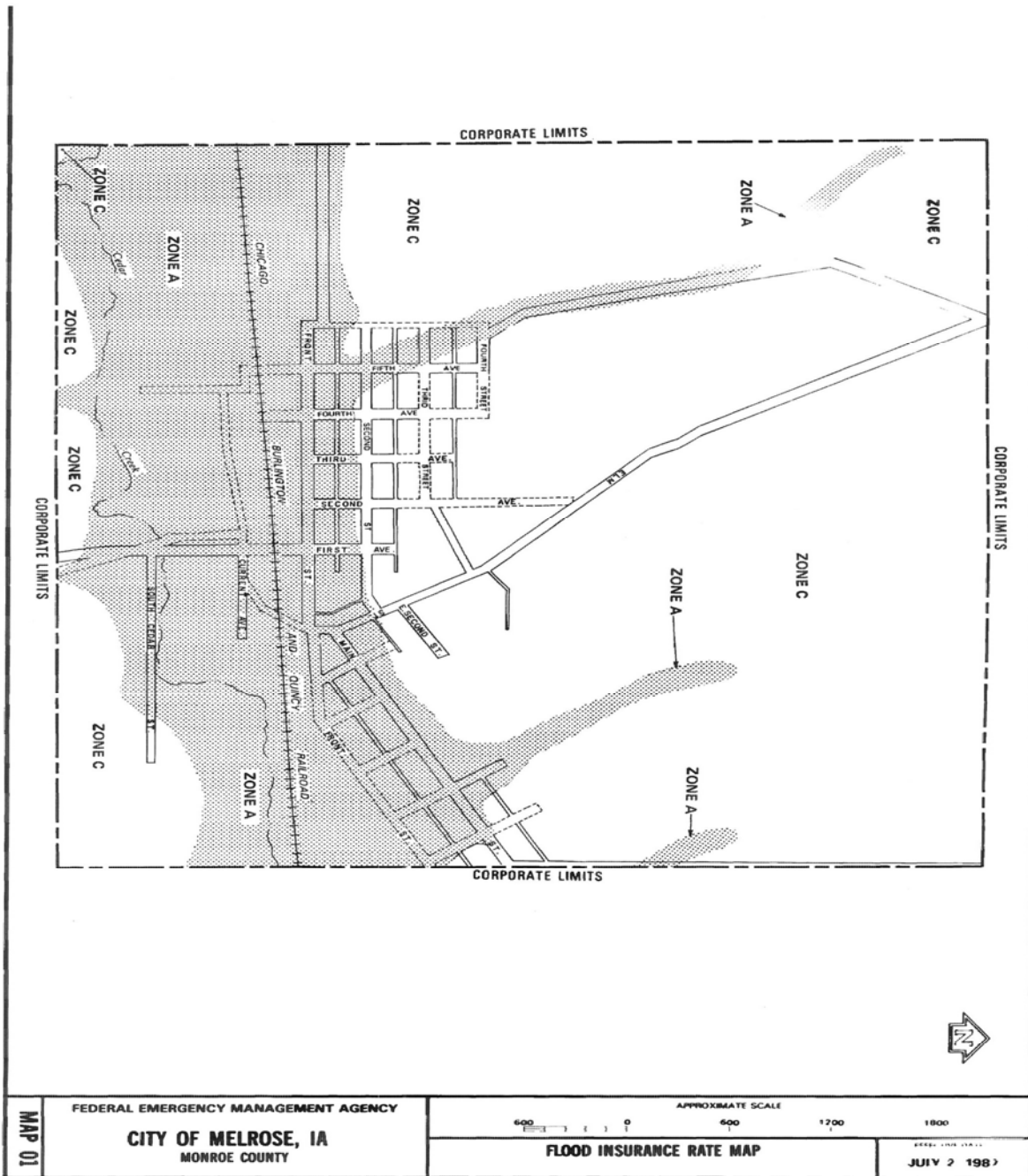
STAPLEE Criteria	Mitigation Action																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
High Risk Hazard Action	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Social																	
Community Acceptance	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Effect on Segment of Population	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technical																	
Technical Feasibility	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Long-Term Solution	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Secondary Impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Administrative																	
Staffing Allocated	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maintenance / Operations	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Political																	
Political Support	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Local Champion	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Public Support	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Legal																	
State Agency	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Existing Local Authority	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Potential Legal Challenge	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Economic																	
Benefit of Action	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cost of Action	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Contribution to Economic Goals	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Outside Funding Required	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Environmental																	
Effect on Endangered Species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Effect on HUMAN / Wildlife	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Consistency with Community Environmental Goals	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Consistent with Federal Laws	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

[http://www.monroecounty.gov/hazardmitigation/docs/staplee\\_criteria.pdf](http://www.monroecounty.gov/hazardmitigation/docs/staplee_criteria.pdf)  
[http://www.monroecounty.gov/hazardmitigation/docs/staplee\\_criteria.pdf](http://www.monroecounty.gov/hazardmitigation/docs/staplee_criteria.pdf)  
[http://www.monroecounty.gov/hazardmitigation/docs/staplee\\_criteria.pdf](http://www.monroecounty.gov/hazardmitigation/docs/staplee_criteria.pdf)  
[http://www.monroecounty.gov/hazardmitigation/docs/staplee\\_criteria.pdf](http://www.monroecounty.gov/hazardmitigation/docs/staplee_criteria.pdf)

## Appendix T: 100yr Floodplain Map



Appendix U: Melrose FIRM





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## Appendix V: Modified Mercalli Scale for Earthquake Intensity

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- I. Not felt except by a very few under especially favorable conditions. (Micro)
- II. Felt only by a few persons at rest, especially on upper floors of buildings. (Micro)
- 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. (Minor)
- 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. (Light)
- V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop. (Moderate)
- VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. (Strong)
- 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. (Major)
- 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. (Great)
- 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. (Great)
- X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. (Great)
- XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly. (Great)
- XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air. (Great)

Source: Iowa Department of Natural Resources, Geological Survey. Modified Mercalli Intensity Scale from National Earthquake Information Center.  
 <<http://www.igsb.uiowa.edu/Browse/earthqua/MERCALLI.HTM>>.

**Appendix W: Alternate Facilities Valuation Estimate Tools**

**Average Building Replacement Value per Square Foot**

Occupancy Class	Total \$/sq. ft.
Single Family Dwelling	77
Mobile Home	52
Multi-family Dwelling	98
Temporary Lodging	102
Institutional Dormitory	98
Nursing Home	89
Retail Trade	67
Wholesale Trade	53
Personal/Repair Services	92
Professional/Tech. Services	87
Banks	151
Hospital	145
Medical Office/Clinic	112
Entertainment & Recreation	131
Theaters	98
Parking	30
Heavy Industrial	69
Light Industrial	69
Food/Drugs/Chemicals	69
Metals/Minerals Processing	69
High Technology	69
Construction	69
Agriculture	26
Church/Non-Profit Offices	113
General Services	88
Emergency Response	130
Schools	91
Colleges/Universities	115

Source: HAZUS

**Contents Value as Percentage of Building Replacement Value**

Occupancy Class	Contents Value (%)
Residential (including temporary lodging, dormitory, and nursing homes)	50
Commercial (including retail, wholesale, professional, services, financial, entertainment & recreation)	100
Commercial (including hospital and medical office/clinic)	150
Commercial Parking	50
Industrial (including heavy, light, technology)	150
Industrial Construction	100
Agriculture	100
Religion/Non-Profit	100
Government Emergency Response	150
Government General Services	100
Education Schools/Libraries	100
Education Colleges/Universities	150

Source: HAZUS

**Example 1**

To find the annual sales from a 15,000 square foot grocery store, you would multiply the structure size by \$30 per square foot (from the table at right).

$$15,000 \times \$30$$

The annual sales would be \$450,000.

**Example 2**

If a public library will be lost for three months due to damage from a 100-year flood, you could determine the damages from the loss of function by multiplying the monthly budget of the library (overhead, rent, staff salaries, etc.) by three months.



**Annual Gross Sales or Production (Dollars per Square Foot)**

Occupancy Class	Annual Sales (\$ / ft <sup>2</sup> )
<b>Commercial</b>	
Retail Trade	30
Wholesale Trade	43
<b>Industrial</b>	
Heavy	400
Light	127
Food/Drugs/Chemicals	391
Metals/Minerals Processing	368
High Technology	245
Construction	431
<b>Agriculture</b>	
Agriculture	83

Source: HAZUS

**Appendix X: History of Iowa Earthquakes**

**IOWA EARTHQUAKES**  
**HISTORIC EARTHQUAKES WITH EPICENTERS IN IOWA**



Number	Date	Nearest Town	Mercalli Intensity
1.	Apr. 28, 1867	Sidney (IA) / Nebraska City (NE)	IV
2.	Dec. 09, 1875	Sidney (IA) / Nebraska City (NE)	III
3.	April 13, 1905 **	Wayland (MO) / Keokuk (IA)	IV-V
4.	Jan. 26, 1925	Waterloo (IA)	II
<b>5.</b>	<b>Nov. 12, 1934</b>	<b>Davenport (IA) / Rock Island (IL)</b>	<b>VI</b>
6.	Jan. 05, 1935 **	Rock Island (IL) / Davenport (IA)	IV
7.	Jan. 05, 1935 **	Rock Island (IL) / Davenport (IA)	III
8.	Feb. 26, 1935	Burlington (IA)	III
9.	Oct. 11, 1938	Inwood (IA)	V
10.	Nov. 08, 1938	Dubuque (IA) *	-II
11.	Nov. 24, 1939	Davenport (IA) / Rock Island (IL)	II-III
12.	Apr. 20, 1948	Oxford (IA)	IV
13.	July 16, 2004	Shenandoah (IA)	III

**Red identifies Iowa's largest earthquake**  
 \* Dubuque experienced three shocks  
 \*\* Epicenter probably just outside Iowa

## Appendix Y: TORRO Hailstorm Intensity Scale

	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m <sup>2</sup>	Typical Damage Impacts
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	10-15	>20	Slight general damage to plants, crops
H2	Significant	10-20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60		Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-75		Severe roof damage, risk of serious injuries
H8	Destructive	60-90		(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

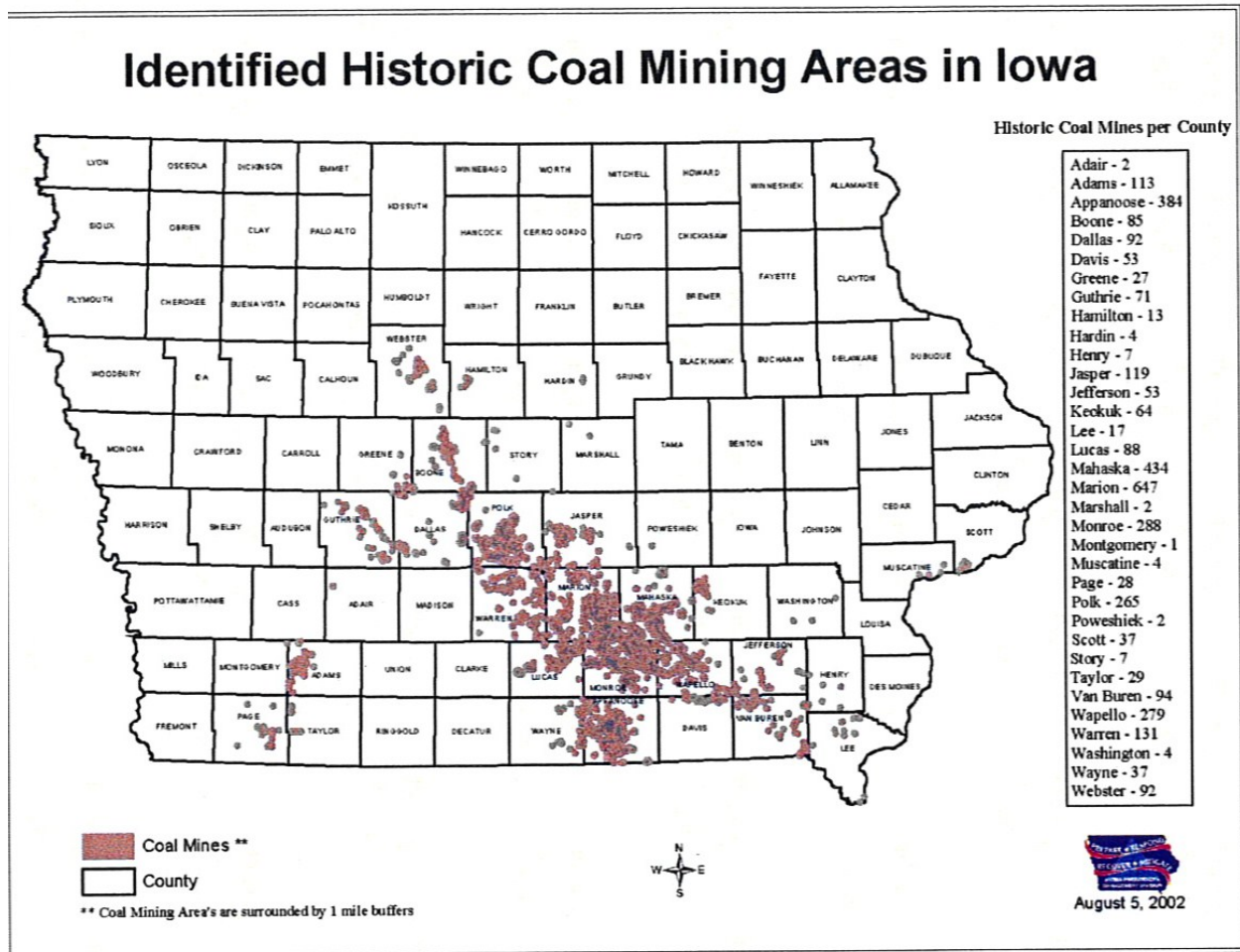
\* Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed and surface wind speeds) affect severity.

Maximum Diameter (mm)	Description
5-9	Pea
10-15	Mothball
16-20	Marble, grape
21-30	Walnut
31-40	Pigeon's egg > squash ball
41-50	Golf ball > Pullet's egg
51-60	Hen's egg
61-75	Tennis ball > cricket ball
76-90	Large orange > Soft ball
91-100	Grapefruit
>100	Melon

Source: FEMA and Tornado and Storm Research Organization  
 (<http://www.torro.org.uk/TORRO/severeweather/hailscale.php>)



Appendix Z: Coal Mining Locations









## Appendix AA: Enhanced Fujita Parameters and Damage Details

Source: Wikipedia, retrieved June 24, 2009 ([www.wikipedia.org](http://www.wikipedia.org))

### Parameters

The six categories for the EF Scale are listed below, in order of increasing intensity. Although the wind speeds and photographic damage examples are updated, the damage descriptions given are those from the Fujita scale, which are more or less still accurate. However, for the actual EF scale in practice, one must look up the damage indicator (the type of structure which has been damaged) and consult the degrees of damage associated for that particular indicator.

Scale	Wind speed		Relative frequency	Potential damage	
	mph	km/h			
<b>EF0</b>	65–85	105–137	53.5%	<p>Light damage.</p> <p>Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.</p> <p>Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0.</p>	
<b>EF1</b>	86–110	138–178	31.6%	<p>Moderate damage.</p> <p>Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.</p>	
<b>EF2</b>	111–135	179–218	10.7%	<p>Considerable damage.</p> <p>Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.</p>	

<b>EF3</b>	136– 165	219– 266	3.4%	<p>Severe damage.</p> <p>Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.</p>	
<b>EF4</b>	166– 200	267– 322	0.7%	<p>Devastating damage.</p> <p>Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.</p>	
<b>EF5</b>	>200	>322	<0.1%	<p>Exploding damage.</p> <p>Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation; incredible phenomena will occur.</p> <p>So far there have been two EF5 tornadoes recorded since the Enhanced Fujita Scale was introduced on February 1, 2007. The most recent one occurred in Parkersburg, Iowa on May 25, 2008 and leveled half the city.</p>	

**Damage Indicators and Degrees of Damage**

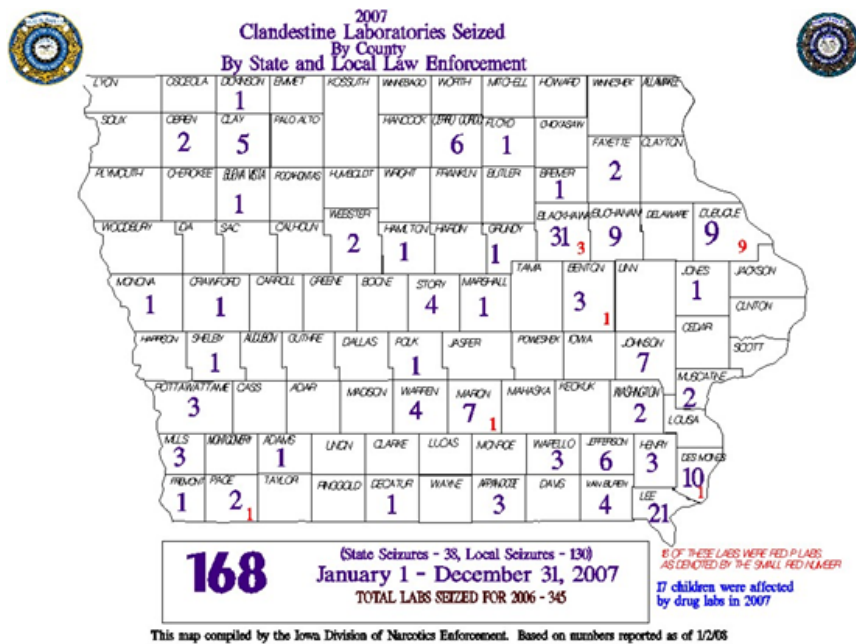
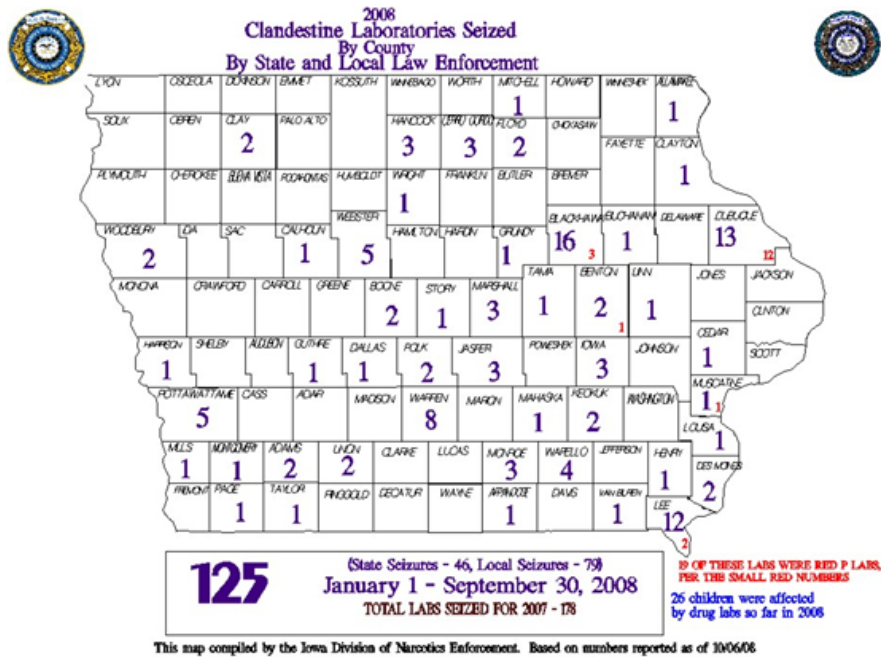
The EF Scale currently has 28 Damage Indicators (DI), or types of structures and vegetation, with a varying number of Degrees of Damage (DOD) for each.

DI No.	Damage Indicator (DI)	Degrees of Damage (DOD)
1	Small Barns or Farm Outbuildings (SBO)	<u>8</u>
2	One- or Two-Family Residences (FR12)	<u>10</u>

3	Manufactured Home – Single Wide (MHSW)	<a href="#">9</a>
4	Manufactured Home – Double Wide (MHDW)	<a href="#">12</a>
5	Apartments, Condos, Townhouses [3 stories or less] (ACT)	<a href="#">6</a>
6	Motel (M)	<a href="#">10</a>
7	Masonry Apartment or Motel Building (MAM)	<a href="#">7</a>
8	Small Retail Building [Fast Food Restaurants] (SRB)	<a href="#">8</a>
9	Small Professional Building [Doctor’s Office, Branch Banks] (SPB)	<a href="#">9</a>
10	Strip Mall (SM)	<a href="#">9</a>
11	Large Shopping Mall (LSM)	<a href="#">9</a>
12	Large, Isolated Retail Building [K-Mart, Wal-Mart] (LIRB)	<a href="#">7</a>
13	Automobile Showroom (ASR)	<a href="#">8</a>
14	Automobile Service Building (ASB)	<a href="#">8</a>
15	Elementary School [Single Story; Interior or Exterior Hallways] (ES)	<a href="#">10</a>
16	Junior or Senior High School (JHSH)	<a href="#">11</a>
17	Low-Rise Building [1–4 Stories] (LRB)	<a href="#">7</a>
18	Mid-Rise Building [5–20 Stories] (MRB)	<a href="#">10</a>
19	High-Rise Building [More than 20 Stories] (HRB)	<a href="#">10</a>
20	Institutional Building [Hospital, Government or University Building] (IB)	<a href="#">11</a>
21	Metal Building System (MBS)	<a href="#">8</a>
22	Service Station Canopy (SSC)	<a href="#">6</a>

23	Warehouse Building [Tilt-up Walls or Heavy-Timber Construction] (WHB)	<u>7</u>
24	Electrical Transmission Lines (ETL)	<u>6</u>
25	Free-Standing Towers (FST)	<u>3</u>
26	Free-Standing Light Poles, Luminary Poles, Flag Poles (FSP)	<u>3</u>
27	Trees: Hardwood (TH)	<u>5</u>
28	Trees: Softwood (TS)	<u>5</u>

## Appendix BB: Iowa Meth Labs Seized by County



Source: Iowa Department of Public Safety, Division of Narcotics Enforcement; <http://www.dps.state.ia.us/DNE/clanlab.shtml>

## Appendix CC: Community Plans/Ordinances/Policies

Planning Capabilities	Jurisdiction with it in Place	Method of Incorporating into this Plan
Comprehensive Plan	Albia, county	Reviewed during this plan to identify trends in jurisdictions
Builder's Plan	None	--
Capital Improvement Plan	None	Not directly incorporated
Local Emergency Plan	Entire County	Reviewed & referenced in the plan
County Emergency Plan	Entire County	Reviewed during mtgs for existing procedures
Local Recovery Plan	Entire County (EOP)	Mitigation action proposed
County Recovery Plan	Entire county (EOP)	Identified in EOP
Local Mitigation Plan	In process for all	This document
County Mitigation Plan	In process for all	This document
Local Mitigation Plan (PDM)	None	--
County Mitigation Plan (PDM)	None	--
Economic Development Plan	Albia, Regional plan	Reviewed for the development of this plan, economic info incorporated in community profiles
Transportation Plan	Regional Plan	Mapping data from LPTP update incorporated into this plan
Land-use Plan	Albia	Reviewed for this plan
Flood Mitigation Assistance (FMA) Plan	None	--
Watershed Plan	None	--
Firewise or other fire mitigation plan	None	--
School Mitigation Plan	None	Mitigation strategy proposed
Critical Facilities Plan (Mitigation/Response/Recovery)	In process for all	This plan
Zoning Ordinance	Albia	Reviewed zoning codes concerning certain hazards
Building Code	None	Not directly incorporated
Floodplain Ordinance	Albia, Melrose	Floodplain mapping deficient
Subdivision Ordinance	None	Not directly incorporated
Tree Trimming Ordinance	Albia	Consulted with regional utility company
Nuisance Ordinance	Albia, Melrose, Lovilia	Not directly incorporated
Storm Water Ordinance	Albia	Mitigation action proposed
Drainage Ordinance	Albia	Reviewed for flooding



Site Plan Review Requirements	Albia	--
Historic Preservation Ordinance	Albia	Reviewed for specific hazard information of aging structures
Landscape Ordinance	None	--
Iowa Wetlands and Riparian Areas Conservation Plan	Unknown	Research answer to find out
Debris Management Plan	None	Mitigation action proposed
Zoning/Land Use Restrictions	Albia	Zone code reviewed
Codes Building Site/Design	None	Reviewed when considering hazards in these jurisdictions
National Flood Insurance Program (NFIP) Participant - Nondelegated	Albia, Melrose, Lovilia	FIRM & NFIP #'s included in this plan
NFIP Participant - Delegated	None	--
NFIP Community Rating System (CRS) Participating Community	None	Mitigation action proposed
Hazard Awareness Program	Entire county by ADLM	Enhance program through mitigation action
National Weather Service (NWS) Storm Ready	None	Mitigation action
Building Code Effectiveness Grading (BCEGs)	None	--
ISO Fire Rating	Albia, Lovilia, Melrose, county	Numbers given in this plan
Economic Development Program	Albia	Reviewed in community profile
Land Use Program	None	--
Public Education/Awareness	None	Mitigation action proposed
Property Acquisition	None	--
Planning/Zoning Boards	Albia, County	Not directly incorporated
Stream Maintenance Program	County	--
Tree Trimming Program	Utility comp performs	Utility company performs
Engineering Studies for Streams (Local/County/Regional)	County	Not incorporated
Mutual Aid Agreements	Albia, Melrose, Lovilia, County	Fire & EMS throughout the county
Hazard Analysis/Risk Assessment (Local)	In process for all	This document
Hazard Analysis/Risk Assessment (County)	In process	This document
Flood Insurance Maps	Melrose	Included in this plan
FEMA Flood Insurance Study (Detailed)	None	--
Evacuation Route Map	County	In EOP
Critical Facilities Inventory	In process	This document
Vulnerable Population Inventory	In process	This document
Land Use Map	Albia	--
Building Code Official	None	--

Building Inspector	None	--
Mapping Specialist (GIS)	County Engineer	Involved in this entire process
Engineer	County	Involved in the process
Development Planner	None	--
Public Works Official	Albia	Consulted for information
Emergency Management Coordinator	Entire County @ ADLM	Participated in the development of this plan
NFIP Floodplain Administrator	Albia	Need to further ID role in communities
Bomb and/or Arson Squad	None	--
Emergency Response Team	Albia, Lovilia, Melrose	Members participated in development of this plan
Hazardous Materials Expert	None	--
Local Emergency Planning Committee	Entire county	Members participated in development of this plan
County Emergency Management Commission	Albia	Members participated in development of this plan
Sanitation Department	Albia	Not directly incorp
Transportation Department	Albia, Regional	Information about roadways provided
Economic Development Department	Albia	Not directly incorporated
Housing Department	None	--
Planning Consultant	Regional @ CVPD	Agency wrote this plan
Regional Planning Agencies	Regional @ CVPD	Agency wrote this plan
Historic Preservation	Albia	Not directly involved
American Red Cross	Albia	Not directly involved
Salvation Army	Regional coverage	Not directly involved
Veterans Groups	Albia	Not directly involved
Environmental Organization	Regional coverage @ ADLM	Not directly involved
Utility Companies	Albia	Not directly involved
Homeowner Associations	None	--
Neighborhood Associations	None	--
Chamber of Commerce	Albia	Director participated in mtgs
Community Organizations (Lions, Kiwanis, etc.)	Albia	Not directly involved
Local Funding Availability	None	--

## Appendix DD: Hazards by Jurisdictions

	Unincorp County	Albia	Lovilia	Melrose	Albia Community Schools
<b>Natural Hazards</b>					
Flash Flood	X	X	X	X	X
Tornado	X	X	X	X	X
Windstorms / High Wind Events	X	X	X	X	X
Extreme Heat	X	X	X	X	X
Hailstorm	X	X	X	X	X
Grass/Wild fire	X	X	X	X	X
Sink Holes	X	X	X	X	X
River Flooding	X				
Severe Winter Storm	X	X	X	X	X
Drought	X	X	X	X	X
Earthquake	X	X	X	X	X
Dam Failure	X				
Thunderstorm / Lightning	X	X	X	X	X
Radon/lead	X	X	X	X	
<b>Human Caused and Combination Hazards</b>					
Air Transport. Incident	X	X			
Pipeline incident	X	X	X		
Transport Radiological Mat	X	X	X	X	X
Rail Transport. Incident	X	X	X	X	
Highway Transport. Incident	X	X	X	X	X
Transport. Haz. Materials	X	X	X	X	X
Human Disease Incident	X	X	X	X	X
Human Disease Pandemic	X	X	X	X	X
Animal/plant/Crop Disease	X	X	X	X	
Agro Terrorism	X	X	X	X	
Biological Terrorism	X	X	X	X	X
Chemical Terrorism	X	X	X	X	X
Fixed Hazardous Materials	X	X	X	X	
Waterway Incident	X				
Energy Failure	X	X	X	X	X
Communications Failure	X	X	X	X	X
Structural Failure	X	X	X	X	X
Structural Fire	X	X	X	X	X

## Appendix EE: Alternate Facilities Valuation Estimate Tools

**Average Building Replacement Value per Square Foot**

Occupancy Class	Total \$/sq. ft.
Single Family Dwelling	77
Mobile Home	52
Multi-family Dwelling	98
Temporary Lodging	102
Institutional Dormitory	98
Nursing Home	89
Retail Trade	67
Wholesale Trade	53
Personal/Repair Services	92
Professional/Tech. Services	87
Banks	151
Hospital	145
Medical Office/Clinic	112
Entertainment & Recreation	131
Theaters	98
Parking	30
Heavy Industrial	69
Light Industrial	69
Food/Drugs/Chemicals	69
Metals/Minerals Processing	69
High Technology	69
Construction	69
Agriculture	26
Church/Non-Profit Offices	113
General Services	88
Emergency Response	130
Schools	91
Colleges/Universities	115

Source: HAZUS

### Example 1

To find the annual sales from a 15,000 square foot grocery store, you would multiply the structure size by \$30 per square foot (from the table at right).

$$15,000 \times \$30$$

The annual sales would be \$450,000.

### Example 2

If a public library will be lost for three months due to damage from a 100-year flood, you could determine the damages from the loss of function by multiplying the monthly budget of the library (overhead, rent, staff salaries, etc.) by three months.



**Contents Value as Percentage of Building Replacement Value**

Occupancy Class	Contents Value (%)
Residential (including temporary lodging, dormitory, and nursing homes)	50
Commercial (including retail, wholesale, professional, services, financial, entertainment & recreation)	100
Commercial (including hospital and medical office/clinic)	150
Commercial Parking	50
Industrial (including heavy, light, technology)	150
Industrial Construction	100
Agriculture	100
Religion/Non-Profit	100
Government Emergency Response	150
Government General Services	100
Education Schools/Libraries	100
Education Colleges/Universities	150

Source: HAZUS

**Annual Gross Sales or Production (Dollars per Square Foot)**

Occupancy Class	Annual Sales (\$ / ft <sup>2</sup> )
<b>Commercial</b>	
Retail Trade	30
Wholesale Trade	43
<b>Industrial</b>	
Heavy	400
Light	127
Food/Drugs/Chemicals	391
Metals/Minerals Processing	368
High Technology	245
Construction	431
<b>Agriculture</b>	
Agriculture	83

Source: HAZUS

**Appendix FF: Attendance/Participation Chart**

PARTICIPANT NAME	POSITION	2/17/2009	4/9/2009	5/14/2009	8/10/2009	1/12/2010	3/9/2010	4/20/2010	6/15/2010
Dien Judge	Emergency Management	X	X	X	X	X	X	X	X
Dan Johnson	Monroe Sherriff/Lovilia	X				X	X		
Ray Vitko	Albia Fire	X							
Dennis Ryan	Co Supervisor /Melrose	X	X			X	X		
John Goode	Co Engineer	X	X	X		X	X		X
Linda Heller	Albia/Melrose City clerks		X	X	X	X		X	
Richard Clarke	Albia Mayor		X			X	X	X	X
Justin Kamerick	Melrose		X						
Kevin Krall	Albia School		X			X			
Dustin Sample	Insurance Agnt		X						
Deborah Morgan	Albia Chamber		X						
Brad Leedom	EMT		X		X	X		X	X
Kathy Welsh	Public Health		X	X		X		X	X
Dan Tometich	Monroe Economic Dir		X		X	X	X	X	X
John Miles	REC		X						
Byron Stilley	REC		X	X					
Kelly Freeman	Albia Hospital			X					
Renee Powers	City of Albia			X					

Jim Coritman				X					
Gene Rouze	Eddyville Rep				X	X			X
Tammy Shroyes	Ministerial Assc					X			X
Michael Beary	Co Supervisor					X			
Jay Andrews	Albia police					X	X	X	
John Hughes	Co Supervisor					X			
John Pabst	Lawyer						X	X	
Rowland Barnes	City of Albia						X	X	X

Appendix GG: Cascading Event Matrix

Cascading Event Matrix	Triggering Hazard		Resulting Hazard	
	Natural Hazards	Human Caused-Accidental	Human Caused Purposeful	Other/Combination Hazards
Fresh Floods				
Tornado				
Windstorms / High Wind Event				
Extreme Heat				
Hailstorms				
Grass or Wildland Fires				
River Flooding				
Severe Winterstorms				
Drought				
Earthquake				
Dam Failure				
Thunderstorms & Lightning				
Radon/Lead				
Air Transportation Incident				
Rail Transportation Incident				
Pipeline Incident				
Highway Transportation Incident				
Transportation Hazardous Materials Incide				
Transportation Radiological Materials Incid				
Waterway Incident				
Fixed Hazardous Materials				
Energy Failure				
Communications Failure				
Human Disease Pandemic				
Human Disease Incident				
Animal / Plant / Crop Disease				
Structural Failure				
Structural Fire				
Trigger Total	4	0	2	0
<b>Cascading Total</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>16</b>



## 12. Glossary

*Note: most definitions contained here are derived from Dictionary.com and other internet searches; some are based on FEMA or Iowa Department of Homeland Security and Emergency Management information. Where exact language is used, the source is cited following the definition.*

100-year flood plain – area in which the chance of a flood occurring in any given year is 1% independent of any other year; this is statistically about once every 100 years, this does not mean that if there is not a flood this year that next year the chance goes up to 2%

500-year flood plain – the area in which the chance is .2% chance of a flood occurring in any given year independent of any other year; this is statistically about once every 500 years this does not mean that if there is not a flood this year that next year the chance goes up to .4%

Acceptable risk hazards – hazards that have been determined by the Monroe County Planning Committee to be low priority for mitigation strategies and projects to the point of no actions or steps are worth taking currently

Acute shortage (energy) – severe shortage in energy resources or supplies

ADLM – is the emergency management service that is a collaborative effort of Appanoose County, Davis County, Lucas County, and Monroe County, Iowa.

Aerosol – a liquid or gas under compression to be dispensed as a spray or foam

Agricultural drought – drought which refers to soil moisture deficiencies

Anhydrous ammonia – a hazardous substance that is used for industrial and commercial purposes and as a fertilizer lacking water which separates it from ammonia hydroxide

Anticholinergics – a class of medications that blocks nerve sensations and treat a variety of conditions including asthma, muscle spasms, and gastrointestinal cramps among others

Appurtenant – legal term describing something that goes along with or belongs to something else

Aquifer – an underground layer of porous rock or soils such as sand or gravel from which water can be drawn from

Asphyxiation – suffocation, choking, smothering

Asthma – respiratory disorder characterized by wheezing, coughing, labored breathing

Atmospheric carbon – carbon monoxide; gaseous carbon in the air, some of which is naturally occurring while some is the result of fossil fuel and wood combustion

Bio-Detection Systems (BDS) – a way to detect pollutants or organic compounds in the air or other substances

Bioterrorism – the use of biological agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom

Blizzard conditions – heavy or prolonged snowstorm characterized by reduced visibility and strong winds

Bottled Fuels – this Census designation is being used in this plan to include the Census designation as well as Fuel Oil and Kerosene; the Census designation “bottled fuels” refers largely to LP gas

Block Group – the smallest census designated area other than for small incorporated areas; many cities contain multiple block groups, which are smaller delineations of blocks which comprise census tracts, some small cities may occupy a small part of a block group however

California Encephalitis – a strain of encephalitis first discovered in California characterized by dizziness, lethargy, headache, fever, seizures, and brain swelling that is transmitted by infected mosquitoes

Cascading Event Matrix – a tool provided by FEMA for ranking hazards in relation to one another including the impacts of one hazard on others or causal relationship between multiple hazards

Cell, storm – a storm cell is the smallest unit of a storm system characterized as an air mass formed by a convective loop

Clandestine – secret or concealed, also related to under-cover law enforcement operations

Coercion – use of force through intimidation or use of power to gain a certain behavior or outcome

Continental climate – a climate region that has cold enough temperatures in the winter to sustain snow and moderate precipitation mainly in the warmer months

Convective (loop or winds) – a meteorological term indicating the transfer of heat in the atmosphere such as by updrafts

Cumulonimbus – clouds that are characterized by large, dense “towers” that are associated with producing thunderstorms, also called Thunderheads or Thunderclouds

Deforestation – removal of a stand of trees

Delimit – marking or setting the outer limits or boundaries of something

Delineate – outline, mark, or define apart from something else, also see Delimit

Demographics – statistical data about a population including age, total population, income, housing status; information found in the US Census

Desertification – the process of an area converting to desert through depletion of vegetation, usually through over-exploitation by animals and / or humans and drought

Disease vector – in epidemiology a vector is a medium or species that carries or transmits diseases, a common disease vector may be mosquitoes

Doppler radar – radar that tracks the speed and direction of something measured

Downburst winds – strong winds that flow downward from cumulonimbus clouds usually associated with intense thunderstorms

Downdrafts – strong downward winds

El Nino – warm ocean currents that develop after December off of the coast of Peru and Ecuador that are sometimes associated with catastrophic storms

Emerald Ash Borer – an exotic invasive species that has been killing ash trees in Michigan, Illinois, Pennsylvania, Ohio, Indiana, and Maryland

Endangered (species) – a species that is determined to be in eminent threat of extinction throughout all or a significant portion of its habitat

Endemic – natural or characteristic, belonging to a particular location

Epidemics – rapidly spreading or extensively found in a population

Epidemiology – branch of medicine dealing with how diseases spread

Erosion – the process of soil or rock being worn away through abrasion, corrosion, or other means

Essential Facility – Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations (FEMA).

Evapotranspiration – the process of transferring moisture from the earth to the atmosphere through evaporation and plant transpiration

Event – the occurrence of a storm or hazard

Fauna – animal life

Flood hazard area – The area shown to be inundated by a flood of a given magnitude on a map; The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies (FEMA).

flood plain – area along a stream or river where flooding is a natural occurrence: flood plains can change over time based on changing conditions upstream such as urban development, dam or levee constructions, and other human actions

Flood zones – Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded) (FEMA).

Floodway – A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided Base Flood Elevations (BFEs), but no floodway has been designated, the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur, or identify the need to adopt a floodway if adequate information is available (FEMA).

Floodway fringe – the area surrounding a floodway

Flora – plant life

Foot and Mouth Disease – a severe and contagious disease found in cows, sheep, hogs, and other hoofed animals “characterized by vesicular eruptions in the mouth and about the hoofs, teats, and udder” (Dictionary.com)

Frost/freeze advisory – National Oceanic and Atmospheric Administration convention of indicating when a frost or hard freeze is possible for an area

Frostbite – injury caused by extreme cold or frost

Fujita Scale – Rates tornadoes with numeric values from F0 to F5 based on tornado windspeed and damage sustained. An F0 indicates minimal damage such as broken tree limbs or signs, while an F5 indicates severe damage sustained (FEMA).

Functionally obsolete (bridges) – bridges that due to changing technology, lack of improvement, or deteriorating conditions are obsolete, this includes width of bridges

Funnel cloud – a rapidly rotating funnel-shaped cloud extending downward from the base of a cumulonimbus cloud, which, if it touches the surface of the earth, is a tornado or waterspout (Dictionary.com).

Gradient winds - horizontal wind velocity tangent to the contour line of a constant pressure surface (or to the isobar of a geopotential surface) at or above 2,500 feet (762 meters) (Allwords.com).

Hacking – breaking into another’s computer illegally, also to skillfully write or alter a computer program

Half-life – the time it takes for one-half of the radioactive atoms of a substance to disintegrate

Hazardous substance – a substance that poses a threat to human, animal, or environmental health

Hazardous Materials – see Hazardous substance

HazMat – short-hand for Hazardous Materials, also used as HazMat Team to indicate the trained professionals that respond to release of hazardous substances

Heat index – a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature

High-risk hazards – hazards that are determined by the Monroe County Planning Committee to pose the most risk to the community and of priority for developing projects or policies to address

Hijack – to forcefully take

Historical Occurrence – the number of times that a hazard has occurred in the community in the past

Horizontal peak gravity acceleration – a measure of how hard the earth shakes in a given area

Housing stock – the collective set of housing units in a given area, often a city or neighborhood

Housing unit – a single collection of rooms occupied by a family or household (conventional or unconventional) such as an apartment, a house, a mobile home, or a condo unit

Hydrocarbon – organic compounds composed of both hydrogen and carbon such as benzene or methane

Hydrological drought – drought which refers to declining surface water and groundwater supplies

Hypothermia – below normal body temperature

Ice jam – an obstruction of a waterway by pieces of ice

Impoundment – a body of water created by an obstruction such as a dam

Influenza – the common flu and variations of the flu

Infrastructure – Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers and regional dams (FEMA).

Intrusion detection system – any one of various electronic means to detect or thwart hacking attempts not unlike antivirus programs

Invasive species – any species of insects, animals, plants and pathogens, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem (invasive.org)

Ionizing – adding an electrical charge to atoms; lightning ionizes the air

IDALS – Iowa Department of Agriculture and Land Stewardship

IDNR – Iowa Department of Natural Resources

Jet stream – fast flowing, narrow current of air located 6 to 9 miles above the earth's surface

Karst subsidence – the effect of water dissolving of particular soils that lead to surface depressions or sink holes

Kniffen Silt Loam – deep, poorly drained soils generally found in loess with varying slopes between 2 to 9%; a National Resource Conservation Service soil category

La Nina – A cooling of the ocean surface off the western coast of South America, occurring periodically every 4 to 12 years and affecting Pacific and other weather patterns (Dictionary.com)

Land cover – the composition of vegetation or human built environment that occupies horizontal space

Land uses – classifications of how land is used in a given space including farmland, forests, water bodies, or urban areas; also a system of classifications used in zoning ordinances

Linguistically isolated” meaning that all members of the household age 14 and above have some difficulty with the English language - def applied to household

Loam – soils composed of a mixture of sand, clay, silt, and organic matter (Dictionary.com)

Logarithmically – mathematical indication that for each increment beyond a set point the number or magnitude increases or decreased significantly

Low-risk hazards – hazards that are determined by the Monroe County Planning Committee to pose a low risk to the community and of low priority for developing projects or policies to address

Lyme Disease – an inflammatory disease caused by tick bites by infected ticks that leads to joint swelling, rash, fever, and sometimes more severe symptoms

Magnitude – size or extent

Malaria – part of a set of tropical diseases characterized by fever, sweating, and chills transmitted to humans by mosquitoes

Maximum Threat – the spatial extent of the community that might be impacted

Median – statistical convention of indicating that half of the data is higher and half of the data is lower than this number; the median number does not necessarily mean the average though it can be the same

Meteorologic drought – drought which refers to precipitation deficiency

Methamphetamine – a central nervous system stimulant used to clinically treat certain conditions but largely known as an illegal drug produced from a variety of chemical inputs that can cause numerous health problems or even death from any given use, including the first

Microbursts – a sudden, violent downdraft of air over a small area. Microbursts are difficult to detect and predict with standard weather instruments and are especially hazardous to airplanes during landing or takeoff (Dictionary.com)

Micro-meteorological – meteorological conditions affecting a small area

Microorganisms – living organisms that require a microscope to view including bacteria and protozoan

Mine subsidence – mine collapses or cave-ins leading to depressions or sink holes on the surface

Mitigation – any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability (FEMA).

Morbidity – the rate of incidence of a disease; proportion of disease in a particular geographic location (Dictionary.com)

Munitions – weapons and military material

NFIP – National Flood Insurance Program; Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 CFR §60.3 (FEMA).



National Registry of Historic Places – listing of historic places including buildings and sites that meet the National Park Services requirements for protection; historic places are proposed by the local community or private owners

Nitrogen oxides – form of nitrogen found in vehicle exhaust

Non-convective winds – winds that do not transfer heat

Notifiable disease – diseases that are required to be reported to public health authorities due to its danger to human or animal health

NWS - National Weather Service

Octanol – a substance composed of fatty alcohol and carbon atoms found in some essential oils and used in perfumes and flavor constituents

Outbreak – a sudden occurrence or manifestation of something; disease outbreaks are when a disease suddenly happens and spreads rapidly

Pandemic (disease) – a disease that is found through a large population, a widespread disease

Percolate – fluid moving through a porous substance such as water soaking into the soil, also indicating activity or movement

Perpetrators – person responsible for undertaking an action, generally a criminal action

Petroleum – flammable, oily, thick, dark-colored fluid from which various fuel substances are produced including gasoline and kerosene

Plume – a space in soil, water, or air containing pollutants spreading from a defined location

Precipitation – rain or snow

Probability (hazard occurrence) – Likelihood of the hazard event, sometimes without regard to hazard history

Proximity – location in relation to something else

Radioactive fallout – radioactive particles themselves or the settling of radioactive particles to the surface of the earth and other landcovers

Reforestation – replanting of trees such as in an area that has been denuded

Rhetoric – use of language to influence others

Rotating blackout – an intentional power outage in order to meet electrical demand when supplies are insufficient

Section – a geographic subdivision under the Public Land Survey; a one-square mile subdivision of a township which is composed of 36 sections, a section can be further divided into “quarters” and “quarter-quarters”

Seismic zone – a designated area where earthquakes and other seismic activity may take place

Severity of Impact – assessment of the severity in terms of fatalities, injuries, property losses, and economic losses

SHMT – State Hazard Mitigation Team

Sniping – shooting a firearm from a hidden location

Socio-economic – pertaining to the interaction between economic and social conditions

Speed of Onset – potential amount of warning time available before the hazard occurs

Strong frontal system – a volatile boundary between two masses of air which may produce strong storms

Subsidence – sinking or lowering to a different level; also known as sink holes

Superfund Sites – a location designated by the Federal Government for toxic waste clean-up

Surface-level ozone – ozone found near the surface of the earth rather than in the upper atmosphere, also known as smog

Tectonic – pertaining to the structure of the earth

Threatened (species) – a species that is determined to be in threat of extinction throughout all or a significant portion of its habitat unless action is taken

Topography – detailed description of a specific place including the shape of the land, where the highs and lows are, and how hills are shaped

Tributary – a creek or stream that feeds into a larger creek or stream or a river

USDA – U.S. Department Agriculture

Updraft – upward current of warm, moist air which can form cumulonimbus clouds

Urbanization – the conversion of agricultural or wild lands to human developed, urban environment

Vaccination – a shot or other delivery method of incapacitated disease to boost immunity to the disease

Vandalism – deliberate or mischievous destruction or alterations of another’s property

Vulnerability – measure of the percentage of people and property that would be affected by the hazard event

Watch vs. warning – The National Weather Service uses a watch to indicate that conditions are right for a given storm to develop while warning indicates that a given storm is in the area; these classifications are applied to tornados, winter storms, thunderstorms, and other weather events

West Nile Virus – a virus that is found mostly in birds but can be transmitted to humans by mosquitoes that manifests as flu-like symptoms, the virus can lead to meningitis or encephalitis; there is currently no known treatment

Wind chill – the apparent temperature experienced by the human body taking into account wind speed and actual air temperature